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

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Abstract

In natural languages, the link between sound and meaning has been a theme of attention in the linguistic field. Although the majority of words display random associations between their form and meaning, there is proof of iconicity, where form and meaning show resemblance, particularly in onomatopoeic words. The Takete-Maluma effect has been extensively studied, where certain sounds are persistently related to round or spiky shapes. Previously, several pieces of research have emphasized the role of consonants in this effect, with consonants displaying a stronger impact compared to vowels. Building on this, this study investigates the contributions of consonants and vowels in the Takete-Maluma effect. We carried out two experiments using Kurdish subjects, investigating the influence of consonants and vowels individually. Experiment 1 concentrated on consonants by using pseudo-words with two consonant pairs related to round and spiky shapes, combined with different vowels. The results showed a slight preference for consonants over vowels in sound-shape connections. The statistical analysis findings exposed that consonants have an insignificant effect on the Takete-Maluma effect. Expanding on these findings, in Experiment 2, we explored the effect of vowels in isolation, regardless of the consonant framework. Accordingly, the goal was to check whether the effects witnessed in Experiment 1 were merely caused by consonants or if vowels themselves determined the outcome. The findings of this experiment specified that the vowel pair /o:/ and /u:/ continually related to round images, while the vowel pair

/ɜ:/ and /i:/ were linked to spiky images. Nevertheless, the consonants did not notably influence the sound–shape process. Hence, the findings of this study challenge the opinion that consonants are the main drivers of the Takete-Maluma effect, contrary to some previous studies. It is not yet known of any investigation concerning the Takete-Maluma effect in the Kurdish language. Taken together, this study aims to cast light on the specific influences of consonants and vowels in sound symbolism, focusing on the relationship between sounds and visual exemplifications. Consequently, the study will shed light on a research exploration that gives further possible anticipations about the nature of the language system.

Keywords: Takete-Maluma effect, sound symbolism, iconicity, round and spiky shapes, Kurdish

1. Introduction:

It is commonly supposed that words maintain a random connection in natural languages between their form and meaning, as de Saussure (1959) claimed. Nonetheless, there is a belief certain forms show associations with their meanings, 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 a phenomenon in linguistics is also called iconicity, in which linguistic units are related to physical or conceptual denotations in the real world. Furthermore, languages generally contain sound-symbolic words representing the relationship between sound and meaning, as demonstrated by studies conducted in different languages. Bloomfield (1933) exhibits this in English, Chastaing (1958) in French, and Imai et al. (2008) in Japanese. For instance, in English, words that are related to stable light frequently start with "gl-" such as "*glow, glare, glint, gleam, glisten, glitter, glaze* ", whereas words that are related to the point often begin with" sp-" such as" spire, *spark, spot, spout*, and *spade*" (Stageberg, 1981, p. 111).

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; Maurer et al., 2006 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). In 1929, Köhler carries out a study in which he displayed two shapes and asked participants to identify which shape is related to the word "*takete*" and which is 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 owns the ability to continually link abstract meanings to specific shapes and sounds.
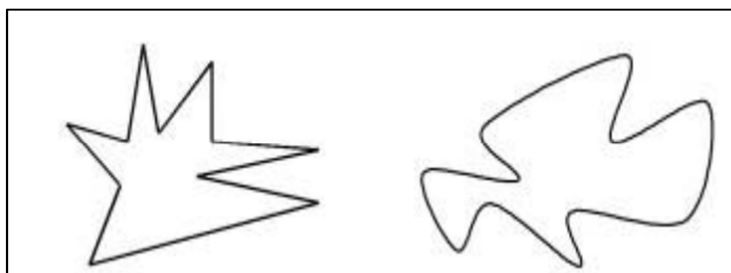

Figure 1: Bouba and kiki shapes used in the experiment conducted by Ramachandran & Hubbard (2001,p. 19)

Besides, a multitude of studies has recognized links between auditory speech stimuli and different visual characteristics of objects. These characteristics comprise size, as presented by Sapir (1929), Peña et al. (2011), and Parise & Spence (2012), as well as brightness, as investigated by Parise & Pavani (2011). Sapir's (1929) research, for instance, discloses that English speakers link pseudo-words comprising high front vowels, such as "*mil*," with small objects, while pseudo-words with low back vowels, like "*mal*," are connected with bigger objects. Similarly, a recent study by Sidhu et al. (2021) discloses that English nouns representing round objects containing "*ball*," "*globe*," "*balloon*," and "*hoop*," tend to display round vowels and bilabial sounds. On the contrary, nouns indicating angular or spiky objects such as "*spike*," "*fork*," "*cactus*," and "*shrapnel*" are

more expected to feature voiceless velar stops. This result additionally verifies Sapir's (1929) *mil/mal* experiment stated earlier, which exhibits that the relationship between sound symbolism and object properties spreads beyond artificial pseudo-words.

Noticeably, the mainstream of previous research has focused on investigating sound-symbolic associations among different languages, exploiting various methodological techniques. Yet, the accurate information and causal reasons behind the preference of certain words, pseudo-words, or objects to be related to roundness or spikiness in the visual domain remain unclear. Specifically, our current understanding is restricted concerning the particular speech sounds in pseudo-words like "*bouba*" and "*kiki*" that display their associations with round and spiky shapes, instead of the contrary. Accordingly, the main goal of this study is to examine the separate impact of consonants and vowels on the Takete-Maluma effect. Formerly, Nielsen & Rendall (2011) highlight the greater influence of consonants compared to vowels on the Takete-Maluma effect. In their study, participants are shown auditory pseudo-words covering various consonants and vowels and asked to link them with round or spiky shapes. The results constantly disclose a robust relationship between pseudo-words with specific consonants (/b/, /m/, /l/, and /g/) and round shapes, regardless of the vowels used. Though, pseudo-words with other consonants (/p/, /t/, and /k/) are more commonly connected with spiky shapes. These outcomes stress a main dependence on consonants rather than vowels in sound-symbolic associations. Likewise, in a study carried out by Ozturk et al. (2013), participants displayed more reliance on consonants than vowels when linking pseudo-words (/*bubu*/, /*kiki*/, /*bibi*/, and /*kuku*/) with round and spiky shapes, validating the results of Nielsen and Rendall (2011). Expanding on this area of study, Fort et al. (2015) carry out a research titled "Consonants are more important than vowels in the Takete-Maluma effect" to further explore the impact of consonants and vowels in this effect. The outcomes of their study again affirm that consonants display a more important effect than vowels in driving the Takete-Maluma effect. These results support the notion of sound symbolism, where specific speech sounds elicit distinct associations, with consonants displaying a more pronounced effect compared to vowels.

To better understand the separate contributions made by consonants and vowels in the Takete-Maluma effect, our current research aims to expand the scope of tested stimuli by exploiting eight vowels and fifteen 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. This wider exploration aims at evaluating the reliability of the dissimilarity previously observed between consonants and vowels. 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, we aim to explore the impact of consonants on the Takete-Maluma phenomenon, while Experiment 2 focuses on the role of vowels. Currently, there is no recorded evidence of symbolic representation in the Kurdish language, specifically concerning the Takete-Maluma effect.

2. 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 round and spiky images, respectively, with different vowels (See Table 1). 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 towards 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.

2.1. Method
2.1.1. Subjects

One hundred native Kurdish subjects (48 boys and 52 girls, mean age: 21 years, range: 19-23) participated in this experiment. The subjects were undergraduate second-grade students in the Department

of English, College of Education, Salahaddin University. As a motivation for taking part in this research, the subjects were guaranteed to receive partial course credit.
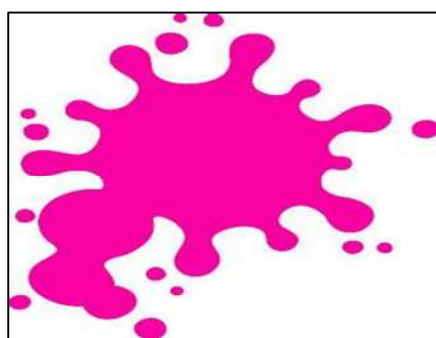
2.1.2. Material

For Experiment 1, we created sixteen pseudo-words following the CvCv pattern (consonant-Vowel-consonant-Vowel) pseudo-words. We combined eight Kurdish vowels with two pairs of Kurdish consonants: Plosives / ک , ت / (corresponding to English /k/ and /t/ for example, /ki:ti:/, /to:ko:/) and continuants /ل , م / (corresponding to English /l/ and /m/ for example, /lu:mu:/, /mili/). These consonants were generally associated with round and spiky images, respectively (See Table 1 for the complete list). The chosen consonants were followed by eight types of Kurdish vowels: front and back. The four front vowels, namely /ئاا/ , ئا/ , ئێ/ , ئی / (corresponding to English c) the four back vowels, namely / ئۆو , ئۆ/ , ئوو/ , ئو / (corresponding to English /o:/, /o/, /u:/, /u/) were selected. If the consonant content of the pseudo-words exhibited to have a more impact than the vowel content, we estimated the subjects' responses to mostly follow the consonant content rather than the vowel content. The pseudo-words were recorded by a female native Kurdish speaker. To create the visual stimuli, we generated a set of eight round and eight spiky black-outlined images. These images were filled with red, pink, and maroon colours (See Figure 2 below). These related reddish colours were chosen to minimize the potential effects of colours on the subjects' selections.

Table 1: The selected stimuli used in Experiment 1

N.	Kurdish consonant pair	English consonant equivalence	Kurdish vowel identity	English vowel equivalence	Kurdish pseudo-words	English pseudo-words equivalence
			ئا	/a:/	مالا	/ma:la:/
			ئێ	/ɜ:/	مێلێ	/lɜ:mɜ:/
			ئی	/i:/	میلی	/mi:li:/
	/م , ل/	/l , m /	ئۆ	/o:/	لۆمۆ	/lo:mo:/
			ئو	/u/	مولو	/mulu/
			ئوو	/u:/	لووموو	/lu:mu:/

			ئۆ	/o/	لۆلۆ	/molo/
			ئا	/a/	لاما	/lama/
			ئا	/aː/	کاتا	/kaːtaː/
	/ ک , ت /	/ t , k /	ئێ	/ɜː/	تێکێ	/tɜːkɜː/
			ئی	/iː/	کیتی	/kiːtiː/
			ئۆ	/oː/	تۆکۆ	/toːkoː/
			ئو	/u/	کوتو	/kutu/
			ئوو	/uː/	تووکوو	/tuːkuː/
			ئۆ	/o/	کۆتۆ	/koto/
			ئا	/a/	تاکا	/taka/

Figure 2: *An example of the visual stimuli (round and spiky images) used in Experiment 1*

2.1.3. Experimental Design

The experiment was conducted on a computer. In each trial, two images (one round and one spiky) were displayed side-by-side on the screen against a white background, with two pseudo-words displayed below. The subjects' choices were coded as "1" or "2" depending on whether they linked the word to the round or spiky shape in each trial (See Figure 1 above and Appendix A).

The remaining word was automatically assigned to the other image by assigning one word to an image. There was no time constraint for their response, and they could modify their answers as often as they desired. The subsequent trial commenced once the subjects had made their selections. The experiment consisted of sixteen forced-choice trials, with the order of words and images

randomized. Trials with the same words and images were presented only once.

2.2. Results and Discussion

For the first experiment's trials, we counted the averages of the correct and incorrect choices made by the subjects in each condition. Subsequently, the overall averages of these choices for all subjects were arranged and reported in the table and figure provided below.

Table 2: The overall averages of all conditions of the consonant pairs with various vowels in the sample of Experiment 1

Averages	All		Female		Male	
	correct	incorrect	correct	incorrect	correct	incorrect
	52.4	47.6	30.1	21.9	22.3	25.8
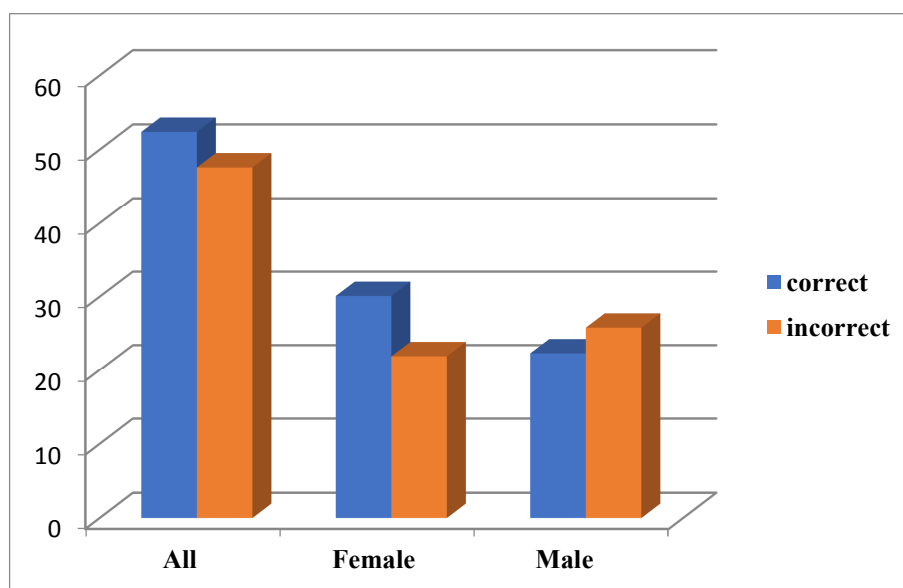
Figure 3: The overall averages of selecting round images and spiky images as a function of the consonant pairs /k/ and /t/ versus /l/ and /m/) that are usually mapped to round and spiky images respectively and these eight types of vowels: front /a:/, /a/, /ɜ:/, /i: /and back /o:/, /o/, /u:/, /u/.

Broadly speaking, the data from Experiment 1, as shown in Table 2 and Figure 3 above, exhibited that while the overall average of correct was larger than incorrect ones, the two averages were relatively close (correct: 52.4 versus incorrect: 47.6). Let us move our focus to the subjects' gender, where the performance of the females marginally outpaced the males (female: 30.1% versus male: 22.3%). Figure 4 below presents a pie chart visualizing the different percentages of correct choices based on gender.
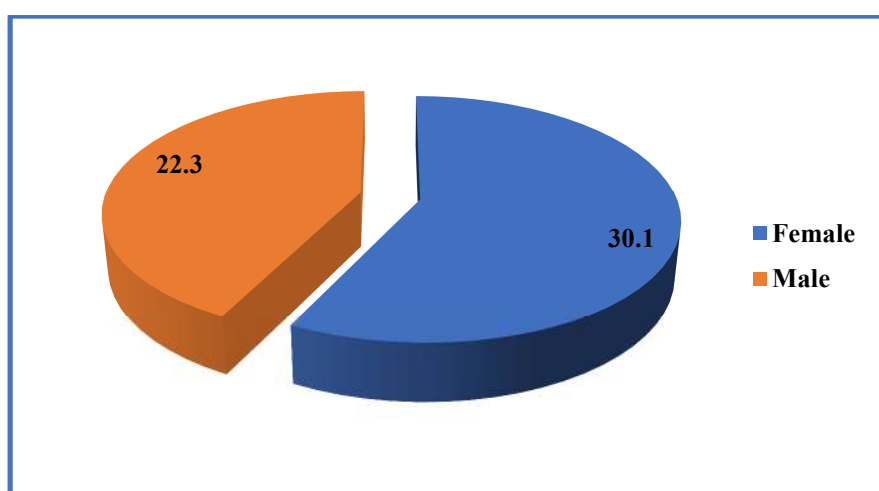
Figure 4: *Averages of correct choices in Experiment 1 according to gender element in the sample*

To gain a closer investigation of the data, let's shit our focus on each condition within the sample. Table 4 and Figure 4 below displayed all conditions of the current experiment. The pseudo-words linked with correct choices were placed in bold red font. Moreover, the highest correct choice of the pseudo-words comprising consonants /l/ and /m/versus k/ and /t/ that corresponded to round and spiky images, respectively, were highlighted in pink (for round) and blue (for spiky). Remarkably, the averages of the correct and incorrect choices generally showed slight differences among them (See Table 3 and Figure 5). For instance, the pseudo-words pair *"mulu-kutu"* revealed a noticeable difference in percentages (51% versus 49%) compared to the other conditions. Furthermore, the pairs *"lumu-tuku"*

and "lama-taka" displayed equal scoring (52% versus 48% for each). Notably, the pseudo-word *"kata"* had the highest correct average among the spiky consonant collection, while "lomo" had the highest correct average in the round category (66% and 59%, respectively), as depicted in Figure 5. Shifting our focus to the gender aspect, the overall average of correct performance for females was 30.1.9%, whereas males had a lower average of correct performance (22.3%) compared to females (See Table 3).

Table 3*: The averages of each condition in the sample of Experiment 1*

N.	pseudo-words	All		Female		Male	
		correct	incorrect	correct	incorrect	correct	incorrect
1	**kata**-mata	66	34	37	15	29	19
2	l3m3-**t3k3**	47	53	32	20	15	33
3	**kiti**-mili	51	49	32	20	19	29
4	**lomo**-toko	59	41	27	25	32	16
5	mulu-**kutu**	51	49	26	26	25	23
6	**lumu**-tuku	52	48	29	23	23	25
7	moto-**koto**	41	59	30	22	11	37
8	**lama**-taka	52	48	28	24	24	24
	Averages	52.4	47.6	30.1	21.9	22.3	25.8

Figure 5: *The averages of each condition in the sample of Experiment 1*

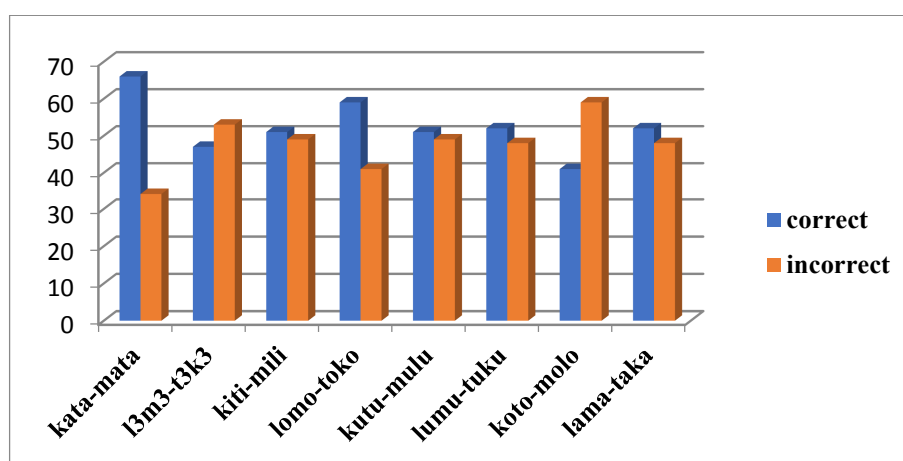A statistical analysis was conducted to assess the significance of the differences observed in the results of Experiment 1 using R Programming. The analysis employed a logistic mixed-effects model, treating subjects as a random factor and considering the consonant pairs (k/ and /t/ *versus* /l/ and /m/) along with the vowels (/aː/, /a/, /ɜː/, /iː/, /oː/, /o/, /uː/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.

This confirms that the consonant pairs (/l/ and /m/ versus /k/ and /t/), which were expected to be associated with the round and spiky images, respectively, did not have an effect on the sound–shape mapping process in the findings of this consonant-focused experiment. Furthermore, the limited impact of vowel identity and the absence of an interaction between the consonant pairs and vowel identity provided support for the insignificant impact of the consonants in the Takete-Maluma effect. Accordingly, the data from this experiment demonstrated that consonants do not play a clear role in the Takete-Maluma effect which contradicts the results of by Nielsen and Rendall's study (2011) and similar research. These studies highlighted the significant role of consonants in the Takete-Maluma effect, suggesting that consonants have a greater impact than vowels in a sound-symbolic phenomenon.

Building upon the findings of the previous experiment, which may disregard the potential significance of consonants in influencing the observed effect, it is crucial to further examine the role of vowels. To thoroughly explore the impact of vowels in isolation and assess whether their influence remains consistent across different consonant contexts, a second experiment was conducted with a specific emphasis on the vowel pairs. By analyzing the outcomes of this experiment, we aimed to determine whether the effects observed in Experiment 1 were solely attributed to the consonant-focused approach or if vowels

themselves consistently influence the results regardless of the consonant identity employed.

3. Experiment 2

Experiment 2 aimed to explore the role of vowels in the Takete-Maluma effect. The experimental design replicated that of Experiment 1, except 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 / ئۆ، ئوو/ versus /ئى، ئێ/ (corresponding to English /o:/ and /u:/ versus /ɜ:/ and /i:/) usually related to round and spiky images, respectively, with various consonants (See Table 2 for the complete list and Appendix B). Suppose they rely more on the fixed vowels for sound-shape matching. In that case, they should select words with /o:/ and /u:/ more frequently when presented with round images and words with /ɜ:/ and /i:/ more frequently when presented with spiky images, regardless of the consonant's identity.

3.1. Method
3.1.1. Subjects

Experiment 2 involved the participation of one hundred native Kurdish individuals (48 boys and 52 girls, mean age: 21 years, range: 19-23) who previously took part in Experiment 1. The subjects were undergraduate four-grade students in the Department of English, College of Education, Salahaddin University. The subjects received partial course credit as an incentive for their participation in the study.

3.1.2. Material

For this experiment, the selected stimuli consisted of two-syllable pseudo-words, with a cVcV structure (consonant-Vowel-consonant-Vowel). A total of thirty pseudo-words were created by combining Kurdish back-vowels pair (/ئى، ئێ/) corresponding to English /i:/, /ɜ:/ , respectively, which were associated with spiky images, and Kurdish front vowels / ئۆ، ئوو/ equivalent to English /o:/, /u:/, respectively, which were typically linked with round images. These vowels were combined with fifteen different Kurdish consonants, consisting of six plosives (/پ، ت، ب، د، گ، ک/) equivalent to English /p/, /b/, /t/, /d/, /k/, /g/, and nine continuants (/ ف، ش، ز، س، ژ، ل، م، /

/ن/) equivalent to English /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /l/, /m/, /n/. Examples of these pseudo-words include /g3:gi:/, /zi:z3:/, /to:tu:/, /bu:bo;/ were created (See Table 4 for the complete list). The aim of this experiment was to decide which vowels linked with spiky images and which ones were more closely associated with round images. A female native Kurdish speaker recorded the pseudo-words. To create the visual stimuli, fifteen round images, and fifteen spiky images were generated. These images were filled with shades of red, pink, and maroon colours, chosen for the same reasons explained in Experiment

Table 4: The selected stimuli used in Experiment 2

N.	Kurdish consonant pair	English consonant equivalence	Kurdish vowel identity	English vowel equivalence	Kurdish pseudo-words	English pseudo-words equivalence
1.			ب	/b/	بێبی	/b3:bi:/
2.			د	/d/	دیدێ	/di:d3:/
3.			گ	/g/	گێگی	/g3:gi:/
4.			پ	/p/	پیپێ	/pi:p3:/
5.			ت	/t/	تێتی	/t3:ti:/
6.			ک	/k/	کیکێ	/ki:k3:/
7.	/ئێ/ , /ئی/	/i:/, /3:/	ڤ	/v/	ڤێڤی	/v3:vi:/
8.			ز	/z/	زیزێ	/zi:z3:/
9.			ژ	/ʒ/	ژێژی	/ʒ3:ʒi:/
10			ف	/f/	فیفێ	/fi:f3:/
11			س	/s/	سێسی	/s3:si:/
12			ش	/ʃ/	شیشێ	/ʃi:ʃ3:/
13			م	/m/	مێمی	/m3:mi:/
14			ن	/n/	نینێ	/ni:n3:/
15			ل	/l/	لێلی	/l3:li:/
16			ب	/b/	بۆبوو	/bo:bu:/
17			د	/d/	دوودۆ	/du:do:/
18			گ	/g/	گۆگوو	/go:gu:/
19			پ	/p/	پووپۆ	/pu:po:/
20			ت	/t/	تۆتوو	/to:tu:/
21			ک	/k/	کووکۆ	/ku:ko:/
22			ڤ	/v/	ڤۆڤوو	/vo:vu:/

23	/ئوو/, /ئۆ/	/ oː , uː/	ز	/z/	زووزۆ	/zuːzoː/
24			ژ	/ʒ/	ژۆژوو	/ʒoːʒuː/
25			ف	/f/	فووفۆ	/fuːfoː/
26			س	/s/	سۆسوو	/soːsuː/
27			ش	/ʃ/	شووشۆ	/ʃuːʃoː/
28			م	/m/	مۆموو	/moːmuː/
29			ن	/n/	نوونوو	/nuːnuː/
30			ل	/l/	لۆلوو	/loːluː/

3.1.3. Experimental Design

The experiment was designed following the same as in Experiment 1.

3.2. Results and Discussion

First, the data from the trials of the second experiment were examined by calculating the averages of correct and incorrect choices made by the subjects in each condition. These averages for all subjects were then exhibited in Table 5 and Figure 5 below, illustrating the overall trends witnessed in their selections.

Table 5: The overall averages of all conditions of vowel pairs with various consonants in the sample

	All		Female		Male	
	correct	incorrect	correct	incorrect	correct	incorrect
Averages	64.1	35.9	33.9	18.1	30.3	17.7
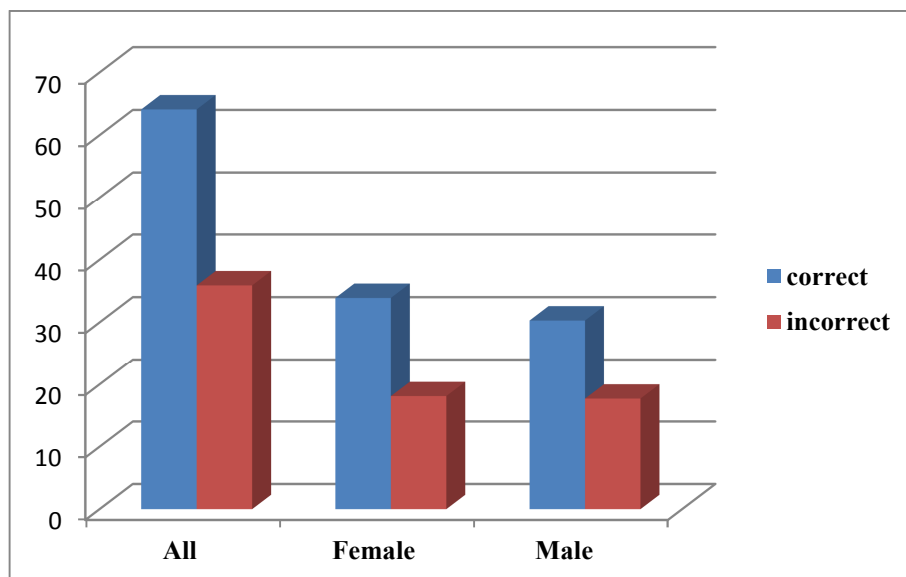
Figure 6: *The averages of selecting round images and spiky images as a function of vowel pairs /o:/ and /u:/ versus /ɜ:/ and /i:/) that are usually mapped to round and spiky images respectively and these consonants /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /l/, /m/, /n/.*

Based on the information displayed in Table 5 and Figure 6 above, it is clear that the overall average of correct selections was considerably higher than that of incorrect ones. Explicitly, the total average of correct selections across all conditions was 64.1%, whereas the total average of incorrect ones was only 35.9%. When examining the performance based on gender, females (30.3%) demonstrated slightly superior performance compared to males (30.3%). However, it is essential to note that the difference in performance between the two genders was smaller than in Experiment 1 (See Table 5). Figure 7 presents a pie chart that illustrates the varying percentages of correct choices based on gender.
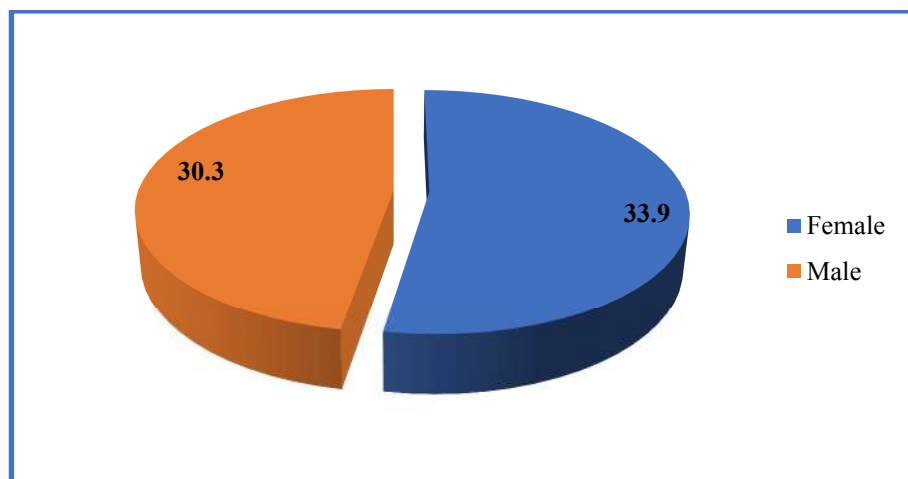
Figure 7: *Percentages of correct selections in Experiment 2 according to gender element in the sample*

The results of the averages of correct and incorrect choices for each condition in the sample were presented in Table 6 and Figure 7 below. The pseudo-words associated with correct choices were highlighted in bold red font. Furthermore, within the pseudo-words containing vowels /o:/ and /u:/ corresponding to round images, the three pseudo-words with the highest correct choices were highlighted in pink. Similarly, within the pseudo-words containing vowels /ɜ:/ and /i:/ and associated with spiky images, the three pseudo-words with the highest correct choices were highlighted in blue. Among the round vowel group, the pseudo-words /*susu*/, /*sosu*/, and /*dudo*/ exhibited the highest correct averages (77%, 77%, and 75% respectively), as depicted in Figure 8. Likewise, within the spiky vowel group, the pseudo-words /*gɜgi*/, /*ɜɜɜi*/, and /*zizɜ*/ displayed the highest correct averages (73%, 67%, and 65% respectively), also shown in Figure 8.

Table 6: *The averages of each condition in the sample of Experiment 2*

N.	pseudo-words	All		Female		Male	
		correct	incorrect	correct	incorrect	correct	incorrect
1	**b3bi** –lolu	54	46	28	24	26	22
2	did3-**nunu**	52	48	34	18	18	30
3	**g3gi**-momu	73	27	42	10	31	17
4	pip3-**susu**	75	25	33	19	42	6
5	**sosu**-t3ti	77	23	33	19	44	4
6	kik3-**fufo**	57	43	28	24	29	19
7	**3o3u**-v3vi	70	30	37	15	33	15
8	zuzo-**333i**	67	33	34	18	33	15
9	**ziz3**-vovu	65	35	35	17	30	18
1	fif3-**kuko**	69	31	37	15	32	16
1	**totu**-s3si	54	46	28	24	26	22
1	sis3-**pupo**	59	41	32	20	27	21
1	**m3mi**-gogu	51	49	32	20	19	29
1	nin3-**dudo**	77	23	44	8	33	15
1	**l3li**-bobu	62	38	31	21	31	17
	Averages	**64.1**	**35.9**	**33.9**	**18.1**	**30.3**	**17.7**
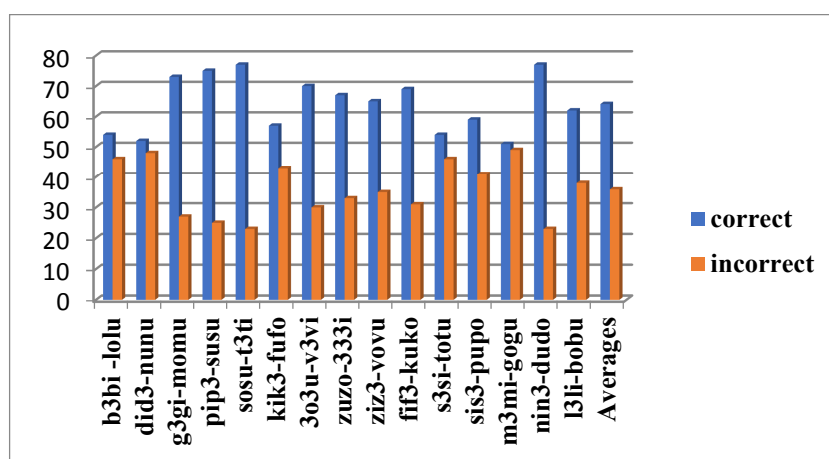
Figure 8: *The averages of each condition in the sample*

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 ($\beta = 2.84$, 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 ($\beta = -2.7$, 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.

The outcomes of this study established the connection between the vowel pairs (/o:/ and /u:/ versus /ɜ:/ and /i:/) and round and spiky images, respectively. Yet, the absence of a significant main effect of consonant identity and the lack of interaction between vowel pairs and consonant identity underlined the considerable influence of the vowel pairs in this particular context. Particularly, the pseudo-words containing /o:/ and /u:/ were consistently linked to round images more frequently than pseudo-words with /ɜ:/ and /i:/. 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.

4. Conclusions

The current study aimed at exploring the individual effect of consonants and vowels on the Takete-Maluma effect, which refers to the constant connection between specific speech sounds and visual shapes. Preceding research revealed that consonants play a more essential role than vowels in leading this effect. This study stretched the scope of tested stimuli by including eight vowels and fifteen consonants from the Kurdish language.

Experiment 1 aimed at investigating the impact of consonants in the Takete-Maluma effect. The outcomes exhibited that the consonant pairs (/l/ and /m/ versus /k/ and /t/), typically related to round and spiky images, did not significantly affect the sound-shape mapping process. In addition, the low effect of vowels and the absence of an interaction between the consonant pairs and these vowels suggested that consonants do not display a clear role in the Takete-Maluma effect. These results are incompatible with previous studies that stressed the important role of consonants in the effect. Building on these results, Experiment 2 mined deeper into the effect of vowels in separation, regardless of the consonant identity used in the context. Consequently, the goal was to decide if the observed effects in Experiment 1 were only driven by consonants or if vowels themselves have a steady influence on the outcome. The results displayed that the vowel pair /o:/ and /u:/ were constantly connected to round images, whereas the vowel pair /ɜ:/ and /i:/ were linked to spiky images. Yet, the consonants did not significantly affect the sound–shape mapping process. As a result, this work has led us to conclude that these findings further challenged the notion of consonants as the primary drivers of the Takete-Maluma effect, contrary to certain previous research.

In order to do future research, it is crucial to investigate the precise devices through which vowels and consonants enhance the Takete-Maluma effect. Additional investigations can delve into the cognitive processes involved in sound-shape mapping, considering the interaction between consonants, vowels, and other phonetic characteristics. In addition, exploring the influence of cultural and linguistic variations on sound symbolism can provide a more holistic comprehension of the Takete-Maluma effect among various populations.

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Appendix A

The choices made by the participants in Experiment 1, which were categorized as either "1" or "2", depended on their association with the round or spiky shapes of the pseudo-words.

age	gender	kata-mata	l3m3-t3k3	kiti-mili	lomo-toko	kutu-mulu	lumu-tuku	koto-molo	lama-taka
	correct code	1	2	2	1	2	2	1	2
19	Female	2	2	2	2	1	2	1	1
18	Female	1	1	1	1	1	2	1	1
18	Female	1	1	1	1	1	1	2	2
18	Female	1	2	2	1	2	1	2	1
19	Female	1	2	2	1	2	2	1	2
21	Female	2	2	2	1	2	1	1	2
19	Female	2	2	1	2	2	2	1	1
17	Female	1	2	2	1	1	2	1	2
18	Female	1	1	1	1	1	2	1	2
18	Female	1	2	1	1	2	2	1	1
19	Female	2	1	2	1	1	2	1	2
18	Female	1	2	1	2	2	2	1	1
18	Female	1	2	2	2	1	1	1	1
20	Female	1	1	2	2	2	2	2	1
19	Female	2	2	2	1	1	2	1	2
18	Female	1	2	2	1	1	1	2	2
21	Female	1	2	1	1	2	2	1	1
19	Female	1	2	2	1	2	2	1	2
19	Female	1	2	2	2	2	2	1	1
19	Female	2	1	2	1	2	2	2	1
18	Female	1	1	2	2	2	2	2	2
18	Female	1	2	1	2	1	1	2	2
23	Female	1	1	2	1	1	2	1	2
19	Female	1	2	1	1	1	1	2	2
18	Female	2	1	2	2	1	1	2	1
19	Female	1	2	2	2	1	1	1	2
19	Female	1	1	2	1	2	1	2	2
18	Female	2	2	1	2	1	2	1	2

19	Female	1	1	2	2	2	2	1	1
18	Female	2	2	1	1	1	2	2	1
22	Female	1	1	1	2	1	1	1	2
19	Female	1	2	2	1	2	2	1	2
21	Female	1	2	1	2	2	1	1	1
19	Female	1	1	2	2	2	1	2	2
20	Female	1	2	2	2	1	1	2	1
20	Female	1	2	1	2	2	1	2	2
19	Female	1	2	2	1	2	1	2	1
20	Female	2	1	1	2	1	2	1	2
19	Female	2	2	1	2	2	1	1	2
22	Female	1	2	1	2	2	2	2	1
19	Female	2	1	2	1	1	2	1	2
19	Female	1	2	2	1	2	2	1	2
21	Female	1	2	1	2	1	1	2	1
19	Female	1	1	2	1	2	1	2	1
19	Female	1	2	2	2	1	1	2	2
20	Female	1	2	1	1	1	1	2	1
19	Female	2	1	2	2	1	1	2	2
20	Female	2	1	1	2	1	2	1	1
19	Female	2	1	2	2	1	2	2	1
21	Female	1	1	2	1	2	1	1	2
20	Female	1	2	2	1	2	2	1	2
21	Female	1	2	2	1	2	2	1	2
19	Male	1	1	1	2	1	1	2	1
19	Male	1	2	2	2	2	1	1	1
19	Male	1	1	2	1	1	2	2	2
19	Male	1	2	2	1	2	1	2	1
20	Male	1	1	1	1	2	2	1	2
19	Male	1	2	2	1	2	2	1	2
20	Male	1	2	1	1	1	2	1	1
19	Male	1	2	2	2	2	2	1	2
19	Male	1	2	1	1	2	1	2	2
19	Male	1	2	1	1	2	1	1	2
20	Male	2	2	1	1	2	1	2	1
23	Male	2	1	1	1	2	1	1	1
19	Male	1	1	1	2	2	2	2	1

19	Male	2	1	1	1	1	2	1	2
18	Male	2	1	2	1	2	1	2	2
20	Male	2	1	2	2	1	1	2	2
21	Male	1	2	2	2	1	2	1	1
20	Male	2	1	1	1	1	2	1	2
19	Male	1	2	2	1	2	2	2	2
19	Male	2	1	1	1	2	1	1	1
19	Male	1	2	2	2	1	2	1	2
19	Male	2	1	2	1	2	2	1	1
22	Male	1	2	1	1	1	2	2	2
18	Male	2	2	2	1	1	1	1	1
20	Male	2	2	1	2	2	1	1	1
19	Male	2	1	2	1	1	2	1	1
18	Male	1	1	1	1	1	1	1	1
18	Male	2	1	2	1	2	2	2	1
23	Male	2	1	1	2	2	1	1	1
20	Male	1	1	1	2	2	2	1	1
19	Male	1	2	2	1	1	1	1	2
22	Male	1	2	2	2	1	1	1	2
19	Male	2	1	1	2	1	1	2	1
19	Male	1	1	2	1	1	1	1	2
20	Male	2	1	1	1	2	1	2	2
19	Male	1	2	2	1	2	1	1	1
24	Male	1	2	1	2	1	2	1	1
23	Male	2	2	2	1	2	2	1	2
20	Male	1	2	2	1	2	1	1	2
20	Male	1	2	1	2	1	1	2	1
20	Male	1	2	2	1	2	1	2	1
19	Male	1	1	1	1	1	1	1	1
22	Male	1	1	1	2	2	2	1	1
20	Male	1	1	2	2	2	2	2	2
20	Male	2	1	1	1	1	2	1	2
19	Male	2	1	1	1	1	2	1	2
21	Male	1	2	1	1	1	1	1	2
20	Male	2	1	2	1	1	2	1	1

Appendix B

The choices made by the participants in Experiment 2, which were categorized as either "1" or "2", depended on their association with the round or spiky shapes of the pseudo-words.

		b3bi-lolu	did3-nunu	g3gi-momu	pip3-susu	sosu-t3ti	kik3-fufo	3o3u-v3vi	zuzo-333i	ziz3-vovu	fif3-kuko	s3si-totu	sis3-pupo	m3mi-gogu	nin3-dudo	l3li-bobu
correct code		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
age	gender															
19	Female	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
19	Female	1	2	2	2	2	1	1	2	1	2	2	2	1	2	2
21	Female	1	2	2	2	2	1	1	2	1	2	1	2	1	2	1
20	Female	1	2	1	2	2	2	2	1	1	2	2	1	2	2	2
19	Female	1	2	1	2	1	1	1	2	1	2	2	2	1	2	1
19	Female	1	2	1	2	2	2	1	2	1	2	1	2	1	2	2
19	Female	1	2	1	2	2	2	1	2	1	2	1	1	1	2	2
18	Female	1	2	1	2	1	2	1	2	2	2	1	2	1	2	1
21	Female	1	2	1	2	1	1	1	2	1	2	1	2	1	2	1
22	Female	1	2	2	2	2	1	1	1	2	2	2	1	1	2	1
18	Female	1	2	1	2	1	2	1	1	2	2	1	2	2	2	2
21	Female	1	2	1	2	1	1	2	2	2	2	1	2	1	2	1
19	Female	1	2	1	1	1	1	2	2	2	2	1	2	2	2	1
18	Female	1	2	1	1	2	2	1	2	1	2	1	1	1	2	1
19	Female	1	2	1	1	1	2	2	2	1	1	1	2	2	2	1
20	Female	1	2	1	2	1	1	1	2	1	1	1	2	1	2	1
18	Female	1	2	1	2	1	2	2	2	2	1	1	2	2	2	2
20	Female	1	2	2	1	2	1	1	1	1	2	1	1	2	2	1
19	Female	1	2	1	2	1	1	1	1	1	2	2	1	2	2	1
18	Female	1	2	1	2	1	1	1	1	1	2	1	1	1	2	1
17	Female	1	2	1	2	1	2	1	2	1	1	2	2	2	2	2
19	Female	1	2	1	1	2	1	1	2	1	1	2	2	2	2	1
21	Female	1	2	2	2	1	2	1	2	1	2	2	1	2	1	2
19	Female	1	2	1	1	1	2	2	1	1	2	2	1	1	1	1
21	Female	1	2	1	2	1	2	2	2	2	2	1	1	1	1	2
19	Female	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1
19	Female	2	2	1	1	1	2	1	1	2	1	1	2	2	2	2
19	Female	2	2	1	1	1	1	2	1	1	2	2	2	2	2	1
19	Female	2	2	2	1	1	1	1	1	2	2	2	1	1	2	1
20	Female	2	2	1	1	2	1	2	2	1	1	2	2	1	2	2
19	Female	2	2	2	2	2	2	2	1	1	2	1	1	1	2	1
18	Female	2	2	1	1	2	2	1	2	1	2	1	1	1	1	1
18	Female	2	2	1	2	2	1	1	2	1	2	2	1	1	1	1
21	Female	2	2	1	1	1	1	1	1	1	2	1	2	2	1	2
20	Female	1	1	1	2	2	1	1	1	2	2	1	2	1	2	1
19	Female	1	1	1	1	2	2	1	2	1	1	2	2	2	2	2
19	Female	1	1	2	1	1	2	1	1	2	1	2	2	1	2	2

20	Female	2	1	1	2	1	2	2	1	1	2	1	2	1	2	1
19	Female	2	1	1	1	1	1	1	2	2	2	1	1	2	2	1
18	Female	2	1	1	2	2	1	1	2	1	2	2	2	1	2	2
18	Female	2	1	2	2	2	1	2	2	1	2	2	1	1	2	1
22	Female	2	1	2	1	1	2	1	2	2	2	2	1	2	2	2
23	Female	2	1	1	2	1	2	1	2	1	1	2	2	1	2	1
19	Female	2	1	1	1	2	1	1	1	1	1	2	1	1	2	2
18	Female	2	1	1	2	1	2	1	1	1	1	1	2	1	2	1
18	Female	2	1	2	2	1	2	1	1	2	1	1	2	1	2	1
19	Female	2	1	1	1	1	1	2	2	2	1	2	2	1	2	1
18	Female	2	1	1	2	1	2	1	1	1	2	1	2	2	2	2
18	Female	2	1	1	1	1	2	2	2	1	2	2	2	2	2	2
19	Female	2	1	1	2	1	1	1	2	1	2	1	1	2	2	1
20	Female	2	1	1	2	1	2	1	2	1	2	2	1	2	1	2
19	Female	2	1	1	2	1	2	1	2	2	1	1	1	1	1	2
19	Male	1	2	2	2	1	1	1	1	1	2	1	2	2	2	2
20	Male	1	2	1	2	1	2	1	2	1	2	2	1	2	2	1
20	Male	1	2	1	2	2	1	1	2	2	2	2	1	2	2	1
20	Male	1	2	1	2	2	2	1	2	1	1	1	2	2	2	1
19	Male	1	2	1	2	2	2	1	2	1	1	1	2	2	2	1
21	Male	1	2	2	2	1	2	2	2	2	1	1	1	2	2	1
23	Male	1	2	1	2	1	2	1	1	1	2	2	1	1	2	1
19	Male	1	2	1	2	1	2	1	2	1	2	1	1	2	2	2
22	Male	1	2	2	2	1	2	1	2	2	2	2	2	2	1	1
19	Male	1	2	1	1	1	2	2	1	2	1	1	1	2	1	1
18	Male	2	2	1	2	1	2	1	2	1	2	1	2	1	2	1
19	Male	2	2	1	2	2	2	1	2	2	2	2	1	1	2	2
19	Male	2	2	1	2	1	1	2	2	2	2	2	1	2	2	1
19	Male	2	2	1	2	1	2	1	2	1	1	1	1	2	2	2
19	Male	2	2	1	2	1	2	1	2	2	2	1	1	2	2	1
18	Male	2	2	1	2	1	2	1	1	1	2	2	1	2	2	1
23	Male	2	2	1	2	1	2	2	2	1	2	2	2	1	1	1
23	Male	2	2	1	2	2	1	1	2	1	1	2	1	2	1	1
19	Male	1	1	2	2	1	1	2	2	1	2	1	2	1	2	1
19	Male	1	1	2	2	2	1	2	1	1	2	2	2	1	2	2
19	Male	1	1	2	2	2	1	1	1	2	2	1	2	2	2	2
20	Male	1	1	2	2	1	1	2	2	2	2	2	2	2	2	1
24	Male	1	1	1	2	2	1	2	1	2	2	1	2	1	2	1
19	Male	1	1	1	2	2	1	1	2	1	2	2	1	1	2	2
21	Male	1	1	2	2	2	1	1	1	1	2	1	1	1	2	1
20	Male	1	1	2	2	1	1	1	2	2	1	2	1	2	2	2
20	Male	1	1	1	2	1	2	1	1	2	2	2	2	1	2	2
20	Male	1	1	1	2	2	2	2	2	2	1	2	2	2	2	2
18	Male	1	1	1	2	2	2	1	1	1	2	1	2	1	1	1
19	Male	1	1	2	1	1	1	1	2	1	2	1	1	2	1	1
20	Male	1	1	2	2	1	2	1	2	1	2	1	2	2	1	2
19	Male	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1
20	Male	1	1	2	2	1	2	1	2	1	2	2	2	1	1	2
18	Male	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1
20	Male	2	1	2	2	1	2	1	2	1	2	2	2	2	2	1
20	Male	2	1	2	1	1	2	2	1	2	2	1	2	1	2	1
19	Male	2	1	1	2	1	2	1	1	1	1	2	1	2	2	2

19	Male	2	1	1	1	1	2	2	2	1	1	1	2	2	2	1
20	Male	2	1	1	2	1	2	1	2	2	1	1	2	2	2	1
19	Male	2	1	1	2	1	2	1	2	2	1	1	2	2	2	1
20	Male	2	1	1	2	1	2	2	2	2	1	1	2	2	2	1
19	Male	2	1	2	2	2	1	2	1	1	2	1	2	2	2	2
19	Male	2	1	1	2	1	2	1	2	2	2	2	2	1	2	1
22	Male	2	1	2	2	2	1	2	2	1	2	1	1	1	1	2
19	Male	2	1	1	2	1	2	1	2	1	2	2	2	2	1	1
19	Male	2	1	1	2	1	1	1	2	1	1	2	2	1	1	2
20	Male	2	1	1	2	1	1	2	2	1	1	1	2	2	1	1
22	Male	2	1	1	1	1	1	1	1	2	1	1	1	1	1	2

پوخته
گەڕان بە دوای گونجاندنی سیمبۆلیزمی شێوەی دەنگ لە دیاردەی کلاسیکی بوبا-کیکی لە لایەن فێرخوازانی کورد

لە زمانە سروشتییەکاندا، پەیوەندی نێوان دەنگ و مانا، تەوەری سەرنجدان بووە لە بواری زمانەواندا. هەرچەنده زۆربەی ووشەکان پەیوەندی هەڕەمەکی لە نێوان شێوە و ماناکانیاندا نیشان دەدەن، بەڵام بەڵگەیەکی ئایکۆنییوون هەیە، کە لێکچوون نیشان دەدەن لە نێوان شێوە و مانا دا ، بەتایبەتی لە ووشە ئۆنۆماتۆپۆیەکاندا. سەبارەت بە کاریگەری بوبا-کیکی کە هەندێک دەنگ بە بەردەوامی پەیوەندییان بە شێوەی یان تیژڕەوە هەیە، ئەمەش بە شێوەیەکی بەرفراوان لێکۆڵینەوەی لەسەر کراوە. پێشتر چەندین توێژینەوە جەختیان لەسەر ڕۆڵی پیتە راستەکان کردۆتەوە لەم کاریگەرییەدا، پیتە راستەکان کاریگەرییەکی بەهێزتریان نیشانداوە بە بەراورد بە بزوێنەکان. لەسەر بنەمای ئەمە، ئەم توێژینەوەوان لێکۆڵینەوەی ئامانجی لە بەکارهێنانی پیتە راستەکان و بزوێنەکان وە کاریگەریان لەسەر بوبا-کیکیدا. دوو تاقیکردنەوەمان ئەنجامداوە بە بەکارهێنانی بابەتی کوردی ، بۆ دەرخستنی کاریگەریی هەر یەک لە پیتە راستەکان و بزوێنەکان بە جیا. تاقیکردنەوەی یەکەم جەخت کراوە لەسەر بەکارهێنانی پیتە راستەکان بە بەکارهێنانی وشەی ساختە لەگەڵ دوو ووشە لە پیتە راستەکان پەیوەست بە شێوەی بازنەی و تیژ، کە لەگەڵ بزوێنە جیاوازەکاندا تێکەڵکرابوون. ئەنجامەکانی شیکاری ئاماریی ئاشکرایان کرد کە پیتە راستەکان کاریگەرییەکی بەرچاویان هەبوە لەسەر بوبا-کیکی. بە فراوانکردنی ئەم دۆزینەوانە، لە تاقیکردنەوەی دووەمدا، کاریگەریی بزوێنەکانمان بە تەنیا ئەنجامدا، بەبێ گوێدانە چوارچێوەی پیتە راستەکان. بەم پێیە ئامانج ئەوە بوو کە بزانرێت ئایا ئەو کاریگەرییانەی لە تاقیکردنەوەی یەکەمدا بینراون تەنها بەهۆی پیتە راستەکانەوە بووە یان بزوێنەکان خۆیان دەرئەنجامەکەیان دیاری کردووە. دۆزینەوەکانی ئەم تاقیکردنەوە دیاریان خست کە جووتە بزوێنە

/ :o/ و /:u/ بەردەوام پەیوەندییان بە وێنەی گۆڕاوەوە هەیە، لەکاتێکدا جووتە بزوێن /:3/ و /:i/ بەستراوەتەوە بە وێنەی تیژ. سەرەڕای ئەوەش، پیتەراستەکان کاریگەرییەکی بەرچاویان لەسەر پرۆسەی دەنگ و شێوە نەبوو. لێرەوە، دۆزینەوەکانی ئەم توێژینەوەیە

بەپەرچی ئەو بۆچوونە دەدەنەوە کە پێوایە پیتەراستەکان بزوێنەری سەرەکی کاریگەری بوبا-کیکین، کەئەمەش پێچەوانەیە لەگەڵ هەندێک لەو لێکۆڵینەوانەی پێشوترکراون. بەڵام تائێستا هیچ لێکۆڵینەوەیەک سەبارەت بە کاریگەریی بوبا-کیکی لە زمانی کوردیدا ئەنجام نەدراوە. ئامانجی ئەم لێکۆڵینەوەیە ڕۆشنایی خستنە سەر کاریگەرییە تایبەتەکانی پیتەراستەکان و بزوێنەکان لە هێماسازیی دەنگدا، بە گرنگیدان بە پەیوەندی نێوان دەنگەکان و نموونە بینراوەکان. لە ئەنجامدا، لێکۆڵینەوەکە ڕۆشنایی دەخاتە سەر گەڕان و تویژینەوە و پێشبینی زیاترسەبارەت بە ئەگەرەکانی سروشتی سیستەمی زمان.

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الملخص

البحث عن تطابقات الرمزية الشكلية الصوتية في ظاهرة تاكيت-مالوما الكلاسيكية لدى المتعلمين الأكراد

في اللغات الطبيعية، يعتبر الربط بين الصوت والمعنى موضوعًا يلقى اهتمامًا في مجال اللغويات. على الرغم من أن غالبية الكلمات تعرض ارتباطات عشوائية بين شكلها ومعناها، إلا أن هناك دليلاً على الأيقونية، حيث يظهر التشابه بين الشكل والمعنى، وخاصة في الكلمات التي تحاكي الأصوات. تم دراسة تأثير ظاهرة تاكيت-مالوما ، حيث يتم ربط أصوات معينة بشكل مستمر بأشكال دائرية أو شائكة بشكل واسع. سبق للعديد من الأبحاث أن أكدت دور الحروف الساكنة في هذا التأثير، حيث أظهرت أن الحروف الساكنة لها تأثير أقوى بالمقارنة مع الحروف المتحركة. بناءً على ذلك، يهدف هذا البحث إلى استكشاف مساهمات الحروف الساكنة والحروف المتحركة في ظاهرة تاكيت-مالوما. أجرينا تجربتين باستخدام مشاركين أكراد، حيث تم دراسة تأثير الحروف الساكنة والحروف المتحركة بشكل منفصل. ركزت التجربة الأولى على الحروف الساكنة من خلال استخدام كلمات وهمية تحتوي على زوجي حروف ساكنة مرتبطين بأشكال دائرية وشائكة، مع استخدام حروف متحركة مختلفة. أظهرت النتائج تفضيلاً طفيفًا للحروف الساكنة على

الحروف المتحركة في ارتباطات الشكل الصوتي. كشفت نتائج التحليل الإحصائي أن الحروف الساكنة لها تأثير غير معتدل على ظاهرة تاكيت- مالوما. واستكمالاً لهذه النتائج، في التجربة الثانية، استكشفنا تأثير الحروف المتحركة بشكل منفصل، بغض النظر عن الإطار الحروف الساكنة. وبناءً على ذلك، كان الهدف هو التحقق مما إذا كانت التأثيرات التي لوحظت في التجربة الأولى ناتجة فقط عن الحروف الساكنة أم أن الحروف المتحركة نفسها تحدد النتيجة. أظهرت نتائج هذه التجربة أن زوج الحروف المتحركة /o:/ و /u:/يرتبطان بشكل مستمر بالصور الدائرية، بينما يرتبط زوج الحروف المتحركة /3:/ و /i:/ بالصور الشائكة. ومع ذلك، لم تؤثر الحروف الساكنة بشكل ملحوظ على عملية الشكل الصوتي. وبالتالي، تتحدى نتائج هذه الدراسة الرأي القائل بأن الحروف الساكنة هي العامل الرئيسي في ظاهرة تاكيت- مالوما ، على خلاف بعض الدراسات السابقة. لا يزال غير معروف أي تحقيق يتعلق بظاهرة تاكيت- مالوما في اللغة الكردية. تجمع هذه الدراسة بين الهدف من تسليط الضوء على التأثيرات المحددة للحروف الساكنة والحروف المتحركة في الرمزية الصوتية، مع التركيز على العلاقة بين الأصوات والتجسيدات المرئية. وبالتالي، ستسلط هذه الدراسة الضوء على استكشاف بحث يقدم توقعات ممكنة إضافية حول طبيعة نظام اللغة

الكلمات الدالة:

ظاهرة تاكيت- مالوما ، رمزية الصوت، التصوير الرمزي، الأشكال المستديرة والمسننة، الكردي