Looking for Kurdish Learners' Correspondences of Shape-Sound Symbolism in the Classic Takete-Maluma Phenomenon

Introduction

The **Takete-Maluma** is a non-arbitrary mental association between certain words and certain visual shapes.

Most narrowly, it is the tendency for people, when presented with the nonsense words **Takete** and **Maluma**, to associate **Takete** with a rounded shape and **Maluma** with a spiky shape.

Theoretical Background

It is commonly supposed that **words** maintain a random connection in natural languages between their form and denotation, as claimed by de Saussure (1959).

Nonetheless, there is a belief certain **words** show associations with their denotations like in onomatopoeic words that display imitations of the sounds they represent as **beep-beep** for the horn of a car and **woof** for the barking of a dog. Such phenomenon in linguistics is also called **iconicity** in which linguistic units are related to physical or conceptual denotations in the real world.

Theoretical Background

Several tasks involving **sound-shape** matching have found that there is a **constant connection** between particular **pseudo-words** (such as '*bouba*' or '*maluma*') with **round** shapes and others (such as '*kiki*' or '*takete*') with **spiky** shapes (Köhler, 1929, 1947; Ramachandran & Hubbard, 2001 among others).

This phenomenon, which is known as the **Takete-Maluma effect**, is indicated to **be universal across different languages** (Köhler, 1947; Davis, 1961; Ramachandran & Hubbard, 2001; Spence, 2011; Bremner et al., 2013).

Theoretical Background

In **1929**, **Köhler** carried out a study in which he displayed two shapes and asked participants to identify which shape was related to the word "*takete*" and which was related to "*maluma*." Köhler discovers a **strong** propensity among participants to connect the **spiky** shape with "*takete*" and the **round** one with "*maluma*."

Ramachandran and Hubbard reproduced Köhler's experiment in 2001, using the pseudo-words "*kiki*" and "*bouba*" as an alternative. Outstandingly, both groups display **a constant pattern**, with **95**% of participants choosing the **round** shape as "*bouba*" and the **spiky** shape as "*kiki*." This outcome discloses that **the human brain** has the ability to **continually** link abstract meanings to specific shapes and sounds.

Theoretical Background

Several studies examined the separate impact of **consonants** and **vowels** on the Takete-Maluma effect. For example, Nielsen & Rendall (2011) highlight the **greater** influence of **consonants** compared to vowels on the Takete-Maluma effect.

Similarly, Ozturk et al. (2013), participants displayed more reliance on **consonants** than vowels when linking pseudo-words with round and spiky shapes, validating the results of Nielsen and Rendall (2011).

Additionally, Fort et al. (2015) affirmed that **consonants** display a **more** important effect than vowels in driving the Takete-Maluma effect.

This Study

To get a **deeper** understanding of this phenomenon, our current research aims to expand the scope of tested stimuli in **morpho-phonemic domain** by exploiting 8 vowels and 15 consonants from the **Kurdish** language.

Thus, we present tested segments containing Kurdish **consonant-focused** and **vowel-focused** bases, permitting a more comprehensive investigation of the roles played by consonants and vowels.

The Aim of the Study

The study comprises two experiments involving Kurdish adult participants, using a forced-choice association task close to the previous studies carried out by Nielsen and Rendall (2011), Ozturk et al. (2013), and Fort et al. (2014).

In Experiment 1, exploring the impact of **consonants** on the Takete-Maluma phenomenon.

In Experiment 2, focusing on the role of **vowels** in the Takete-Maluma phenomenon.

Currently, there is **no recorded** evidence of symbolic representation in the **Kurdish** language, specifically concerning the Takete-Maluma effect.

The Purpose of Experiment 1

The purpose of this experiment was to examine the effect of **consonants** in the Takete-Maluma effect. To achieve this, we created Pseudo-words that focused on two specific pairs of consonants with different vowels. These pseudo-words were formed by combining the two consonant pairs /**k**/ and /**t**/ versus /**l**/ and /**m**/) commonly linked with **spiky** and **round** images, respectively, with different vowels.

Subjects in this experiment were tasked with matching these pseudo-words with visually unfamiliar spiky and round images. Our aim was to **direct** the subjects' attention toward the consonants in the stimuli, encouraging them to depend on consonant-sound connections for shape awareness. Therefore, we expected to observe a constant impact of consonant particularity regardless of the vowels used in the selected pseudo-words for the experiment.

Experiment 1

Kurdish consonant pair	English consonant equivalence	Kurdish vowel identity	English vowel equivalence	Kurdish pseudo-words	English pseudo-words equivalence
/ ل , م /	/ l , m /	ئا	/a:/	مالا	/ma:la:/
		ئێ	/ɜ:/	مێلێ	/lɜ:mɜ:/
		ئی	/i:/	میلی	/mi:li:/
		ئۆ	/o:/	لۆمۆ	/lo:mo:/
		ئو	/u/	مولو	/mulu/
		ئوو	/u:/	لووموو	/lu:mu:/
		ئۆ	/o/	لۆلۆ	/molo/
		ئا	/a/	لاما	/lama/
/ ک , ت /	/ t , k /	ئا	/a:/	کاتا	/ka:ta:/
		ئێ	/ɜ:/	تێکێ	/tɜ:kɜ:/
		ئی	/i:/	کیتی	/ki:ti:/
		ئۆ	/o:/	تۆکۆ	/to:ko:/
		ئو	/u/	کوتو	/kutu/
		ئوو	/u:/	تووکوو	/tu:ku:/
		ئۆ	/o/	کۆتۆ	/koto/
		ئا	/a/	تاکا	/taka/

The averages of each condition in the sample of Experiment 1
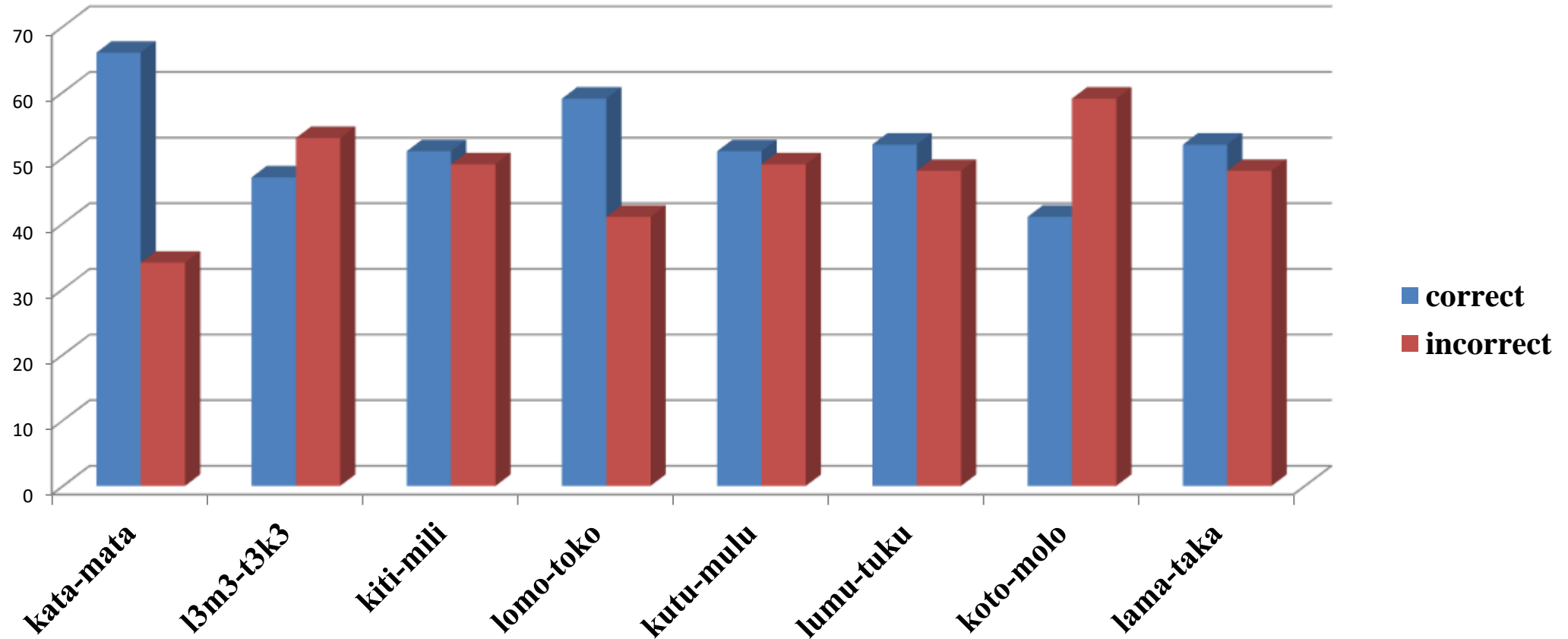
A Statistical Model

A statistical analysis was conducted to assess the significance of the differences observed in the results of Experiment 1 using R Programming. The analysis employed **a logistic mixed-effects model**, treating subjects as a random factor and considering the consonant pairs (k/ and /t/ *versus* /l/ and /m/) along with the vowels (/a:/, /a/, /ɜ:/, /i:/, /o:/, /o/, /u:/and /u/) as considered as fixed factors. The results of the experiment exhibited that there was **no significant impact** from the consonant pairs ($\beta = 0.9$, $SE = 0.78$, $z = -0.21$, $p = .71$).

This proposes that the pseudo-words containing /t/ and /k/ did not show significant associations with spiky images. Similarly, the pseudo-words containing /l/ and /m/ were not linked to round images. Nevertheless, upon closer investigation, it was found that the main effect of vowel identity was marginally significant ($\beta = -1.43$, $SE = 0.59$, $z = -1.71$, $p = .061$). Additionally, there was no interaction between consonant pairs and vowel identity.
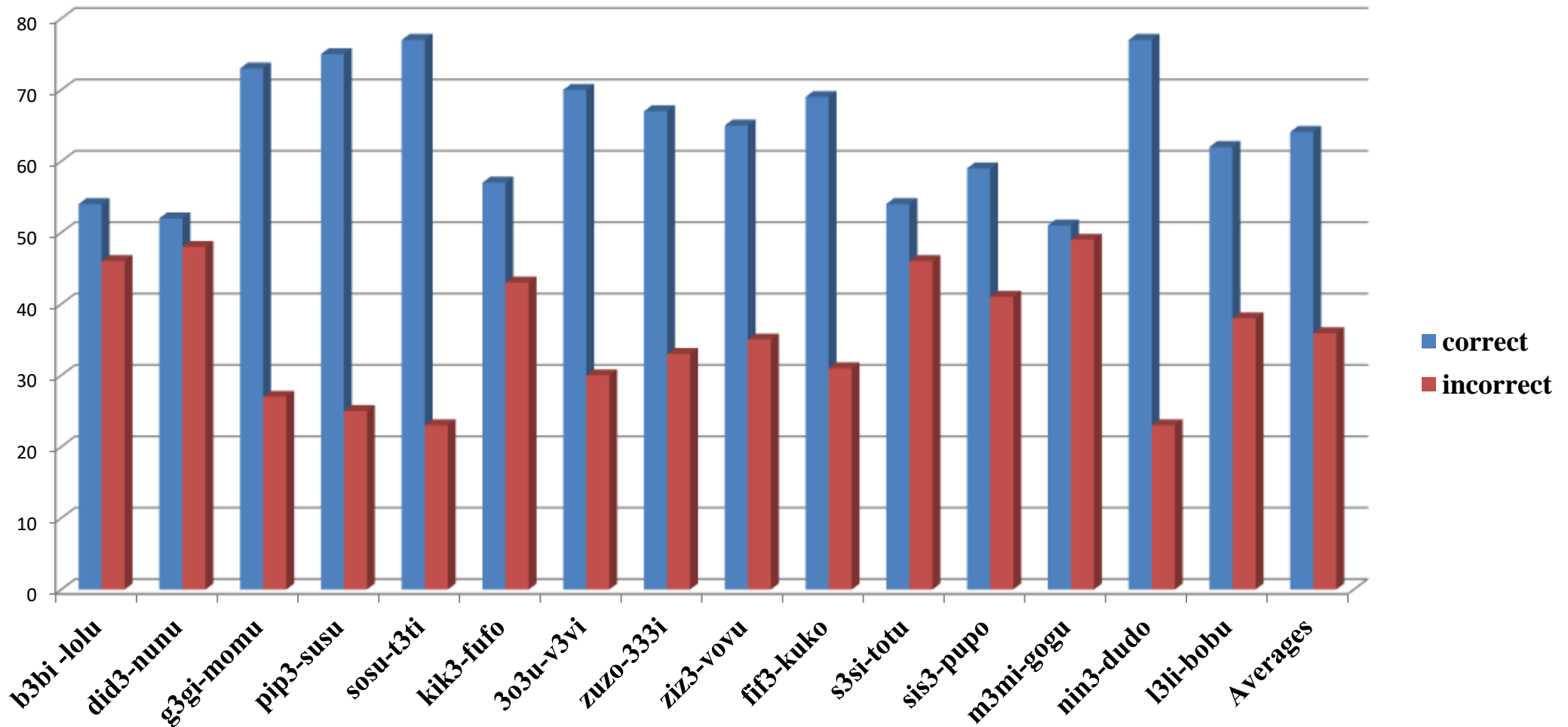
The Purpose of Experiment 2

Experiment 2 aimed to explore the role of **vowels** in the Takete-Maluma effect. The experimental design replicated that of Experiment 1, with the exception that we constantly held a specific pair of vowels while changing the consonant identity in the pseudo-words. The pseudo-words were generated by combining the two Kurdish vowel pairs /ئوو/ ,/ئۆّ/ versus /ئى/ ,/ئێ/ (corresponding to English /oː/ and /uː/ versus /ɜː/ and /iː/) usually related to round and spiky images, respectively, with various consonants.

If they rely more on the fixed vowels for sound-shape matching, they should select words with /oː/ and /uː/ more frequently when presented with round images, and words with /ɜː/ and /iː/ more frequently when presented with spiky images, regardless of the consonants identity.

Experiment 2

Kurdish consonant pair	English consonant equivalence	Kurdish vowel identity	English vowel equivalence	Kurdish pseudo-words	English pseudo-words equivalence
/ئی/ , /ئێ/	/iː/, /ɜː/	ب	/b/	بێنی	/bɜːbiː/
		د	/d/	دیدێ	/diːdɜː/
		گ	/g/	گێگی	/gɜːgiː/
		پ	/p/	پیپێ	/piːpɜː/
		ت	/t/	تێتی	/tɜːtiː/
		ک	/k/	کیکێ	/kiːkɜː/
		ڤ	/v/	ڤێڤی	/vɜːviː/
		ز	/z/	زیزێ	/ziːzɜː/
		ژ	/ʒ/	ژێژی	/ʒɜːʒiː/
		ف	/f/	فیفێ	/fiːfɜː/
		س	/s/	سێسی	/sɜːsiː/
		ش	/ʃ/	شیشێ	/ʃiːʃɜː/
		م	/m/	مێمی	/mɜːmiː/
		ن	/n/	نینێ	/niːnɜː/
		ل	/l/	لێلی	/lɜːliː/
/ئوو/ , /ئۆ/	/ oː , uː/	ب	/b/	بۆبوو	/boːbuː/
		د	/d/	دوودۆ	/duːdoː/
		گ	/g/	گۆگوو	/goːguː/
		پ	/p/	پووپۆ	/puːpoː/
		ت	/t/	تۆتوو	/toːtuː/
		ک	/k/	کووکۆ	/kuːkoː/
		ڤ	/v/	ڤۆڤوو	/voːvuː/
		ز	/z/	زووزۆ	/zuːzoː/
		ژ	/ʒ/	ژۆژوو	/ʒoːʒuː/
		ف	/f/	فووفۆ	/fuːfoː/
		س	/s/	سۆسوو	/soːsuː/
		ش	/ʃ/	شووشۆ	/ʃuːʃoː/
		م	/m/	مۆموو	/moːmuː/
		ن	/n/	نوونوو	/nuːnuː/
		ل	/l/	لۆلوو	/loːluː/

The averages of each condition in the sample of Experiment 2

A Statistical Model

A **statistical** analysis was implemented using R Programming to assess the significance of the differences noticed in the results of this experiment. To perform this analysis, **a logistic mixed-effects model** was utilized, considering subjects as a random factor and treating vowel pairs (/o:/ and /u:/ versus /ɜ:/ and /i:/) and consonants (/f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /l/, /m/, /n/) as fixed factors. The results specified a significant effect of vowel pairs (β = 2.84, SE = 0.88, z = 3.28, p = .031), indicating that pseudo-words containing /o:/ and /u:/ were more commonly related to round images, whereas the pseudo-words containing /ɜ:/ and /i:/ were more frequently connected with spiky images.

Nevertheless, the analysis exposed no effect of consonant identity (β = -2.7, SE = 1.08, z = −3.18, p = .03), showing that consonant identity did not affect the sound–shape mapping process. Furthermore, there was no interaction detected between vowel pairs and consonant identity.

Conclusion

The **outcomes** of this study established the connection between certain **vowels** and round-spiky images. Yet, the **absence** of a significant main effect of **consonant** identity and the lack of interaction between vowels and consonant identity underlined the considerable influence of the vowels in this particular context.

These outcomes **contradicted** the conclusions drawn in the study conducted by Nielsen and Rendall (2011) among others, which emphasized the crucial role of consonants in the sound–shape mapping process, proposing that consonants held greater significance than vowels in the sound–shape mapping process.

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