

Language shaping identity or identity shaping language – a study on sensory sound-symbolism among native Macedonian speakers

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Abstract

A number of different theories exist concerning the origin of words. The aim of this paper is to provide an overview of the phýsis and the nómos/thesis theories about the origin of words, arguments debated even in one of Plato's dialogues - Cratylus. It goes without saying that words show different relations between their form and their meaning. This paper takes a closer look at linguists' divided opinions, presenting and comparing them, setting out from the notion that the forms of the words bear only an arbitrary association with their meaning, and goes on to discuss the notions of onomatopoeia, sound-symbolism and iconicity. Furthermore, this paper presents several studies covering the experimental approaches to sound-symbolism, with special attention devoted to sensory sound-symbolism. The summary of these studies suggests what potential elements of the form of the word might be responsible for the form-meaning relationship in a word. In addition, a small-scale online survey was conducted with the aim to investigate potential sensory sound-symbolism in Macedonian based on the above-mentioned studies, in order to see what similarities and differences exist. Evidence of patterns of non-arbitrariness present in language is analysed through a discussion of the relation between the form, particularly the sounds and the meaning of words.

Keywords: *arbitrariness, sound-symbolism, iconicity, form-meaning relations, ideophones*

Introduction

Communication is the process of sending and receiving messages either through verbal or non-verbal means. Basically, it can be considered an everyday need to share information among people.

Language is the basic tool for communication among people, which can take many forms. As a conscious means of communication, language is exclusive only to humans, and to encompass all of its different forms one can say that language is expressed through *signs*, defined as *combinations of forms and meanings*.

What aroused our interest was the question of how words or signs originated - whether the combination of sounds or letters comprising a word came naturally, by association to a property of the thing described, or whether it was the result of a community deciding how to name certain things. This dilemma is, in fact, the reason behind this paper on the sound-meaning associations in words, as well as to explore further whether an actual link exists between some aspects of the sounds of words and their meanings, or whether it is convention, after all, that is responsible for the meanings of words as we know them.

Theoretical background

Even before the existence of linguistics as a discipline, philosophers were theorizing about the nature of the meaning of words. In *Cratylus*, Plato discusses the origin of language and word-meaning relations through a discussion about the methods and purposes of assigning correct names to things using the voices of Socrates, Hermogenes, and Cratylus (Plato, trans. 1997). Hermogenes speaks in favour of the conventional argument, stating that names of things originate through the process of custom and

common acceptance by a group of people who choose to attribute a particular name to a particular thing. In these lines, Plato proposes a later widely-accepted theory referred to as the *arbitrariness of words*.

Contrarily, Cratylus takes the naturalist point of view and states that the names of things are naturally assigned, and that conventions are not sufficient to give meaning to them. Thus, “the correctness of a name” relies on the fact that names reveal in themselves something about the nature of their bearers, either by encoding descriptions of them in their forms, or resembling them in their pronunciation.

As linguistics developed, linguists had divided views on this topic. At first it seemed as though more linguists supported the conventional argument on the origins of words, which states that the relation between the form and the meaning of the word is conventional, and the forms of the words, which people use to refer to things, are not naturally connected to the things they refer to, but are arbitrarily chosen by custom and common acceptance.

Among the supporters were Aristotle, John Locke and many others, but the conventional theory is probably made most famous by the theory referred to as the *arbitrariness of the linguistic sign*, elaborated by the father of modern linguistics, the Swiss linguist Ferdinand de Saussure. In *A Course in General Linguistics*, he argues that the relation between the form of the word, or what he calls the *linguistic sign*, and its meaning is conventional and arbitrary. He states that “the linguistic sign unites, not a thing and a name, but a concept and a sound-image” (De Saussure 1966: 66). He describes the concept as *signified*, which he considers an abstract notion, while the sound-image is described as *signifier*, for which he does not have in mind the material sound, but rather the “psychological imprint of the sound, the impression it makes on our senses” (De Saussure 1966: 66). The linguistic sign unites the concept (the *signified*) with an acoustic image in the speakers’ mind (the *signifier*). Therefore, the link would be arbitrary because the exact concept can be connected with various different acoustic images depending on the language in which the concept is evoked. The basic premises on which his theory is based are agreement, consistency, and common acceptance.

As the study of linguistics developed, new findings made linguists suspicious of this whole idea, and many began to investigate the so-called *phýsis* argument about the origins of words, and the possible word form-meaning relation. This argument leans on the notions of onomatopoeia and sound-symbolism.

The term *onomatopoeia* comes from the Greek word *onoma*, meaning ‘name’, and *poiein*, meaning ‘to make’. Onomatopoeia is the process of forming words by including sounds that are similar, or refer to the thing that the words describe. *Onomatopoeic words* are words formed by imitating the sound of nature, or words whose sounds or pronunciation suggest the thing itself, such as *splash*, *bang*, *meow*, *buzz*.

De Saussure (1966: 69) disregards these words, stating that they are marginal, limited in number, and possibly arbitrary in nature as, although the dog barks the same everywhere, people use different onomatopoeic words to describe the barking worldwide.

Nevertheless, a group of linguists with opposing opinions, including John Wallis, Charles de Brosses, Charles Nodier, Wilhelm von Humboldt, Otto Jespersen, Dwight Bolinger, Roman Jakobson, among others, decided to investigate the possible relationship between the pronunciation, or the individual sounds, and the meaning of words, and discovered that some words displayed a connection between their form and their meaning. Contradicting the principle of arbitrariness, this entails a possibility that linguistic sounds, such as phonemes, syllables, or tones, can carry meaning in themselves, or be *sound-symbolic*.

Sound-symbolism is a part of the natural argument which indicates that the relation between the form and the meaning of words is not based on convention, but it is, rather, natural, and the meaning of words is suggested by their pronunciation, or the sounds that compose them.

During the Middle Ages and the Renaissance many linguists looked at this issue more closely. John Wallis published a list of English phonesthemes in his book *Grammatica linguae Anglicanae*. His belief is that several combinations of particular sounds indicate their own meaning when used together, which proves to be repetitive in each word containing them; for example, *br-* is suggestive of a violent involuntary crack, as in *breach, break, brook* (Wallis 1653, as cited in Magnus 2013).

In 1836 Wilhelm von Humboldt published his work *On Language: The Diversity of Human Language-Structure and Its Influence on the Mental Development of Mankind*, in which he distinguishes three different types of sound-meaning relations in language: 1) based on acoustics rather than on articulation; 2) based on the imitation of semantic essence by the actual articulation of the phoneme; and 3) based on the linguistic process of clustering.

Dwight Bolinger, author of *The Sign is Not Arbitrary* and *Rime, Assonance and Morpheme Analysis*, argues that a given form is physiologically tied to a given meaning, reflecting on the evidence that frequently similar forms tend to move in the direction of similar meanings (Bolinger 1949).

Sound-symbolism as a term indicates that the mere sound used in the pronunciation of the word carries information about the meaning of the word. The term does not refer only to the meaning of the individual sound and nothing else, but it can also apply to the phonological features of the word, such as the phonemes used, the tone with which the word is pronounced, its syllables, or complex sound structures that activate a range of association in a repeated manner and in that way are related to aspects of meaning. As defined by Hinton et al. (1994), it is the “direct linkage between sound and meaning”. In fact, sound-symbolism is classified into four types based on the degree of linkage between the sound and the meaning of the word: corporeal, imitative, conventional, and synesthetic, also observed by Sapir (1928), and Ramachandran and Hubbard (2001), and later defined as *sensory* by Cuskley and Kirby (2013). Lockwood and Dingemans (2015) regard *sensory sound-symbolism* as a natural connection by which the form of the word imitates aspects of the referent within or across modalities.

The most widely used term to describe sound-symbolic words is *ideophone*, first introduced by Doke – a scholar of Bantu languages. According to him, ideophones are words with an iconic function, which are not limited only to sound-imitation. He describes them as “radical - a word, often onomatopoeic, which describes a predicate or qualificative in respect to manner, colour, sound, state or action” (Doke 1935, as cited in Magnus 2013: 22). Doke distinguished these words from adverbs, since he felt that adverbs describe something only in respect to manner, place, or time.

Often, these words are described as words that bring to mind a vivid impression of an idea, sensation or sensory perception, which frequently, but not necessarily, is evoked through sound. This impression, as previously stated by Doke, can also be conveyed through other modalities, such as colour, smell, movement, shape, action, etc. These words provide a link between language and sensory perception through their characteristic sound patterns, peculiar grammar properties, and sensory meaning.

Dingemans (2012) describes ideophones as marked words, which are actually depictions. Accordingly, ideophones stand out from other words and portray a depiction, that is, they signify their referent in their own special ways. They describe sensory imagery, which helps the reader or listener to create a mental picture of the thing described through the senses. Both internal and external perceptions can be included, such as inner feelings, balance, perceptions of the environment, and anything that can be experienced through the senses.

Sound-symbolism is not limited only to ideophones. Research on the topic also includes relations between individual sounds, and certain combinations of sounds and sensory meaning. John Rupert Firth

coined the term *phonestheme* to describe a sound sequence and a meaning with which that particular sound sequence is commonly associated, such as the association of *gl-* in *glance*, *glimpse*, *glint*, with the meaning of indirect use of the eye (Firth 1930, as cited in Magnus 2013).

Bergen (2004) defined phonesthemes as “frequently recurring sound-meaning pairings that are not clearly contrastive morphemes” as *sn-* in English words such as *snore*, *snarl*, *sniff*, *sneeze*, with a meaning associated with the ‘nose, mouth’.

Methodology

Numerous studies have been conducted in the field of sound-symbolism, which have also investigated the effect that specific sounds have on size, shape, light, motion, which depict sensory sound-symbolism. Examples of such studies will be presented in the following paragraphs as they were taken as the starting point for the small-scale survey that was conducted among native Macedonian speakers.

Sound - size associations

Edward Sapir (1928) is one of the first linguists who demonstrated that there is a real association between sound and meaning. He tested native speakers' intuition with pseudo-words. The participants were given combinations of sounds, such as ‘mal’ and ‘mil’, and were asked to say if those two words meant ‘table’ in a certain language, which one would have been bigger. His findings showed that out of the 500 participants of all ages who took part in the study, 83% of the children and 96% of the adults persistently noted /i/ to be smaller, and /a/ to be bigger.

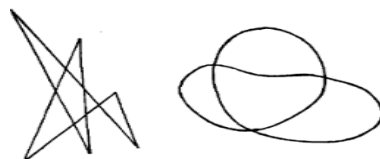
Ohtake and Haryu (2013) tried to analyze vowel-size association by conducting sets of studies with the aim to investigate the influence of the acoustic features of the vowel and the kinesthetic experience of the pronunciation (the articulation of the sound) on the meaning of a word. They conducted two studies testing both factors. The first involved asking the participants to determine the sizes of two disks as quickly as possible. While the participants were doing this speed classification task, they were informed that a task-irrelevant sound might be heard at times. That sound was either the vowel /a/ or /i/. The results showed that the /a/ elicited bigger images, while the /i/ elicited smaller images, as the participants responded more slowly in the incongruent condition than in the congruent or control conditions.

In their second study they tried to see whether these bigger-smaller associations of the vowels could be elicited only with the imitation of the articulation of the vowels /a/ and /i/, that is, by the proprioception of the size of the oral cavity when pronouncing the vowels /a/ and /i/, but without the actual pronunciation of any vowel sound. The participants were asked to do a speeded classification task with the same visual stimuli, but this time while holding objects in their teeth that imitate the size of the oral cavity as when actually pronouncing the vowels /a/ and /i/. They chose an egg-shaped object which imitated the lip shape and resonance space during the production of /a/ – mouth wide open, and tongue placed low in the oral cavity, and a board-shaped object, which, when held, imitated the articulation of /i/ – mouth slightly open along the vertical axis, lips pulled sideways, and tongue positioned high in the oral cavity. This time the participants were not presented with any kind of auditory stimuli. The results indicated that there was no significant correspondence between the size of the disk and the controlled condition of the size of the oral cavity. This means that the proprioception of the size of the oral cavity on its own may not contribute to vowel-size associations. The conclusion of this study is that this effect of associating vowels with object size relies on the acoustic properties of the vowels rather than on their articulation.

Sound - shape associations

Köhler (1947: 224-225) conducted a study in which he tried to classify human experiences, and find the link between the objective experiences and the senses. He investigated the association of sound-symbolism with shapes. The participants in his study were presented with two shapes: spiky or angled, and round (see Figure 1), and two pseudo-words: *takete* and *maluma*, and were asked to associate the shapes with the given words. As Köhler reported, “most people answered without any hesitation”, and the participants, in general, associated *takete* with the spiky form, and *maluma* with the round form.

Figure 1: A screenshot of the original shapes used in the *takete-maluma* study (1947).



Ramachandran and Hubbard (2001), in search for the origins of the evolution of language, adapted Köhler's study using the pseudo-words *kiki* and *bouba*. The results showed that when people were asked to associate the spiky and round forms (see Figure 2) presented with the words given, 95% of them associated *kiki* with the spiky form, and *bouba* with the round form. As a reason for this association they provided the explanation that “the sharp changes in visual direction of the lines in the spiky figure mimics the sharp phonemic inflections of the sound *kiki*, as well as the sharp inflection of the tongue on the palate.”

Figure 2: A screenshot of the original shapes used in the *kiki-bouba* study (2001).



Bremner et al. (2013) investigated whether sound - shape associations previously noted in Westerners are also present in the remote population Himba, a tribe in Namibia, with little exposure to Western culture. Himba have no written language, which made this study the first of its kind, because it helped to remove the orthographic effects and association with the cultural environment of written language in the early life of the participants. Having no written language, these participants were not able to base their decisions by associating the roundness of the shape with the roundness of the letter O, and vice versa for K. Despite that, the majority of the participants still associated *kiki* with the spiky shape, and *bouba* with the round. As such, Bremner et al. (2013) managed to prove that a remote society without a written language also exhibits this effect.

The main conclusion from these studies is that people tend to link sonorants to round shapes, that is, to curviness, while plosives tend to be associated with spikiness.

Sound - colour associations

In 2014 Moos et al. examined the associations between vowel sounds and colours in synesthetes and control participants. *Synesthesia* can be defined as the automatic and involuntary experience of a perception in a modality different from the one stimulated, i.e. a perceptual phenomenon in which stimulation of one sensory or cognitive pathway leads to involuntary experiences in a second sensory or

cognitive pathway such as seeing colours when listening to speech sounds. In their paper, Moos et al. investigated whether the acoustic properties of vowels influence colour perception. The participants were presented with a vowel sound and they had to associate it with the corresponding colour and grey-shade. Their findings suggested that increased F2 (formants)¹ in front vowels like /i/ were associated with the colours yellow and green, while vowels with increased F1, such as the open vowel /a/, were associated with the colour red. Both of these groups chose lighter shades for open (high F1) and front (high F2) vowels.

This indicates that lightness is associated with higher musical pitch and “clearer” timbre (pitch-lightness association). The results applied to both synesthetes and non-synesthetes, but synesthetes behaved more consistently, with the exception in the grey-shade task where the contrast between the consistent behaviour of the synesthetes’ and the controls’ performance was reduced.

This study showed that colour associations were influenced by vowel acoustics, and that front vowels with a high F2 were associated with lighter shades than back vowels. Moos et al. (2014) proved that although synesthetes usually associate letters with colour, they also show systematic influence from the acoustic-phonetic structure of vowel sounds. In the end, they suggest that grapheme-colour synesthesia may also be influenced by the acoustic-phonetic properties of the sounds.

Asano and Yokosawa (2011) conducted an experiment with synesthetes and the hiragana and katakana Japanese writing systems. Their results suggested that both consonants and vowels influence the perception of colours, and that the effect was not due to visual form. The results indicated a tendency to associate back vowels and voiced consonants with darker colours, while front vowels and voiceless consonants were usually associated with brighter colours.

Sound - motion associations

Cuskley (2013) examined the relationship between sounds and motion by using an animated bouncing ball and specifically-designed pseudo-words, which varied in terms of reduplication, voicing, and vowel quality with the motion of a bouncing ball. Participants were exposed to auditory stimuli of these sounds and were asked to alter the speed of a simple animated bouncing ball in order to match the words with the motion, which allowed them to make gradable associations, as well. The words were carefully designed by taking seven voiced/voiceless consonant pairs and combining them with either the front vowel /i/ or the back vowel /u/. They created the words in the following manner: only the voiced consonant sound could vary, not the place or manner of articulation in a word. Following, *kigu* was a valid word, while *kivu* was not, because /k/ and /v/ vary in terms of both their place (*k*: *velar* and *v*: *labial*), and manner (*k*: *plosive* and *v*: *fricative*) of articulation. Mixed voicing was rated as slower than entirely voiced and voiceless words, between which there was no significant difference. Reduplicated consonants were rated the fastest. No significant difference was found between high and mixed vowels, which means that high vowels were not specifically rated as fast, but back vowels were considered particularly slow. In general, it was shown that the reduplication of consonants, together with the alternation of vowels led participants to move the ball faster. However, the study was limited to one particular type of motion, that is, the speed of a bouncing ball (visual motion), a type of bi-directional motion. Participants made the ball go more slowly in response to back vowels, while in response to front vowels and syllable reduplication with vowel alternation, the ball was made to go more quickly.

Study conducted with ideophones

¹ *Formants* are peaks of the sound spectrum. Basically, they are accumulations of acoustic energy at certain frequencies. Vowels are usually distinguished by their first two formants, F1 and F2.

Japanese is one language with a wide use of sound-symbolic words, and it is reported to have an extensive set of ideophones commonly used in natural speech. Therefore, Japanese ideophones were used in numerous studies in order to test sound-symbolism, which helped, in a way, to exclude the specifically-designed maximal differences of the pseudo-words.

Iwasaki et al. (2007), in their studies, used Japanese ideophones (referred to as *mimetics* in Japanese), and they tested whether, and to what extent, English speakers with no prior knowledge of Japanese might sense and appreciate certain dimensions of previously unfamiliar Japanese ideophones. They used ideophones for laughing, i.e. words that mimic voices and are considered most iconic, and ideophones for walking, i.e. words that mimic manner, which are close to being least iconic on the iconicity continuum.

Japanese and English participants were given a list of semantic dimensions and were asked to rate each semantic dimension. Then, the ratings were analysed and compared. There were significant correlations between the ratings for half of the ideophones for laughing between the two groups, and the most highly correlated was *kusu-kusu*, which was rated by both Japanese and English speakers as quiet, restrained, non-resonant laughter produced by a female adult with her mouth shut. The semantic dimension of impressions of the beauty and grace of the ideophones for laughing received the lowest ratings, as the English speakers attributed the opposite meaning of the Japanese speakers. For the ideophones for walking, the Japanese and English participants exhibited fewer correlations, as only seven words out of 28 showed significant correlation between the two groups, and the most highly correlated word was *toko-toko*, rated by both groups as a small person wearing hard-soled shoes, walking quickly and energetically with small strides on a hard, dry surface in an informal manner.

On one hand, the results indicate that there are universalities, or at least some similarity of sound-symbolism to which both English and Japanese speakers are sensitive, and that ideophones for laughing are more iconic than ideophones for walking.

On the other hand, the existence of language-specific sound-symbolism in Japanese is obvious, and this might be attributed to the language itself, as well as the cultural experience. The semantic dimensions of *beautiful voice* and *graceful* were rated completely opposite by the English and Japanese speakers, as the Japanese speakers associated the vowel /e/ with vulgar laughing, while the vowel /u/ was associated with *beautiful voice*, *graceful* and *formal laughter*, which appears to be specific to the Japanese language and culture. Also, the Japanese participants rated words that contained /q/ as less continuous, and words that start with vowels as more *beautifully voiced*, *feminine* and *formal*. The vowel /a/ showed distinctive commonalities by both groups and was rated as *amused*, *cheerful*, *energetic*, *excited*, *good*, *loud*, *nice*, *pleasant voice*, *resonant voice* and *mouth-wide-open*.

The ideophones for walking did not show any common sound-symbolism between the English and Japanese speakers, as only two dimensions, *hard-soled* and *wet surface*, received similar ratings by both groups. The Japanese speakers exhibited several language-specific sound-meaning associations, as they rated words containing /a/ as the most *graceful* and *high-self-image*, and words containing /o/ as the least *graceful* and *high-self-image*.

The results also showed a contrast between voiced and voiceless consonants, as the voiced consonants were related to *big-stride* and *noisy*, and the voiceless consonants to *even-paced*, *feminine*, *formal*, *good*, *graceful* and *high-self-image*.

The findings confirmed the existence of sound-symbolism in Japanese ideophones to which both English and Japanese speakers are sensitive, and also established that sound-symbolism is more evident in words that are high on the iconicity continuum, such as the words for laughing, as opposed to words low on the continuum, i.e. the words for walking. This also indicates that not all ideophones are completely intuitive to speakers of other languages and, according to Iwasaki et al. (2007), it depends on the specific-semantic context in the study, as well as prior exposure to the language and culture.

Results and discussion on the sensory symbolism survey amongst Macedonian native speakers

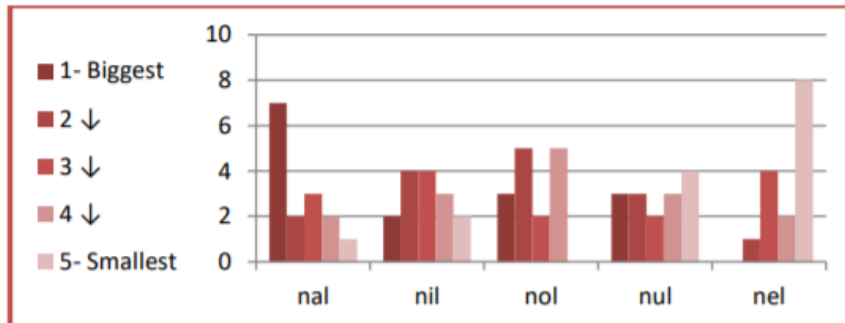
In an attempt to investigate sound-symbolism, we created an online survey² (see Appendix 1) to examine sensory symbolism, i.e. the association of letters/sounds present in Macedonian, with physical size, shape, colour, and motion. We decided to reduplicate the study carried out by Iwasaki et al. (2007) by choosing several of the ideophones used in their study and translating the semantic dimensions into Macedonian to test whether, and to what extent, Macedonian speakers might sense certain dimensions of Japanese ideophones. The participants were also asked to explain their responses.

Concerning the methodology that was employed - the survey consisted of 14 questions, and was conducted online and anonymously. The survey was open, and there were no limits in terms of who could participate. There were 15 participants that responded, all recruited through social media. All of the participants are native Macedonian speakers. The findings will be discussed separately in the following paragraphs. The questions about the explanations of the participants’ choices will be discussed together with the corresponding questions. Also, the findings will be compared to the previously-mentioned findings, in the section presenting the various studies.

Sound - size associations

This question consisted of five pseudo-words designed with the five vowels in Macedonian /a, i, o, u, e/ (/a, u, o, y, e/): *nal, nil, nol, nul, nel*. The participants were asked to imagine that all of these words meant *chair*, and the classroom model of *chair* was taken for comparison, as all of the participants were familiar with its size. The participants were asked to sort these words by size, from biggest (1) to smallest (5):

Graph 1: A graphic representation of sound-size associations in Macedonian.



The findings indicate that there are two notable associations of sounds with physical size. The pseudo-word *nal* was rated as the biggest in physical size by seven of the participants, while the pseudo-word *nel* was rated as the smallest in physical size by eight of the participants.

The participants explained that their choices were mostly based on associations, such as drawing parallels between the similarity in pronunciation and orthography with the English language, i.e. *nal - small*, and *nil - big*, or employing direct associations based on instinct, as participants mentioned that *nol* reminded them of something big, while *nel* of something small. Similarly, the vowels /o/ and /u/ sounded big, while /a/ and /i/ small, according to some participants. One respondent employed association based on similarity in pronunciation with already-existing words and names. Consequently, they rated *nil* as the biggest, because they associated it with the river Nile due to the similarity in pronunciation in Macedonian, while *nal* and *nol* were perceived as more closed during pronunciation,

²https://docs.google.com/forms/d/1_5p4hcvl8UIDtRtR_CLzN7PhV6IIOpGQW_HkfoNYP4/edit?fbclid=IwAR0cjPOhJPUjur24_e2TkZ0j3GAjXjD2HrgNj5gmoi42q-Zk2B8oZ8fdwRo

and, therefore, smaller; *nul* reminded them of the Macedonian word for zero - *nula*, which is of no value, and *nel* was associated with something even smaller than zero.

Others said their decisions were based on the order of the vowels in the alphabet, the openness of the mouth and lip position, as well as the vowel length during pronunciation – for example, they considered /a/ as the most open, as the lips are not touching or near, and, therefore, they said it implies something bigger, while /u/ was perceived as the most close and round vowel, as the lips are the most close to each other as compared to other vowels, and, thus, it was associated with something smaller. Personal opinions on softness, tenderness and balance among the vowels also influenced the participants in their decisions.

In comparison to previous research carried out by Sapir (1928), and Ohtake and Haryu (2013), we may say that, on one hand, some findings correlate with the previous findings indicating that /a/ was rated as having something to do with bigger objects in physical size. On the other hand, in the previous research /i/ was associated with smaller objects, while in Macedonian we can see that /e/ was perceived as having something to do with small physical size.

Sound - shape associations

Two questions examined possible associations between sounds and shapes. Namely, participants were asked to associate the shapes and the words used in Köhler's study (1947), and the ones used in Ramachandran and Hubbard's study (2001), i.e. the angular, spiky shape and the curvy, round shape with the words *takete* and *maluma*, and *kiki* and *bouba*, respectively, all of which were transcribed in Macedonian.

The findings indicate that all 15 participants associated the word *takete* with the angular, spiky shape, and, consequently, *maluma* was unanimously associated with the curvy, round shape. The findings involving the words *kiki* and *bouba* indicate that three of the participants associated the angular, spiky shape with the word *bouba*, while 12 of them with the word *kiki*, and vice versa.

The participants' explanations of their choices for these questions were very similar, and they will be discussed together. Most of the participants explained that the pronunciation of these words and the written shapes of the letters influenced them in the process of making the association. Also, they said they were guided by the same instinct and employed the same logic when they responded to these questions, i.e. correspondence of the appearances of the shapes and the pronunciation of the words, according to which *takete* and *kiki* sounded and looked more angular, spiky, and sharp. One of the participants said that *takete* reminded them of a Chinese word, which has something to do with the Chinese³ art of paper folding referred to as *origami*, and, therefore, they associated it with the angular, spiky shape. On the other hand, *maluma* and *bouba* looked and sounded to the participants as corresponding to something curvy, round, soft, and were even compared to a balloon by two participants, and a tulip by one - shapes that, according to them, subconsciously helped them associate it with the curvy and round shape. Other means they based their choices on were coincidence and elimination.

The remaining three participants, who responded in the opposite manner, stated that the word *bouba* sounded sharper and more complicated to them, and, as a result, they associated it with the angular shape, which they also considered more complicated, while the word *kiki* looked and sounded simpler, and, based on its simplicity, they associated it with the form without any sharp angles.

The results are in line with the previous research carried out by Köhler (1947), and Ramachandran and Hubbard (2001), whose findings also suggest that most of the participants associated the words *takete* and *kiki* with the angular, spiky form, and *maluma* and *bouba* with the curvy, round form.

³ Note: in fact, it is not a Chinese art, but rather a Japanese one.

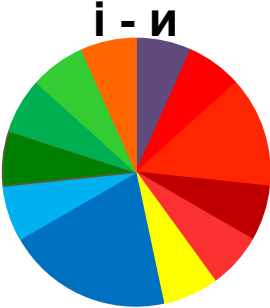
Sound - colour associations

In order to investigate whether some colour can be associated with a particular letter or sound, the following question required the participants to associate the vowels in Macedonian /a, i, e, u, o/ (/a, u, e, y, o/) with a particular colour or shade of colour. Furthermore, three pairs of voiced-voiceless consonants: /b-p; g-k; z-s/ were included. The results are presented in the pie charts that follow:

Pie chart 1: Sound-colour associations for /a/



Pie chart 2: Sound-colour associations for /i/



Pie chart 3: Sound-colour associations for /u/



Pie chart 4: Sound-colour associations for /o/



Pie chart 5: Sound-colour associations for /e/



The participants associated vowels with different colours based on their perception and previous experience. Including the different shades of the same colour, we may say that seven of the participants associated the vowel /a/ with the colour red, whereas five associated /i/ with it; /o/ received the same rating for white and yellow by four of them, /u/ was associated with the colour green by five of the participants, and /e/ was associated with yellow, green and blue by four participants respectively.

Previous research indicates that open vowels such as /a/ were rated as containing a high proportion of red, which is in line with the result from the association of the Macedonian vowel /a/, in which seven of the participants associated it with red. The findings from the survey also indicate that five of the participants associated the colour red with the front vowel /i/, while in the study carried out by Moos et al. (2014), it was rated as containing a high proportion of green, a colour which in our survey received rates by only three people. The research carried out by Moos et al. (2014) stated that front vowels are usually associated with yellow or white, which, when compared with the findings from our survey, indicates that only the front vowel /e/ in Macedonian shows some association with yellow by four of the participants, while only one of them associated it with white.

Unfortunately, the findings from this question are fairly inconclusive as the participants were given liberty to choose whatever colour they thought could be associated with the certain vowel, and limitations were not set in their choices.

The following pie charts contain results of sound-colour association for three voiced-voiceless pairs /b-p, g-k, z-s/:

Pie chart 6: Sound-colour associations for /b/



Pie chart 7: Sound-colour associations for /p/



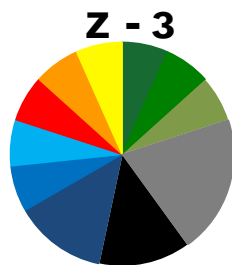
Pie chart 8: Sound-colour associations for /g/



Pie chart 9: Sound-colour associations for /k/



Pie chart 10: Sound-colour associations for /z/



Pie chart 11: Sound-colour associations for /s/



Three pairs of consonants were chosen based on their voicing, voiced versus voiceless, /b-p/, /g-k/ and /z-s/. The voiced consonant /b/ was rated blue by four of the participants, while its voiceless counterpart /p/ was associated with orange by six of the participants. The voiced consonant /g/ was rated green by three, while the voiceless consonant /k/ was also rated green by four of the participants. The voiced consonant /z/ was rated blue by four of the participants, while its voiceless counterpart /s/ was associated with yellow by five of the participants.

According to Asano and Yokosawa's study (2011), voiced consonants were associated with darker colours, while voiceless consonants with brighter colours, which is in line with the findings presented in the pie charts, as the voiced consonants received lower ratings for lighter shades of colours than the voiceless consonants.

The reasons behind the participants' choices concerning vowel/consonant associations with colours will be discussed together, as they showed great similarity. Most of the participants explained that their decisions were based on the pronunciation of the sounds. This means that the letter/sound itself reminded them of a certain colour. However, some of them said they chose a colour corresponding to a certain sound by means of association and correlation with already-existing concepts and previous memories. This means that a particular sound reminded them, personally, of a particular word or a memory with a particular meaning, which had some significance in their lives. The meaning of that particular word or memory influenced them in choosing the colour associated with the sound, which means they were influenced by that word, and not by the letters/sounds themselves. One respondent explained how they based their decision on association and the importance of the meaning of the word before they associated it with a particular colour. The examples they provided were the following: /e/ - light = the colour white, and also energy and a nice sunny day = yellow; /a/ - a fallen leaf during the fall = yellow; /i/ - a smile and nature = light green, /z/ - snake = black; /s/ - crescent = yellow; /k/ - whip and violence = light yellow; /g/ - based on memories of the game called *hangman*, whose form is the same as *g* in Cyrillic (Г), and which was always played with a blue pen = blue; /p/ - the cry of a little child = grey; /b/ - based on association of an old well with moss around it = blackish-green.

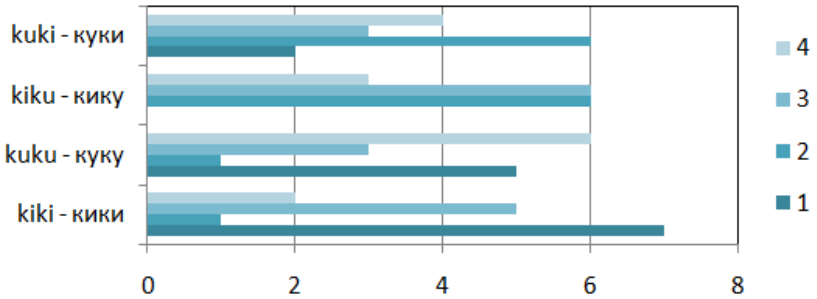
Some of these associations were obviously made in Macedonian, as when the words are translated, the initial letter of the word is the same with the sound, such as /e/ – energy (*energija*), /z/ –snake (*zmija*), /s/ – crescent (half-moon/in the shape of a crescent), whose colour is usually presented as yellow, /k/ – whip (*kamshik*), whose colour is usually yellowish, /p/ – cry (*plach*), the colour grey might be due to the fact that crying is usually associated with sadness, /b/ – an old well with moss around it; moss would probably associate a blackish-green colour.

Sound - motion associations

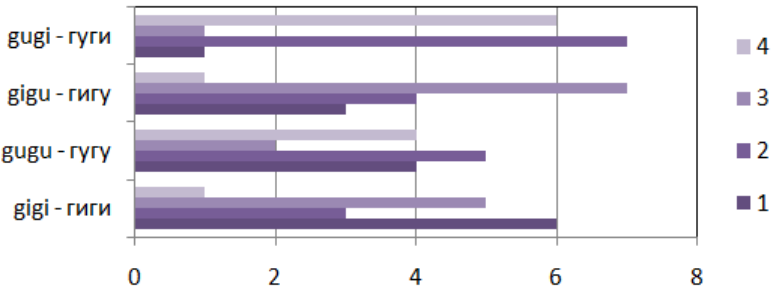
Associations between sound and motion were explored in Cuskley's study (2013). Here, the participants were asked to imagine that the pseudo-words used in the survey mean *motion of a car*. As

such, 16 pseudo-words were transcribed in Macedonian, as they met the criteria established in Cuskley’s study (2013), according to which only the voicing of the consonants could vary. The voiced-voiceless consonant pair /g/-/k/ (plosives, velar) were used, combined with the vowel /i/ (front, high, rounded) and /u/ (back, high, rounded). The task involved rating the speed of a car presented by those 16 words on a scale from 1 to 4, where 1 = the fastest and 4 = the slowest motion of the car.

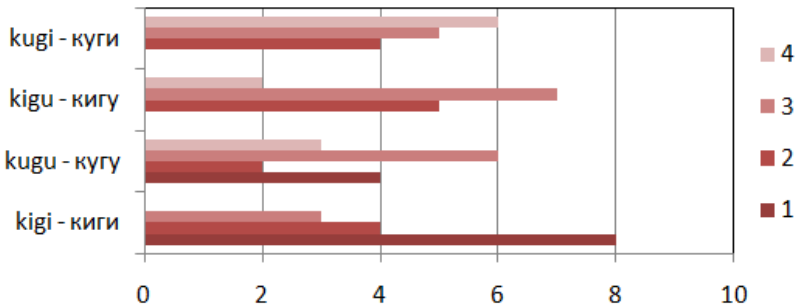
Graph 2: A representation of the findings from the sound-motion associations for the pseudo-words with a reduplicated consonant /g/.



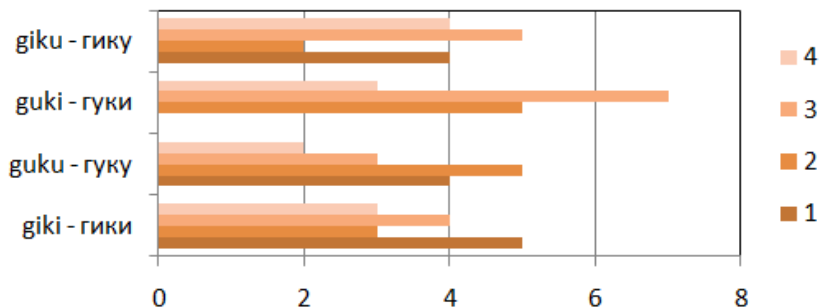
Graph 3: A representation of the findings from the sound-motion associations for the pseudo-words with a reduplicated consonant /k/.



Graph 4: A representation of the findings from the sound-motion associations for the pseudo-words with the mixed voiceless-voiced consonants /k/-/g/.



Graph 5: A representation of the findings from the sound-motion associations for the pseudo-words with the mixed voiced-voiceless consonants /g/-/k/.



Mixed voicing (k/g) and the reduplication of the vowel /i/ (*kigi*) was rated the fastest by eight of the participants, voiceless consonant reduplication (k/k), together with the reduplication of the vowel /i/ (*kiki*) was rated the fastest by seven, voiced consonant reduplication with the reduplication of the vowel /i/ (*gigi*) was rated the fastest by six, and, finally, mixed voicing (g/k) with the reduplication of the vowel /i/ (*giki*) was rated the fastest by five, as was voiceless consonant reduplication with the reduplication of the vowel /u/ (*kugu*).

In general, the reduplication of the vowel /i/ was rated faster than the reduplication of the vowel /u/, which was still rated fast, but not as fast as the words with /i/. Voiced consonant reduplication was rated the fastest if we consider 1 and 2 as fast dimensions in the survey, then voiceless consonant reduplication, and mixed voicing (g/k) were rated equally fast, and mixed voicing (k/g) was generally rated the slowest. Mixed vowels in the order /u, i/ were rated the slowest, both when combined with reduplicated consonants and with mixed consonants.

Most of the participants said they based their ratings on the sounds of the words when pronounced. Some of them said that the vowel /i/ sounded faster, while the vowel /u/ sounded a bit slower to them, and, also, the voiceless consonant /k/ sounded faster to them than the voiced consonant /g/. Furthermore, the participants said that the words containing reduplication of vowels sounded faster than those containing mixed vowels. One respondent said they rated them based on a personal balance of the vowels in regards to louder or quieter combinations, as well as intuition. Another respondent stated that they were influenced by the openness of the lips during the pronunciation of the vowels, according to which the lips are close and nearly touching for the vowel /u/, which made them rate it slower, while the lips are not touching or near for the vowel /i/ in comparison, which made them rate it faster. Among the participants, one respondent said that they imagined the sounds that a car made as being produced by the pseudo-words and based their opinion on sounds, i.e. the ones that sounded faster were rated faster, and vice versa.

In comparison to previous research conducted by Cuskey (2013), we can say that mixed voicing was rated faster, especially the combination k/g, and generally reduplications of voiced consonants were rated faster than voiceless, but without any huge difference. The vowel /i/ was rated as faster than the vowel /u/, which was rated slowest in combinations with both reduplicated and mixed consonants, which is in line with the previous findings according to which the back vowel /u/ was considered slow.

Semantic dimensions

The last two questions were used to test whether Macedonian speakers could sense some semantic dimensions of Japanese ideophones. Despite the fact that Japanese is a distant language to Macedonian speakers, we were curious to see if the sole sound of these ideophones would be able to bring to mind a vivid impression of an idea, a sensation or some sort of a depiction in the mind of the participants with

no previous knowledge of the Japanese culture and language, which might help them associate the right semantic dimension to the words. We also wished to see to what extent native Macedonian speakers would be able to sense the semantic dimensions, and whether they would also be sensitive to the same universalities as the Japanese and English participants in Iwasaki et al.'s study (2007). In total 12 ideophones were used, borrowed from the list used by Iwasaki et al. (2007) - six ideophones for laughing, and six for walking.

Unfortunately, this question was largely misunderstood by the participants; some of them only chose one dimension, others included only a few, or wrote a dimension of their own. Therefore, it was hard to reach any definite conclusions in regards to this question, and the ratings that will be presented include only semantic dimensions that were chosen by at least three of the participants, i.e. a semantic dimension will be included only if at least three people out of 15 rated the semantic dimension for that particular word.

Ideophones for laughing

A. *kusu-kusu* was rated as a formal (3), purposeful (3), good (3), nice/kind (3) laughter produced by one person (3), a female⁴ (3) with a beautiful voice (3).

Original meaning: the manner of laughing to oneself.

B. *kera-kera* was rated as formal (3), nice/kind (5), loud (4), momentary (3), laughter produced by someone who is amused (3) and has a pleasant voice (5), but is laughing without energy (3).

Original meaning: the sound of high-pitched, unrestrained laughter.

C. *kara-kara* was rated as unrestrained laughter (4) produced by someone who has a pleasant (4) and beautiful (3) voice.

Original meaning: the manner of laughing loudly but without malice.

D. *ahaha* was rated as loud (9), energetic (5), unrestrained (4), cheerful (3), continuous (4) laughter of many people (4), who are amused (5), and laugh with their mouth wide open (6).

Original meaning: the sound of loud laughter.

E. *ehehe* was rated as cheerful (4), purposeful (4), restrained (3), nasty/mean (3), laughter of one person (3), a young child (4).

Original meaning: the sound of soft laughter (usually embarrassed or lascivious laughter).

F. *uhuQ* was rated as excited (3), restrained (3), involuntary (3), low pitched (3) laughter produced by a young child (3), or adult (3), with mouth shut (4).

Original meaning: the sound of laughing, or chuckling, to oneself briefly and softly.

The participants explained that they rated the dimensions based on how they sounded to them when pronounced. They said they used their instinct to rate a dimension, as well as by pronouncing the words; according to their intonation, they imagined how the words would sound, and what their intention might be. Two participants mentioned creating mental pictures of the meaning of these words when they read or tried to pronounce them, based on which they rated the dimensions. One person mentioned that they took into consideration the vowels and their strength when they rated the dimensions. Also, association was employed by one person, who stated their answers were based on the way in which their friends and people around them laugh, and, also, they were influenced by the softness or roughness of the words when pronounced.

The only possible conclusion that may be made with the previous study is that /a/ was also rated as *amused, cheerful, energetic, pleasant voice, nice, and mouth-wide open*.

⁴ Though the semantic dimension is *feminine*, the term *female* is used in the study carried out, as well as in the conclusions from the analyses.

Ideophones for walking

A. *toko-toko* was rated as quiet (6), fast (3), steady (4), energetic (3), feminine (3), clumsy (3), even-paced (4) walk of a small person (3) who is wearing hard-soled shoes (4), and is walking with small strides (4).

Original meaning: the manner of walking, trotting, etc., with quick, short steps.

B. *sorori-sorori* was rated as a quiet (3), good (4), graceful (6), purposeful (3), steady (4), long distance (3), walk of many people (4) or a young child (3) on a hard surface (ground/floor) (4).

Original meaning: the manner of moving slowly.

C. *bura-bura* was rated as a noisy (4), fast (4), informal (3), clumsy (3), aimless (3), uneven-paced (3), walk of many, big people (5), possibly a young child (3) on a wet surface (ground/floor) (3), who is/are walking with big strides (3).

Original meaning: the manner of walking around leisurely.

D. *tuka-tuka* was rated as a slow (3), steady (4), clumsy (3), recreational (3) walk on a hard surface (3) wearing hard-soled shoes (4).

Original meaning: the manner of walking toward someone briskly and with determination.

E. *noso-noso* was rated as a steady (5), aimless (3), good (3), energetic (4), feminine (4) walk on a soft surface (4).

Original meaning: the manner of moving slowly and lethargically.

F. *dosin-dosin* was rated as a masculine (4), noisy (3), energetic (4), clumsy (3), even-paced (3), long distance (4), walk of many people (3) with a high self-image (5) on a dry (3), hard surface (ground/floor) (3).

Original meaning: loud, resonant sounds as of a very large person or animal walking or stomping heavily.

The participants responded that they rated the words based on how they sounded to them when pronounced, the rhythm that the words produced, and whether they instinctively sounded soft or rough based on their own criteria for these dimensions. Several people stated that when they read and pronounced the words, mental images were created in their mind, depicting people walking. This means that the participants imagined people, and the way in which they walk based on the sound of the words. One respondent stated that they rated the words based on associations. For example, *bura-bura* reminded them of the Macedonian word for *storm* (*bura*); *tuka-tuka* reminded them of the steadiness and inability to move or do anything, meaning one is stuck in one place for a longer period of time based on the Macedonian word for here – *tuka*, the association presented was '*tuka pa tuka*'; *toko-toko* reminded them of something happening on a daily basis; *noso-noso* of some word taken from baby talk, and *sorori-sorori* of a person who does not know what to do with their life but does not take any action to change that.

Several ratings showed an overlapping in the semantic dimensions rated in the previous research. For example, *toko-toko* was rated by the Macedonian, English, and Japanese participants as a small person wearing hard-soled shoes, walking quickly and energetically with small strides, based on the study carried out by Iwasaki et al. (2007). As opposed to Japanese, where /o/ and voiced consonants were rated as low self-image, the ideophone *dosin-dosin* received ratings for the opposite dimension in the survey, i.e. high self-image. The same ratings with the previous research were also perceived for the voiced consonants, as in the ideophones *bura-bura* and *dosin-dosin*, which were related to big-stride and noisy, as well as the voiceless consonants, as in *toko-toko*, which showed correspondence in the ratings of the semantic dimensions even-paced and feminine, and *sorori-sorori* for the dimensions good and graceful.

Conclusion

Both theories (the theory of arbitrariness and sound-symbolism) about the origin of words have valid points. The *theory of arbitrariness*, as such, suggests no relation between the form of the word and its meaning, which means that people have tailored words to fit their own needs, and those words reflect their environment and culture. For example, many nations have vocabularies associated with certain trades that are non-existent in other environments and hard to translate accurately. Furthermore, Eskimos have 50 words for *snow*, while Americans have 13 different words for one type of *sandwich* – such as *submarine*, *hoagie*, *hero*, and so on.

However, after the arguments, explanations and evidence provided by those linguists who support the *sound-symbolism theory* as evidence of form-meaning association, we can conclude that there are indeed words that reflect meaning through their form, some in its entirety, while some exhibit only hints that help the user to decipher the meaning of words. Such is the case, for example, of words that exhibit relative iconicity, such as phonesthemes and ideophones.

Even though Macedonian is not one of the languages that have ideophones in their vocabulary, we believe that everyone has, at least once, experienced the vividness of some word, or its performance, as Dingemans (2012) describes it. Moreover, the native Macedonian speakers who participated in the survey also reported creating mental images and imagining the ways in which people walk while mapping the semantic dimensions for the ideophones for walking. The findings from these two questions indicate that the participants were also able to sense some semantic dimensions, which were referred to as universal between the English and the Japanese participants in the study carried out by Iwasaki et al. (2007). We cannot discuss the culturally-specific dimensions of Macedonian since the participants did not rate each semantic dimension, and more data is necessary to make definite conclusions.

The given summary of several studies, as well our study, show, in a way, consistent results, as low back vowels and voiced consonants are frequently linked with words that convey some sort of meaning that has to do with roundness and darkness in terms of colour. Back vowels are also associated with slowness in motion, as compared to front vowels, which are related with quickness. On the other hand, high front vowels and voiceless consonants are present in words whose meaning is associated with spikiness and brightness in colour.

In terms of previous sound- and (physical) size-associations, it was discovered that low and back vowels are usually associated with big objects, while high and front vowels with small objects.

In terms of our study, the findings are similar, with the exception that the vowel /a/ in Macedonian, which was associated with bigger objects, is classified as a low (according to the position of the tongue in the oral cavity during pronunciation), middle vowel (according to the movement of the tongue during pronunciation), and, also the fact that the Macedonian respondents associate the vowel /e/ with smaller objects, which, in turn, is classified as a middle, front vowel. Both vowels /a/ and /e/ are classified as unrounded in Macedonian and in English.

In spite of all these sound-meaning associations, it has been proven that some aspects of the meaning of words are language-specific and culturally-bound.

After taking into consideration all the information presented, we, personally, believe that the semiologist Charles Sanders Peirce (1955) is the one that might have proposed a reasonable solution, i.e. the co-existence of arbitrariness and sound-symbolism in words. This would mean that a word can be both arbitrary and sound-symbolic at the same time; these two concepts would simply operate on a different level in a word, which would give hints to the language user about the meaning of words, but also, at the same time, would require them to have some prior knowledge of the language in order to fully grasp the meaning of the word.

Finally, our belief is that words exhibit different levels of iconicity, some are simply more iconic than others.

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