

Sound Symbolism in the Turkish Tongue

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1 October 2021

Abstract:

Ideophones (marked, sound symbolic words depicting sensory imagery) are an increasingly described feature of many languages, across families (Dingemanse, 2019). As many languages lack ideophones as a richly developed word class, researchers are starting to investigate the cross-linguistic iconicity of these words by testing their guessability.

Theoretically, cross-linguistic guessability could serve as some measure of iconicity, resemblance of form and meaning. If their meanings are only accessible to those who have learnt the language, there is no distinction between ideophones and other words in any given language, in terms of iconic properties.

In Dingemanse et al.(2016), native Dutch speakers were asked to guess ideophones in one or several ideophone-rich languages in an experimental setting. Using two-way forced-choice experiments wherein participants heard ideophones from various languages, participants guessed their meanings slightly above chance. Thereby they were able to find evidence for weak cross-linguistic iconicity.

Here, I continue this line of enquiry by using a four-way forced-choice task using ideophones gathered from a list of Turkish ideophones (Baturay, 2010). 200 native English-speakers completed a 20-question experiment, administered online via Qualtrics, in which they were told to guess which of four definitions matched the Turkish word with which they were presented. One of the four options was correct, accompanied by three foil options. These incorrect options consisted of the 'opposite' meaning of the correct one (e.g. the correct meaning is 'something blazing' and one foil would be 'something freezing'). The other two foils consisted of a semantically unrelated meaning ('a gentle smile') and its opposite ('a harsh frown'). All ideophones were played once and participants could only hear the word and were not exposed to any items in written form.

The preliminary results indicate that some ideophones were highly guessable whilst others were not. This calls into question whether iconicity is a necessary property of an

ideophone or whether or not 'ideophones' are a word-class, but a word-class with a diverse cognitive profile. These preliminary results also question whether there are multiple levels of iconicity within and amongst language systems.

1. Acknowledgments

It is a great undertaking to thank all those worthy of my gratitude when writing this thesis, I would like to thank Mark Dingemanse, the primary supervisor of this thesis, for taking me on as a student at very short notice after circumstances forced me to change topics from the cognitive basis of tone in Limburgian/Limburgish to another topic of interest - iconicity in language. I would like to thank Pieter Seuren for his continued support for me as a person and as a scholar. He has been a great mentor. Though his views do not line up with my own specifically related to this field of enquiry, his criticism has been valuable in my thinking, particularly related to what this study I conducted means and what its import is. Jarret Geenen deserves many thanks for being a supporter and critic in the best sense of both words, allowing for some good chats and challenging thoughts. To Renuka Raghavan and Hande Sodacı for help with graphs in R, to Afreen Khalid and Mat Azevedo for being peer readers, to Hande Sodacı and Christoph Aurnhammer for support. I greatly appreciate all comments on the study I received at the 7th International Symposium on Brain and Cognitive Science and the 2021 UK Cognitive Linguistics Conference.

2. Introduction

Human languages come in a variety of forms, but are these forms arbitrary? This study seeks to address one tiny fragment of that topic: namely, potential transcultural, cross-modal correspondences between sound and meaning as experienced by the human mind. Across cultures, are there utterances that bring with them certain feelings, emotions, or other vivid experiences from the sound alone? Here I address this by studying the cross-linguistic guessability of certain groups of words deemed to be 'iconic' - having some component of their meaning inherent to their properties as words.

Starting from the idea that iconicity should facilitate communication (Kelly et al., 2009) (Kelly et al., 2017), it follows that iconic words should be more easily communicated and that those ignorant of a language should still be able to guess the meaning of iconic words more than other words. Some evidence for this has already emerged in relation to a class of words (ideophones) in Dingemanse et al. (2016) and this thesis seeks to investigate if the same class of words in Turkish would also be guessable by speakers of another language (English here).

Before returning to these queries, it will be useful to give a brief overview of the language with which I'm testing these properties, namely Turkish. My research question is whether or not native-speakers of an unrelated language can correctly indicate the meaning of certain Turkish utterances (ideophones), despite having no knowledge of Turkish whatsoever. I chose Turkish for reasons of accessibility (many speakers at the university where this work was conducted and therefore many advisors on all things Turkish-language) and due to the lack of work done on this widely-spoken language, and because certain types of utterances (ideophones, explained later) were present in Turkish in abundance. I shall then provide the reader with a romp through the history of iconicity research in the field and in the lab. Once the topic has been introduced, I shall detail the experiment I conduct for this thesis and then bring everything back together into a wider discussion, finishing with some avenues for future research.

3. Iconicity

Linguistic iconicity is the idea that words paint pictures (icons) of ideas, that they have motivated sound-meaning correspondence that is not reliant on being specific to a certain linguistic system. In short, these lexical items are not arbitrary in the relationship between their form and their meaning. This non-arbitrariness has long been discounted as a potential feature of language, with the focus instead being on language as a system of arbitrary signs (Whitney, 1867, de Saussure, 1916, Hockett, 1960, Pinker & Bloom, 1990). Instead, linguistic symbols were long seen as fully arbitrary. Words were thought to only carry meaning by convention within a community of speakers and are composed of smaller phonemic units that do not carry meaning themselves (De Saussure, 1916). However, there has long been acknowledgement of sound-to-sound iconicity, such as onomatopoeia in which words mimic the natural sounds they represent. There is a long history of speculation around non-arbitrary aspects of language (Lévelt 2013; Dingemanse, 2018). Words like cock-a-doodle-doo (English), kikeriki (German) are subject to the phonological rules of the language in question while bearing a likeness to the sounds for which they stand (Perniss, Thompson, & Vigliocco, 2010). However, there is also a history of more serious speculation, investigation and experimentation in the domain of sound symbolism. To slightly simplify the narrative, one can separate the research into three broad categories: non-systematic speculation, field-research on living languages and experimental work.

The scientific study of sound symbolism has been a part of the history of western psycholinguistic tradition since Wilhelm von Humboldt (Lévelt, 2013). Wilhelm Wundt proposed sound-symbolic stages in language evolution: *Lautgeberden*¹ (phonetic gestures) and *Lautmetaphern* (phonetic metaphors) (Lévelt, 2013). These two phenomena were considered extinct, but Wundt also described accounts of ideophone-like phenomena as *Lautbilder*, a term later taken-up by early ideophone researchers (Dingemanse, 2018).

¹ *Lautgebärden*

West Africa was an early hotbed for research into sound symbolism and ideophones. Dietrich Westermann worked on a number of West African languages, most notably Ewe, a language spoken in today's Togo and Ghana. In his grammar and dictionary of the Ewe language, Westermann described a class of words he deemed *Lautbilder* (as had Wundt) which are some of the most engaging early descriptions of ideophones (Dingemanse, 2018). A number of other traditions of ideophone description emerged in work done on other parts of the world, such as southern Africa, Southeast Asia, Japan and South America (see Dingemanse, 2018 for a review of the literature).

Sound symbolism's experimental study commenced around 1929 with such figures as Wolfgang Köhler. Köhler's work is particularly interesting as a re-branding of the work would ultimately give its name to cross-modal association effect; the kiki-bouba effect, after Ramachandran and Hubbard's 2001 paper. However, psychological experiments have found a relationship between form and meaning (Köhler, 1967, Ramachandran & Hubbard, 2001). These studies were about pairing words and objects and looking for non-arbitrary patterns (allegedly round words like maluma/bouba being paired with round shapes, etc). Vaguely-reported results indicated that there was indeed a trend.

A number of Westermann's proposals were tested by Eli Fischer-Jørgensen (1978) on Danish, finding in two separate experiments in two separate years with 99 Danish phonetics students, that her phonetics students matched adjectives to vowels in a way strikingly similar to the 'way the vowels are used in the West African languages. They were presented with 'light' and 'dark' vowel groups and had to match pairs of Danish adjectives to them.' Fischer-Jørgensen reported that "79 to 98%" of her students "were in agreement with the West Africans" regarding sound symbolic mappings, theorising these mappings may be universal.

The bulk of experimental work on ideophones and iconicity has been conducted on vanishingly few of the world's languages. For 'sound symbolism this has largely been work on English and/or Standard Average European (Lockwood & Dingemanse, 2015). For ideophones,

Japanese is strongly represented in the experimental world, demonstrating that word-learning is greater for ideophonic/iconic words than for non ideophonic/iconic words (Yoshida, H., 2004, Kantartzis, 2011). Japanese was also present in the study by Dingemanse et al. (2016), though the experiment added Korean, Ewe, Siwu and Semai. This study, as well Fischer's work on Danish), does diversify this sample considerably. My choice of Turkish adds to this effort to bring about more diversity in the experimental study of ideophones. As already detailed, Turkish is the most spoken of these languages and the easiest to both record and cross-reference with native-speakers. All these factors converge on it as a perfect candidate for this study.

Having laid out the background, the goal of the present study is to answer the following question: Would English native speakers faced with Turkish ideophones be able to correctly identify the correct meanings of the 20 ideophones (above chance)? A significant result would lend evidence to the theory that ideophones have cross-linguistic, as well as language-specific properties.

While the view that linguistic symbols are fundamentally arbitrary still has a strong hold on mainstream linguistics, many researchers challenged that view and described different aspects of motivated form-meaning mappings across languages and levels of linguistic processing. On the lexical level, ideophones, words which represent all sorts of real-world experiences, have been found to exist in a wide array of typologically and 'genetically' distinct languages. Scientific thinking about iconicity, writ large, form three major categories, as laid out critically in Dingemanse et al. (2019)

- 1) Iconicity as a discrete property that is present or absent
- 2) Iconicity as semiotic relations that come in kinds
- 3) Iconicity as a scalar substance that comes in degrees

Any construal of iconicity as an all-or-nothing property is a bit of a red herring (Dingemanse et al., 2020), since the work done on natural languages recognises ideophones as words. Being words, ideophones are to some extent language-specific. They do in fact follow the phonetic patterns of the languages of which they are a part.

For instance, Turkish ideophones still fit into Turkish phonology as opposed to Dutch or Japanese phonology. To the extent that they may use their particular phonology as part of the perceptual analogies between aspects of form and aspects of meaning, they may or may not be noticed by people who don't share the same phonological system. Ergo, there is to expect some degree of variation in how people construe and recognise iconic mappings.

That should indeed account for some variation between otherwise equivalent iconic items. The core aspect of these items should indeed be recognisable across all systems of the same type and beyond (spoken:spoken, sign:sign, but also, theoretically sign:spoken and spoken:sign). Here Turkish and English serve as the two spoken systems. There should be good reason to assume that English speakers will indeed guess the correct meaning of Turkish ideophones. This is not a blanket statement, but rather one that needs to be nuanced. When I write that these items should be guessable, I mean correctly indicated above statistical chance.

4. Ideophones

Some words are often said to be iconic or sound symbolic (also echoic and mimetic). Chief amongst these are ideophones. Ideophones are 'marked words that depict sensory imagery found in many of the world's languages' (Dingemanse, 2012). Ideophones are marked. They depart from the normal lexical patterns of a language: they stand out. The literature on ideophones is replete with remarks on their salience (Dingemanse, 2018). They are salient in their phonology, deviating from the norm within the rest of a language's system. What is perceived as 'marked' is language-specific, but that ideophones are marked is apparently universal (Dingemanse, 2012).

Also notable in Dingemans's working definition is that ideophones are words. These words follow convention and have specific meanings, just like all other words. They are to a large extent conventionalised lexical items and this fact may clarify why they frequently appear to have language-specific characteristics.

Depiction is another key aspect of ideophony. These depictions are of sensory imagery. Examples of this depiction include words like the Japanese *doki doki* (ドキドキ). This ideophone depicts the sound of the heart beating in this state of dual arousal, excitedness/dread (used in situations where one is both looking forward to something but also considerably nervous). However, the meaning of the ideophone is not 'heart-beat,' even though the meaning allegedly relies on the receivers' mental link between the sound of the heart-beat and the lexical item *doki doki*. One could postulate this link being formed by the rhythm of the constant-vowel interaction with [d] and [k] resembling the beating of the flustered heart.

Reinforcing the point that these are language specific forms of iconicity, Korean has a similar but distinct ideophone with a similar meaning of 'pounding (heart)': *dugeundugeun* (두근두근). [d] remains the same, but [k] is in this instance [g] and *dugeundugeun* does not end in a vowel, the way it does in the Japanese example. The two languages share aspects of both form and meaning in this example.

This is then precisely the question that arises: It is conceivable that speakers of other languages also perceive that link between a heart-beat and *doki doki* per se and that it would help the speakers to more easily understand the meaning of such lexical items. A Korean-speaker might perceive the Japanese utterance to be iconic, given the similarity to the Korean equivalent. However, when one looks at the Turkish equivalent *küt küt*, the overlap is much less in the sounds present in the utterance. The [k] of *küt* could be seen as overlapping with the [k] of the 'ki' in *doki* and the [g] of *dugeun*.

Turkish ideophones consist of a sound-symbolic root. The root of the ideophone imitates the referent and fine-grain distinctions are created by variation in the form of these roots. These monosyllabic roots are the primary form of an ideophonic utterance, to which endings are affixed, and are called the 'primary form.' Primary forms most commonly conform to a consonant-vowel-consonant (CVC) structure. The affixation of a suffix to this root is how most Turkish ideophones are formed. These endings include *-ır* (*ır*, *-ur*, *-ür*, depending on the vowel harmony, the agreement with the other vowels of the word) and *-il* (*-il*, *-ul*, *ül*, also according to vowel harmony). The primary form combined with the ending is called the secondary form. (ex: primary form *bang*, 'loud commotion, music with high volume' combined with *-ır*, yielding *bangır*) Amongst Turkish ideophonic suffixes, *-ır / -il* are arbitrarily distributed (Jendraschek, 2001).

The *-ır / -il* ending is known as a 'continuity suffix.' Ideophones ending with *-ır / -il* appear as reduplicated when used adverbially (Hatiboğlu, 1981, as cited in Jendraschek, 2001). These forms can be used to produce various parts of speech. Secondary forms can also be produced by the addition of *-ış* and its allomorphs (as with *-ır / -il*, these forms are in accordance with vowel harmony). There are other possible endings, but they are uncommon (Jendraschek, 2001).

In Turkish, ideophones are usually reduplicated (ex. *bangır bangır* not *bangır*). This repetition is both a common feature of ideophones around the world and also of Turkish language in general. The reduplicated ideophones containing vowel alterations are perceived to be less monotonous than those with non-alternated vowels (Jendraschek, 2001). Another notable feature is that vowels in Turkish ideophones can be identical in both parts of the ideophone or alternated (*şarıl şarıl* vs *şarıl şurul*). These vowel alternations change the semantic properties of the ideophone to some extent. For instance, *şarıl şarıl* means 'water flowing in an abundant quality' while *şarıl şurul* denotes the disturbing, excessive manner of pouring liquids making varied noises (Zeybek, 2019).

5. How to test iconicity - universal claims and interlinguistic results

In a previous section we saw what linguistic iconicity is and became familiar with a subset of words in natural languages which are generally considered iconic, namely ideophones. To test iconicity, it is useful to have an operational definition of the concept. There are various tests one can use to measure the iconicity of an item or a series of items. Here, I opted for a cross-linguistic ideophone indication task to measure iconicity (participants indicating which definition they felt was correct). Whilst this operationalisation appears to construe iconicity as a property that is present or absent, above-chance selection of correct answers lends credence to the idea that the items concerned are iconic, but does not necessitate the conclusion that the items concerned are 'fully' iconic and that those not indicated correctly above chance are arbitrary. However, this operationalisation would fit better into the 'present or absent' construal of iconicity.

I chose this cross-linguistic indication approach because, 1) it had been done before (though never with Turkish) (see Dingemanse et al., 2016), and 2) Iconicity is about perceived resemblances, and it therefore follows that participant should be able to identify these to some degree, resulting in better guessability. Indication is perhaps a better word than guessability because it would mean that participants would effectively not be guessing but indicating the definition they believe to be correct, rather than guessing at random (or so it follows from the hypothesis I set out). Investigating how guessable/easily correctly indicated Turkish ideophones are is one way of putting this idea to the test.

To answer the question of how iconicity is tested, it is necessary to look at studies that have not just dealt with ideophones, but also studies on pseud-words and contrast them. A notable example is the case of the 'Kiki Bouba' study by Ramachandran and Hubbard (2001), about cross-modal association. The authors interpret the fact that 95 percent of participants matched kiki to a jagged shape as evidence of 'natural constraints on the ways in which sounds are mapped on to objects' (Ramachandran & Hubbard, 2001). Much research followed this 21st-century revival of Köhler's original ideas (Köhler, 1967). However, a review of the literature

does not support percentages nearly as Ramachandran and Hubbard's, whose reporting of their procedure makes exact replicability challenging (Dingemanse et al., 2016).

Despite this previous work stressing universality 'our theory really relates to the origin of *proto-language...*' (Ramachandran & Hubbard, 2001) (the reader will note that 'proto-language' here is taken as a singularity, not proto-languages, but 'proto-language', more recent work stresses that potentially iconic words 'show language-specific nuances' (Dingemanse, 2019). If these language specific features are nuances, then they still contrast with arbitrariness. Therefore, when participants are given a task such as the present study or that by Dingemanse et al. (2016) would be testing both conventional (language specific) and non-arbitrary aspects of iconicity together, given that these two currents interact in naturalistic ideophones.

As I mentioned previously, two major strands of sound symbolism research, that on real language(s) and that on artificial creations, matching pseudo-words with definitions or matching shapes and sounds and so on. In terms of testing iconicity itself as a notion, the pseudo-word research has largely taken the assumption that auditory/vocal iconicity is non-arbitrariness and non-arbitrariness is effectively a universal drive to match certain sounds and certain meanings.

Bridging traditions, Dingemanse et al. (2016) designed a study in which 82 Dutch listeners were given a binary-choice task. These participants were presented with 203 ideophones from five languages. These ideophones came in 4 iterations, an original recording (native speaker's utterance), a diphone/full resynthesis replicating the pitch, segments and amplitude contour of the original utterance, a resynthesis retaining only the segmental information of the item and one retaining only the prosody. Participants could indeed choose the correct meaning of the ideophones above chance, but lower than for pseudo-word studies. The authors conclude that assumptions taken from the pseudo-word research cannot be necessarily transferred to work on real languages.

How to test if something is iconic or not has remained a complicated task. In my own study, I took interlinguistic indication (speakers of one language indicating the meaning of words

in another language) as a proxy for iconicity with the full knowledge that this is an imperfect proxy, with many factors potentially leading to interlinguistic indication. However, interlinguistic indication, by its very nature, does reveal something about two languages' interaction and making use of another linguistic system's meaning-mapping.

6. This study

Turkish is a highly described language. There are more than 80 million speakers of Turkish as a first language or as an additionally-learned language. However, despite the large number of speakers and the language's historical importance from Ottoman times until today (Göksel & Kerslake, 2005), discussions of iconicity in Turkish are few and far between. The literature on Turkish ideophones has been 'anything but abundant' despite Turkish having a rich ideophone inventory (Jendraschek, 2001). Other Turkic languages, such as Tuvan, also have inventories of sound symbolic vocabulary (Harrison, 2004).

As a result of this mismatch between description and prevalence in the experimental literature, and because of the easy access to native Turkish speakers on the campus of Radboud Universiteit, it became both scientifically worthwhile and practical to construct an experiment on iconicity in Turkish, using recordings of Turkish ideophones. Researchers have investigated ideophone guessability in Japanese, Korean, Ewe, Siwu and Semai (Dingemans et al., 2016). Adding another language, Turkish, which is typologically and genetically relatively unrelated to those studied in Dingemans et al. (2016) strengthens the case that any findings similar to that study's will bolster claims of cross-linguistic properties of ideophones.

Turkish is a member of the Turkic language family. This family has a centuries-old history and a large geographical range, extending from the Balkans to China, from the Mediterranean to Siberia. This family includes languages such as Azeri, Turkmen, Kyrgyz, Kazakh, Uighur, Altai, and Yakut, amongst others. The Turkic branch has a highly controversial relationship with Mongolic and, even more controversially, with Korean and Japanese (Savelyev & Robbeets, 2020). There is growing skepticism regarding an Altaic language family

encompassing languages from Turkish to Japanese. However, that there is a Turkic family of languages that are genetically and typologically similar is solid ground (Göksel & Kerslake, 2005).

Turkish is largely spoken in the Republic of Turkey and is the states' official language. The majority of Turkey's 70 million inhabitants are native speakers of Turkish, with Kurdish forming a major linguistic minority along with Armenian (Göksel & Kerslake, 2005). Many ethnolinguistic minorities have undergone large-scale assimilation. Outside of Turkey, Turkish (and its sister language Gagauz) is spoken by communities in former Ottoman territory, such as Greece, Bulgaria, Moldova, etc.

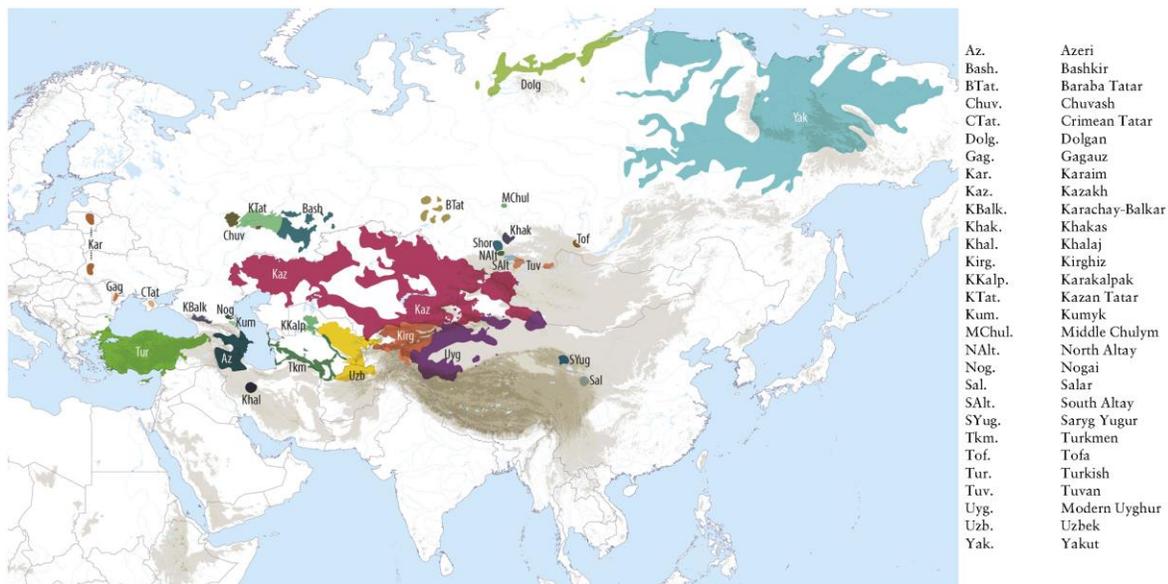


Fig. 1 Map of Turkic Languages by region where they are 'natively' found (Savelyev and Robbeets 2020)

7. Method

Pre-test

I conducted an initial pre-test wherein 50 ideophones were taken from a thesis dealing with (and providing long lists of) Turkish ideophones (Baturay, S., 2010). I made sure the definitions of these items did not overlap enough to be confused for each other (this was my own judgement). I also selected ideophones where the standard form found in the thesis by

Baturay had the same vowel in both parts of the reduplicated ideophone (*şarıl şarıl* would be selected, not *şarıl şurul*, for instance). This was to keep the amount of potential phonetic-semantic variables as limited as possible. So, all items are attested ideophones, but a sub-set that served the purpose of testing the ideophone at the lexical, not individual vowel level, as this was not my goal (hence no manipulation of vowels in the study).

I worked in consultation with a Turkish contact with an MA in linguistics (Hande Sodacı, now a PhD candidate at Koç University) as a first-pass attempt to make sure the ideophones were recognisable. Being informed anecdotally that they were highly variable in usage and each one was likely to be unknown to some individuals, I opted for a pre-test in which a small group of Turkish speakers were asked to confirm whether they recognised items and to give a definition. If the answer was 'yes, I recognise this word' and if the definitions they gave matched the definition given in the thesis from which they were extracted, then the item was eligible for the real study. I then picked the top 20 of these items (see Appendix I), controlling for non-overlapping definitions. These became the stimuli for the experiment.

8. Participants

I recruited 128 participants (of all genders and all ages above 18) from various online platforms (e.g. Facebook, Twitter) as well as by word-of-mouth. All participants were self-reported native English-speakers and were ignorant of Turkish (they spoke/understood no Turkish). Many of the participants were bi/multilingual (this was not factored into the current analysis), but none were speakers of any Turkic language. No participants had ever lived in Turkey (or stayed for more than a period of one month).

9. Design

The present study was conducted using the survey software Qualtrics (see fig. 2) for a visual representation of the following text). The survey format lent itself well to the study of ideophone guessability. Subjects would be presented with one of twenty ideophones making up my stimuli. The participants would also be presented with four options representing possible

meanings/definitions of said ideophones. This resulted in a four-way forced-choice task, departing from many studies using two-way (binary) forced-choice tasks. In such binary forced-choice tasks, stimuli are often contrived for a low complexity and high contrast (Dingemanse et al., 2016). In the cited study, Dingemanse et al. opted to increase ecological validity by manipulating suprasegmental information. I opted instead to retain simplicity on the suprasegmental level, but instead to add two more options to each ideophone's possible range of definitions. This was done to investigate if the item itself, spoken in a neutral manner,² could be matched with its correct definition above chance.

Binary forced-choice tasks are methodologically sound but have some limitations. For instance, if one option does not sound fitting to the participant that does not necessarily mean the other option, the one chosen, does sound fitting, but rather just less fitting than the option deemed incorrect. This already reveals some information about the tendency to deem one option more fitting than the other, but a further complexification of the task gives more weight to the items indicated correctly, as their correct indication was from a number of options.

For an item to be indicated above chance, guessability would need to exceed 25% (for a two-way experiment, above 50% given that there is a 50/50 chance of guessing correctly when one item is correct and the other is not. In my experiment, a 4-way task, chance level is 25%). The stimuli were recorded on an iPhone 6s in a voice-note application by the author. The stimuli were voiced by İrem Günaydın, a Turkish Erasmus exchange student. The audio would play once and then the participants would select the definition they believed matched the ideophone they heard.

These definitions were, respectively, the correct definition, the semantic opposite of this definition, a semantically unrelated definition and the semantic opposite thereof (see Fig. 2). Of

² The native speaker was asked to record the stimuli in a 'neutral' manner so that all items would have the same intonation. However, I recognise the limitations of this decision. Nonetheless, this kept the suprasegmental information constant. As Dingemanse et al. (2016) maintain 'prosody is a potential confounding factor that is not controlled for in many studies.'

course, there are definitions without perfect opposites and what is semantically entirely unrelated is also up to some interpretations - these potential limitations/confounds are discussed further in the discussion section. These definitions did not appear in any particular order (they were manually randomised). The questions (the block containing the ideophone with its four possible definitions) were randomised using the randomiser in Qualtrics.

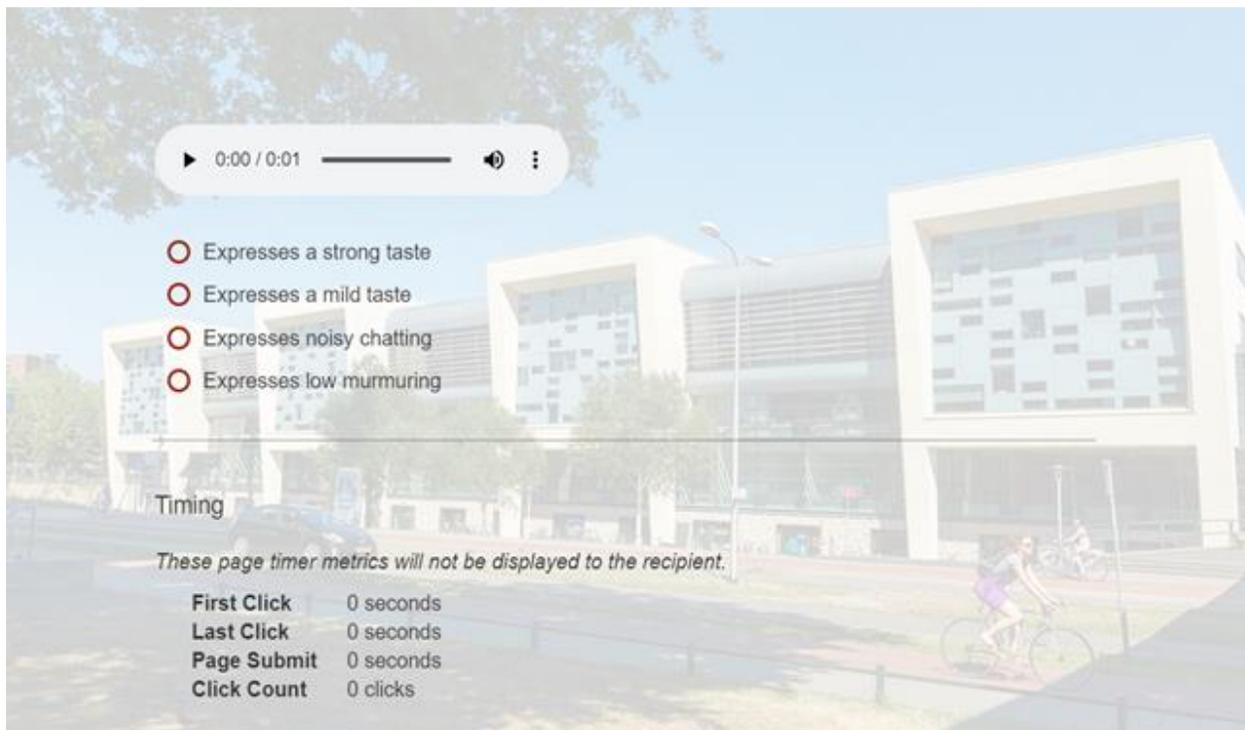


Fig. 2

In Figure 2, we see an example of a question from the author's point of view (for a participant, the timing information would be missing), the audio file (a voice-recording of 1 of the 20 ideophones) would be visible until clicked on, then it would disappear and no longer be able to be repeated by the participant - they could only hear the audio once.

I sought to measure not only the number or percentage of correct responses i.e. It was not merely which ideophone was guessed correctly but also which option was chosen because in the analysis thereof one would find the answers to questions such as ‘are there correspondences between which items were chosen?’ and if they were the wrong items i.e. if the participants could indicate the real meaning of the item being closely followed by the opposite meaning. Or ‘are semantically related items just as likely to be chosen as the opposite meanings?’ I used R to visualise the data. Below you will find the charts demonstrating participants’ responses.

10. Results

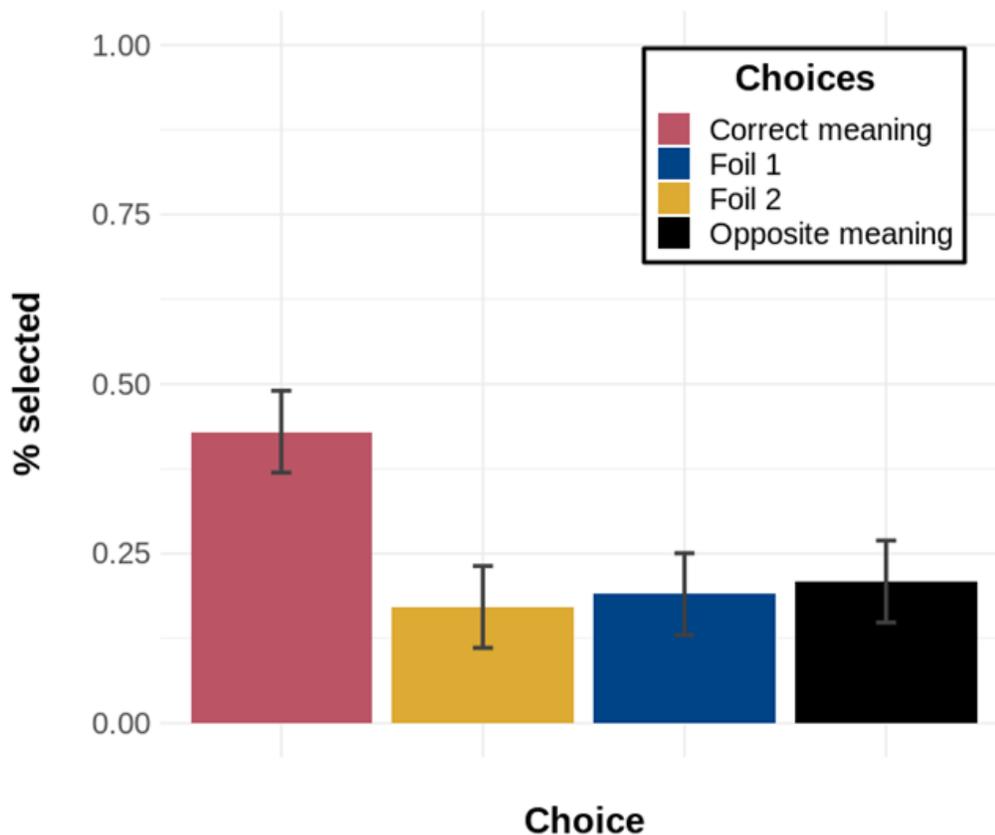


Fig. 3. Bar chart demonstrating the percentage of correct responses across all participants and all items

Figure 3 demonstrates that the largest percentage of responses were correct, meaning participants indicated the correct definition of the ideophone with which they were presented. As can be seen, the correct meaning was chosen at nearly double the percentage chance would predict (0.25), as displayed on the y axis. This represents responses across the whole dataset, in percentages. The following chart, Figure 4, displays a breakdown of the percentage of participants who chose an option (correct, foil 1, foil 2 and opposite, respectively) by item. That is, what percentage of participants indicated the correct meaning of *zonk zonk*, the foil 1 definition, the foil 2 definition and the opposite meaning, respectively. All reduplicated ideophones are shown as single words on the y axis (*zonk zonk* appearing merely as *zonk*). A full list of the items and their possible meanings (including the correct meaning) is found in Appendix 1.

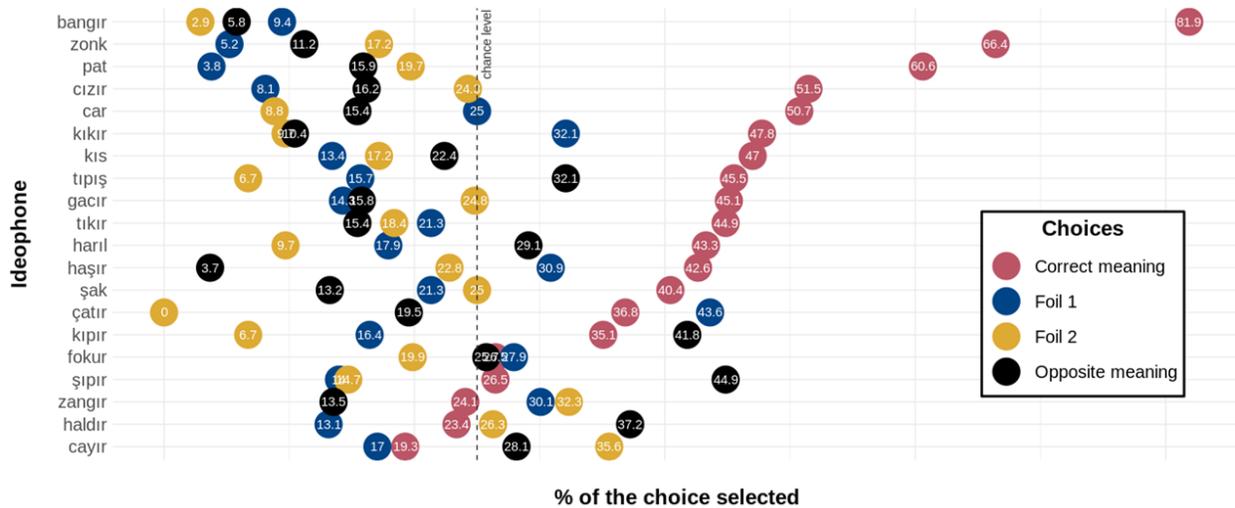


Fig. 4

17 of the 20 ideophones had a correct meaning that was selected above random chance level (25%), indicated by the dotted line in figure 4. Discounting the two that were close to chance

level (the correct definitions of *fokur fokur* and *şıpır şıpır* were both respectively indicated by 26.5% of participants, not much higher than the chance level, .25 percent), 15 of the 20 were correctly paired with their correct meanings above chance. More than 60 percent (60.6%) of participants correctly paired *pat pat* with its meaning, while 66.4% indicated the correct meaning of *zonk zonk*. Of particular note, *bangır bangır* was paired correctly with its meaning by 81.9 percent of participants.

To test whether, on average, participants were able to guess the meaning of ideophones above chance level (25%), I conducted a one sample t-test.

For a sample of 20 words, participants were much more likely to pick the correct meaning of the word ($M = 42.81$, $SD = 15.50$) compared to a chance level of 25%, $t(19) = 5.13$, $p = .000$.

The p-value is represented here as 'significance' (sig.). A p-value of less than .05 indicates a significant result (meaning the chance of observing the data assuming the null hypothesis is true is below .05). This means the null hypothesis can be rejected, as there was indeed a difference between the two groups, participants and chance level.

11. Discussion

As outlined in the results section, the outcome of the one-sample t-test indicates that Turkish ideophones, when treated as a group, could be correctly paired with their respective definitions above chance. In addition, some items were chosen by a high percentage of participants. Dingemanse (2019) makes it clear that iconicity is not a necessary property of an ideophone. This class of words is just that, a class of words. Iconicity can be found in other word classes as well and ideophones are not iconic, seeing iconicity an all-or-nothing property (Dingemanse et al., 2020). Perhaps other features of the ideophonic words, besides their iconicity influenced the results. After all, I did not know how iconic these words were or could be.

Other studies have investigated that question, making use of iconicity ratings and also how iconic words seem to change over time (Perry et al., 2015; Flaksman et al., 2017; Winter et al., 2017; Winter & Perlman, 2021).

However, even taking the assumption that there would be minor variation in the results between ideophones, why certain definitions present themselves more readily to participants than others is therefore still intriguing. This intriguing result could potentially be explained by 1) chance correspondences between Turkish and English morphosyntax and semantics. 2) A second possibility is overlapping systematicity - that lexical item with certain systematic features (such as consonants being associated with a certain meaning) may be overlapping - this sounds like the first consideration about chance correspondences. However, it implies chance is the reason for this overlap, whereas the second consideration postulates that there could be another reason for this correspondence, underlyingly similar language-specific phenomena in general, not merely of a few outliers.

Continuing the assumption that cross-linguistic guessability is either relatedness, coincidental similarity or iconicity, their correct indication could be explained by one of the other two possibilities (i.e. relatedness or coincidental similarity. An English-speaking participant correctly indicating that *bangır bangır* means 'a loud commotion, music with high volume' need not necessarily demonstrate that item's iconicity. The English word 'bang' overlaps considerably in both sound and meaning. It could merely indicate that the participant used their own language in order to suss out the meaning. Also of note was *zonk zonk* ('a head throbbing with pain') which has a somewhat uncommon English counterpart 'to be zonked out,' meaning to be unfocused, foggy, daydreamy, a bit 'gone.' The meaning isn't the same, but potentially overlapping. *Pat pat* ('to hit with a flat object') was yet another example of a similar pronunciation and meaning between English and Turkish (English, 'pat' as in 'to pat something down.'

This overlap presents a few options for consideration. 1) This overlap could be down to coincidence. For some reason, a few similar forms arose in Turkish and English respectively that happen to refer to similar meanings. 2) One could propose a shared iconic origin for both the Turkish and the English. Both languages independently arrived at the similar sounds for similar meanings precisely because speakers of both languages were imitating a property of that idea in the words they produced. This line of thought could be reasonable.

However, why would related languages not share these iconic roots and unrelated languages be less-likely to, given the caveat that iconicity is about perception and is indeed modulated by the linguistic environment? That is, *bang* in Dutch means 'araid' as does *bange* in German, two close linguistic relatives of English. In this scenario, English-speakers would be drawing on the iconic properties of loud noises in the word for 'bang' and Dutch and German (with *knal* and *Knall*, respectively) would not be. 3) Is the far-fetched idea that the Turkish *bangır* and the English 'bang' share the same non-iconic root.

However, the rest of the highly correctly-indicated items did not seem to have any obvious (or even particularly tenuous) overlap with English words/phrases. This overlap could potentially explain outlier items, but not the general trend that Turkish ideophones have meanings that can be correctly indicated above chance (by English-speakers ignorant of Turkish).

One can see that in figure 4. that several items show a high degree of competition between the correct and incorrect responses. In fact, for various items, there is ample competition amongst two incorrect responses and the correct response. This could indicate that, although the responses were chosen above chance, the separation between the correct and foil may be down to chance and may disappear only in much larger datasets. Alternatively, this could also suggest that the foil/incorrect definitions were unwittingly iconically evoked by the stimulus item for which they were contrived.

It is not entirely clear what the real-world import of the study is and what it tells us about the role of meaning in human communication. As a thought experiment, if a number of monoglot speakers of Turkish and English respectively washed up on the same uninhabited island, one could postulate that Turkish speakers would get their meaning across better by using their inventory of ideophones. It would also follow that this communication strategy would skew the evolution of the language contact situation. Do these iconic units, these non-arbitrary linguemes, survive more and will they dominate future generations on the imaginary island?

Another consideration when thinking about and accessing the present study is the following, well-rehearsed 'WEIRD' problem (Henrich et al., 2010). Most research is done on individuals Western, Educated, Industrial, Rich and Democratic societies (and specifically undergraduates attending universities in the United States). However, the broad 'Western' bias is strikingly narrow, even assuming the whole 'West' and not just the United States. My study made use of native English-speakers, most of whom would have been from a society deemed 'WEIRD' by Heinrich and colleagues. It would be useful to run similar experiments where the participants indicating ideophones are from smaller languages from around the globe. Perhaps this would reveal more than a survey of those who happen to speak English as a native language.

The reason this is of particular import here, as in a number of other psychological studies, is the claim of cross-cultural application. Studies making claims that a phenomenon cuts across cultures. By the very nature of constructing a task in which participants from one language guess the meanings of words from another language, one is purporting to say something about a property, underlying or emergent, that is occurring in the minds of both the speaker uttering the word and the listener. That these two, speaker and listener, are from (potentially vastly) different language communities necessitates that this property is somehow common to both. It could be that English and Turkish in this study, or Dutch and Ewe, Dutch and Siwu, Dutch and Korean and so on in Dingemanse et al. (2016) have some interactional

property, by coincidence, that allows for anglophone and neerlandophone participants to indicate the correct meanings of words from Turkish and the other five languages (respectively) above chance level.

12. Avenues for future studies

To further corroborate these findings, one could investigate the state of ideophony in other Turkic languages and to find out if the same structures and rules apply. When investigating a phenomenon, isolating a facet or feature of an object of study detracts from the complexity of the phenomenon and the ecological validity of the study investigating said phenomenon. After all, if ideophones are largely iconic, but also vary according to the specific properties of a given languages, studying ideophones in the context of their families would allow one to see which processes are most susceptible to the general historical linguistic processes normally studied, such as regular sound change. Those that seem most resistant to such processes would be good targets for future research vis-à-vis those least resistant - what makes the two different in terms of indication rates? Such a study would further the case for iconicity and its indication to be a particular force in the evolution of languages and their diversification.

The current trend in the literature is that sound symbolism facilitates correct guessing/indication of lexical items across languages, as supported by this thesis. Another trend is for pseudo-word binary choice tasks involving naming names (asking participants if a shape is maluma or takete) to be seen as supporting universal sound-shape mappings, a notion challenged by studies such as that of Styles and Gawne (2017), investigating whether speakers of Syuba would pair 'kiki' or 'bubu' to spiky and round shapes respectively (amongst other combinations). The authors found no preference amongst Syuba speakers for matching shapes with pseu-words. For that reason, it is helpful to have a more representative sample of the world's languages in order to establish if Styles and Gawne's study is an outlier or whether more languages will create a counter-trend.

An ideophone in the hand is worth two in the head?

Another avenue for continued research is the relationship between ideophones and gesture. Wilhelm Wundt hypothesised the existence of now-extinct '*Lautgeberden*'³ (sound gestures). Iconic gestures have been shown to aid spoken word learning (Kelly et al., 2009; Kelly et al., 2017). There are systematic mappings between vowel position and gesture size (Shinohara et al., 2016). Additionally, it has been noted that ideophones are best described through other ideophones and by gestural communication (Dingemanse, 2013). Iconicity in the visual domain may have a cognitive relationship with iconic ideophones in the spoken domain. This provides yet another avenue for new and refining research. One could measure the iconicity of co-ideophone gestures (gestures produced alongside ideophones). One could investigate whether the gesture itself were iconic or another category of gesture. Such a study could also generate stimuli for yet a further follow-up. Fruitful research questions include whether 1) Photos of iconic gestures could be paired with certain ideophones. 2) A video of a gesture could also elicit a certain ideophone and 3) English speakers could merely hear the Turkish (or other language's) ideophone and produce a gesture that itself would be recognised as iconically representing said ideophone. Such studies would strengthen the evidence that ideophones and gestures share similar iconic qualities.

Finally, a study that would bridge a number of lines of reasoning on ideophony and iconicity, also using Turkish as the language of study, would be to test whether or not native speakers, linguists and those ignorant of the language would 'agree' on which items were more or less iconic. As previously discussed, ideophones are language-specific, meaning there is some degree of conventionality to them. They are subject to conventionalisation and can 'move away' from iconicity (as Jendraschek puts it) towards greater degrees of arbitrariness (Jendraschek, 2001.). To see which items are indeed more or less iconic, one could acquire

³ *Lautgebärden*

iconicity ratings from native speakers and compare/contrast this with a forced-choice task similar to the one carried out for this thesis. If items rated more iconic were reliably correlated to both words denoted iconic by linguists and those words demonstrated to be iconic by experiments such as the present thesis study. That is, native-speaker intuitions, academic phonetics and the cognitive correlates of iconicity all on the same page. This could productively refine the scientific attribution of iconicity based on phonology.

13. Conclusion

The intent of this study was to attempt to replicate the findings (or not) of Dingemanse et al. (2016) with a typologically and genetically different language than the five tested in that study, but not to focus on suprasegmental cues, but a rather blunt approach of merely testing iconicity as operationalised in the present study as 'correct interlinguistic indication,' that is, participants being presented with options (four in my study) and being able to correctly indicate the correct meaning. Of course, this is an imperfect operationalisation of iconicity - other factors may be at play. I have treated them in the discussion section.

The present study is an attempt to chip away at the phenomenon of linguistic iconicity and what this means for human language in practice. Does an iconically-motivated form-meaning mapping make inter-linguistic understanding more achievable? While many more studies in much more ecologically valid scenarios would be needed to draw stronger conclusions, the conclusion of the present study is that a certain degree of form-meaning correspondence allows native English speakers to indicate Turkish ideophone meanings above chance, despite being ignorant of the Turkish language.

The result of an online study, these data were analysed by means of a one-sample t-test. This is concluded with the caveats that to truly operationalise iconicity is no easy feat. The notion of iconicity itself is a complex window into both the universality and diversity of the human experience. Above-average correct indication of Turkish ideophone meanings by English speakers is in line with previous literature. Taken as a whole, this literature provides evidence of

iconic form-meaning mappings playing a role in the processing of ‘foreign’ languages. Future work will add to the growing trend of treating language as multimodal and seeing iconicity as being related to a number of depictive behaviours humans engage with alongside the segmental form of an utterance.

14. References

- Baturay, S. (2010). *Apophony in Turkish onomatopoeic reduplications*. Boğaziçi University, MA Thesis. International Periodical for the Languages, Literature. Istanbul.
- Dingemanse, M. (2012). Advances in the cross-linguistic study of ideophones. *Language and Linguistics Compass*, 6(10), 654–672. <https://doi.org/10.1002/lnc3.361>
- Dingemanse, M. (2013). Ideophones and gesture in everyday speech. *Gesture*, 13(2), 143–165. <https://doi.org/10.1075/gest.13.2.02din>
- Dingemanse, M. (2018). Redrawing the margins of language: Lessons from research on ideophones. *Glossa: A Journal of General Linguistics*, 3(1), 4. <https://doi.org/10.5334/gjgl.444>
- Dingemanse, M. (2019). “Ideophone” as a comparative concept. In Kimi Akita & Prashant Pardeshi (eds.), *Ideophones, Mimetics, Expressives: Iconicity in Language and Literature Vol. 16*, 13–34. Amsterdam: John Benjamins. <https://doi.org/10.1075/ill.16.02din>
- Dingemanse, M., Perlman, M., & Perniss, P. (2020a). Construals of iconicity: Experimental approaches to form–meaning resemblances in language. *Language and Cognition*, 12(1), 1–14. <https://doi.org/10.1017/langcog.2019.48>
- Dingemanse, M., Perlman, M., & Perniss, P. (2020b). Construals of iconicity: Experimental approaches to form–meaning resemblances in language. *Language and Cognition*, 12(1), 1–14. <https://doi.org/10.1017/langcog.2019.48>

- Dingemanse, M., Schuerman, W., Reinisch, E., Tufvesson, S., & Mitterer, H. (2016). What sound symbolism can and cannot do: Testing the iconicity of ideophones from five languages. *Language*, *92*(2), e117–e133. <https://doi.org/10.1353/lan.2016.0034>
- Fischer-Jørgensen, E. (1978). On the universal character of phonetic symbolism with special reference to vowels. *Studia Linguistica*, *32*(1–2), 80–90. <https://doi.org/10.1111/j.1467-9582.1978.tb00329.x>
- Göksel, A., & Kerslake, C. (2005). *Turkish: A Comprehensive Grammar*. London: Routledge.
- Harrison, K. D. (2004). South Siberian sound symbolism. In E. J. Vajda (Ed.), *Current Issues in Linguistic Theory* (Vol. 262, p. 197). Amsterdam: John Benjamins. <https://doi.org/10.1075/cilt.262.16har>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature*, *466*(7302), 29–29. <https://doi.org/10.1038/466029a>
- Hockett, C. F. (1982 [1960]). The origin of speech. *Scientific American*, *203*, 88–111. Reprinted in: W. S-Y Wang. (1982), *Human communication: Language and its psychobiological bases* (pp. 40–12). San Francisco: W. H. Freeman. <https://doi.org/10.1038/scientificamerican0960-88>
- Imai, M., Kita, S., Nagumo, M., & Okada, H. (2008). Sound symbolism facilitates early verb learning. *Cognition*, *109*(1), 54–65. <https://doi.org/10.1016/j.cognition.2008.07.015>
- Jendraschek, G. (2001). Semantic and structural properties of Turkish ideophones, *Turkic Languages*, *5*, 88-103.
- Kantartzis, K., Imai, M., & Kita, S. (2011). Japanese sound-symbolism facilitates word learning in English-speaking children. *Cognitive Science*, *35*(3), 575–586. <https://doi.org/10.1111/j.1551-6709.2010.01169.x>
- Kelly, S. D., McDevitt, T., & Esch, M. (2009). Brief training with co-speech gesture lends a hand to word learning in a foreign language. *Language and Cognitive Processes*, *24*(2), 313–334. <https://doi.org/10.1080/01690960802365567>

- Kelly, S., Bailey, A., & Hirata, Y. (2017). Metaphoric gestures facilitate perception of intonation more than length in auditory judgments of non-native phonemic contrasts. *Collabra: Psychology*, 3(1). <https://doi.org/10.1525/collabra.76>
- Köhler, W. (1967). Gestalt psychology. *Psychologische Forschung*, 31(1), XVIII–XXX. <https://doi.org/10.1007/BF00422382>
- Levelt, W. J. M. (2013). *A History of Psycholinguistics: The Pre-Chomskyan Era*. Oxford: Oxford University Press.
- Lockwood, G., & Dingemanse, M. (2015). Iconicity in the lab: A review of behavioral, developmental, and neuroimaging research into sound-symbolism. *Frontiers in Psychology*, 6. <https://doi.org/10.3389/fpsyg.2015.01246>
- Perniss, P., Thompson, R. L., & Vigliocco, G. (2010). Iconicity as a general property of language: Evidence from spoken and signed languages. *Frontiers in Psychology*, 1. <https://doi.org/10.3389/fpsyg.2010.00227>
- Pinker, S., & Bloom, P. (1990). Natural language and natural selection. *Behavioral and Brain Sciences*, 13. <https://doi.org/10.1017/S0140525X00081061>
- Ramachandran, V. S., & Hubbard, E. M. (2001). Synaesthesia--a window into perception, thought and language. *Journal of Consciousness Studies*, 8(12), 3-34.
- Savelyev, A., & Robbeets, M. (2020). Bayesian phylolinguistics infers the internal structure and the time-depth of the Turkic language family. *Journal of Language Evolution*, 5(1). <https://doi.org/10.1093/jole/lzz010>
- de Saussure, F. (1959) [1916]. *Course in General Linguistics*. New York: The philosophical library.
- Shinohara, K., Yamauchi, N., Kawahara, S., & Tanaka, H. (2016). Takete and Maluma in action: A cross-modal relationship between gestures and sounds. *PLOS ONE*, 11(9), e0163525. <https://doi.org/10.1371/journal.pone.0163525>

- Styles, S. J., & Gawne, L. (2017). When does Maluma/Takete fail? Two key failures and a meta-analysis suggest that phonology and phonotactics matter. *I-Perception*, 8(4), 2041669517724807. <https://doi.org/10.1177/2041669517724807>
- Winter, B., & Perlman, M. (2021). Iconicity ratings really do measure iconicity, and they open a new window onto the nature of language. *Linguistics Vanguard*, 7(1). <https://doi.org/10.1515/lingvan-2020-0135>
- Winter, B., Perlman, M., Perry, L. K., & Lupyan, G. (2017). Which words are most iconic?: Iconicity in English sensory words. *Interaction Studies. Social Behaviour and Communication in Biological and Artificial Systems*, 18(3), 443–464. <https://doi.org/10.1075/is.18.3.07win>
- Yoshida, H. (2004). *Iconicity in language learning: The role of mimetics in word learning tasks* (Doctoral dissertation). Indiana University, the United States.
- Zeybek, N. (2019). Corréls sémantiques de l'alternance vocalique dans les idéophones du turc. *Signifiances (Signifying)*, 3(1), 63–86. <https://doi.org/10.18145/signifiances.v3i1.232>
- Whitney, W. D. (1867). *Language, and the study of language. Twelve lectures on the principles of linguistic science*. C. Scribner & Company.

15. Appendix 1: List and coding of stimuli

0 - opposite real meaning

1 - real meaning

2 - semantically unrealed foil

3 - opposite of unrelated foil

l)

bangir bangir

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0 - Expresses a calm silence

1 - Expresses a loud commotion, music with high volume

2 - Expresses a rough surface

3- Expresses a smooth surface

II) şak şak

0 - Expresses the sound of yelling

1 - Expresses the sound of clapping

2- Expresses the smell of something sweet

3 - Expresses the smell of something bitter

III) haşır haşır

0 - Expresses the sound of slimy things sliding past each other

1 - Expresses the sound of dry things rubbing against each other

2- Expresses the feeling of nervousness

3 - Expresses the feeling of despair

IV) zonk zonk

0 - Expresses the feeling of having a clear head

1 - Expresses a head throbbing with pain

2- Expresses the sensation of lips on skin

3 - Expresses the sensation of rough surfaces against skin

V) cayır cayır

- 0 - Expresses something freezing
- 1 - Expresses something blazing
- 2- Expresses a harsh frown
- 3 - Expresses a gentle smile

VI) tıklar tıklar

- 0 - Expresses a hard, irregular hitting sound
- 1 - Expresses a soft, regular hitting sound
- 2- Expresses a feeling of inner well-being
- 3 - Expresses a sinking feeling in one's stomach

VII) harıl harıl

- 0 - Expresses lethargic movement, laziness
- 1 - Expresses busy movement, working hard
- 2- Expresses something hard and strong
- 3 - Expresses something soft and weak

VIII) gacırcacırcı

- 0 - Expresses regular soft sounds
- 1 - Expresses irregular harsh sounds
- 2- Expresses dull colour
- 3 - Expresses intense colour

IX) fokur fokur

- 0 - Expresses the sound of birdsong
- 1 - Expresses the sound of boiling
- 2- Expresses the smell of something rotten
- 3 - Expresses the smell of flowers

X) car car

- 0 - Expresses low murmuring
- 1 - Expresses noisy chatting
- 2- Expresses a strong taste
- 3 - Expresses a mild taste

XI) kıkır kıkır

- 0 - Expresses the sound of slushy food
- 1 - Expresses the sound of crispy food
- 2- Expresses the motion of running
- 3 - Expresses the stillness of sleep

12) şıpır şıpır

- 0 - Expresses the irregular blowing of air
- 1 - Expresses the continuous leaking of liquids
- 2- Expresses the colour of a bright sunset

3 - Expresses the blue-black darkness of night

13) çatır çatır

0 - Expresses the sound of a gooey object being squished

1 - Expresses the sound of a hard object cracking

2- Expresses the smell of something rotten

3 - Expresses the smell of something sweet

14) cızır cızır

0 - The sound of snow crunching underfoot

1 - The sound of sizzling

2- Expresses a dull taste

3 - Expresses a sharp taste

15) kıs kıs

0 - Expresses a sincere gasp of concern

1 - Expresses sarcastic and silent laughing

2- Expresses the jaggedness of an object

3 - Expresses the roundness of an object

16) zangır zangır

0 - Expresses the sound of soft shaking

1 - Expresses the sound of hard shaking

Howard 35

2- Expresses the feeling of flowing water

3 - Expresses the feeling of sandpaper

17) kıpır kıpır

0 - Expresses feeling worn-down

1 - Expresses feeling lively, energetic

2- Expresses high-pitched cackling

3 - Expresses deep belly laughing

18) pat pat

0 - Expresses the sound of brushing something soft

1 - Expresses the sound of hitting something with a flat tool

2- Expresses the taste of something creamy

3 - Expresses the taste of something spicy

19) tıpış tıpış

0 - Expresses walking with fast and long steps

1 - Expresses walking with slow and short steps

2- Expresses high light notes

3 - Expresses heavy low notes

20) haldır haldır

0 - Expresses something happening slowly

Howard 36

1 - Expresses something happening quickly

2- Expresses a good feeling

3 - Expresses a bad feeling