

Fairy-Tale Character Names and Sound Symbolism: An Experimental Study of Back and Front Vowels in Kazakh

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Abstract—This study aims to experimentally investigate how the sound-symbolic functions of back (low) and front (high) vowels are realized through the semantics of fairy-tale characters. The experiment was conducted online using the Google Forms platform and involved 55 participants. As research material, six short fairy-tale-like texts were used, each describing semantically opposed characters (e.g., a brave Lion vs. a cowardly Rabbit, a strong Wolf vs. a weak Calf). After each text, participants were presented with pairs of artificial words that were phonologically contrasted: forms dominated by back vowels versus forms dominated by front vowels (e.g., bobobo vs. bibibi). Participants were asked to rate how well each artificial word matched the given character on a 5-point ordinal scale (1–5). The collected data were analyzed in the R statistical computing environment using non-parametric statistical methods. The results demonstrate that the effect of sound symbolism varies depending on character semantics. Artificial words dominated by back vowels were consistently rated higher for characters associated with “bravery”, “strength”, and “largeness”, whereas forms dominated by front vowels were preferred for characters associated with “cowardice,” “weakness,” and “smallness”. These differences were statistically significant. In contrast, characters related to movement speed showed an asymmetrical sound-symbolic effect, while no significant differences between back and front vowels were observed for light–dark imagery or texture-based characters. Overall, the findings indicate that the sound-symbolic potential of back and front vowels is dependent on the specific character image and its semantic domain.

Index Terms—fairy-tale, characters, sound symbolism, vowels, folklore

I. INTRODUCTION

The relationship between language and meaning has long been one of the central theoretical issues in linguistics. Although the arbitrariness of the linguistic sign was established as a fundamental principle within the classical structuralist tradition (Saussure, 1999), interdisciplinary research conducted over the past decades (Lockwood et al., 2016; Sidhu & Pexman, 2018; Johansson et al., 2020; Winter & Perlman, 2021) has demonstrated that this principle is not absolute. In particular, the field of sound symbolism (also referred to as phonetic iconicity), which investigates systematic relationships between sound and meaning, has provided substantial empirical evidence that linguistic signs are not entirely arbitrary (Monaghan et al., 2012).

Sound symbolism refers to the systematic association between specific phonetic units (sounds, syllables, or prosodic features) and particular semantic concepts or perceptual properties (Magnus, 2013). It has long been observed across many languages that back or low vowels tend to be associated with concepts such as largeness, heaviness, and strength, whereas front or high vowels are more often linked to smallness, weakness, and lightness (Wichmann et al., 2010; Haynie et al., 2014). Importantly, this phenomenon is not restricted to individual languages but appears as a recurrent cross-linguistic and cross-cultural tendency, suggesting a degree of universality.

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One of the earliest experimental demonstrations of sound symbolism is Köhler's (1929) well-known bouba–kiki experiment, which showed that rounded shapes are preferentially associated with words containing back or open vowels, while angular shapes are linked to words with front or close vowels (Ramachandran & Hubbard, 2001). Subsequent studies (Imai & Kita, 2014; Elsen, 2017) have extended these findings to a wide range of semantic domains, including size, texture, movement speed, emotion, and even social evaluation (Sidhu, 2025). Moreover, sound-symbolic effects have been observed not only in adults but also in children and even in pre-linguistic infants (Nielsen & Rendall, 2011; D'Onofrio, 2013; Ozturk et al., 2013).

Nevertheless, accumulating evidence suggests that the strength and consistency of sound symbolism are not uniform across all semantic domains (Khassenov et al., 2026). While the association appears robust and stable in domains such as size, strength, and weight, it tends to be weaker or more variable in abstract or culturally mediated domains, such as light–dark contrasts or moral evaluation. This observation highlights the need to conceptualize sound symbolism not merely as a universal phenomenon but as a system constrained by specific semantic and cognitive factors.

Another important direction in contemporary research involves investigating sound symbolism through artificial words rather than natural lexical items. Because artificial words lack conventional semantic content, participants' judgments rely solely on phonetic form, allowing researchers to isolate the direct relationship between sound and meaning. This approach enhances experimental control and increases the interpretability of the results.

Following this methodological framework, the present study aims to experimentally examine the symbolic functions of back and front vowels in Kazakh across different semantic domains. The use of fairy-tale-like texts in this study is not accidental. Fairy tales are rich in semantic oppositions, cognitively accessible, and culturally familiar narrative structures. Binary oppositions such as brave–cowardly, strong–weak, and big–small are particularly salient in fairy-tale discourse (Jung, 1991; Qondybai, 2020), making it an ideal context for testing sound-symbolic effects.

It is well known that fairy-tale characters are often referred to not by personal names but by generalized labels. In Tursunov's (2004) "Genesis of the Kazakh Domestic Fairy Tale", characters such as the giant, the orphan, or the khan are shown to form oppositional pairs (e.g., orphan vs. khan, youngest son vs. elder brothers, trickster vs. khan), even though they lack individual names. In the present study, we constructed fictional characters embodying dualistic concepts and developed fairy-tale-like plots accordingly (Agabekova et al., 2024). Based on our research hypothesis, the names associated with characters—reflecting their traits and attributes—may carry sound-symbolic meaning. This assumption is grounded in the widely held view that sound symbolism played a particularly significant role in proto-language.

We hypothesize that the symbolic functions of back and front vowels are directly dependent on semantic domain. In concrete and perceptually salient domains such as strength, bravery, and size, artificial words dominated by back vowels are expected to receive systematically higher ratings, whereas in domains associated with weakness, smallness, and lightness, forms dominated by front vowels should be preferred. Confirming this hypothesis would suggest that sound symbolism in Kazakh aligns with universal tendencies observed in other languages. Notably, experimental studies of this kind have not previously been conducted in Kazakh. Although some research on sound symbolism exists (Khassenov, 2021), the interaction between fairy-tale narratives, character semantics, and the phonetic form of character names has not yet been explored.

Therefore, this study argues for treating sound symbolism not merely as a phonetic phenomenon but as a multi-layered system situated at the intersection of semantics, cognition, and discourse. The symbolic potential of back and front vowels may be activated or attenuated depending on character imagery, semantic domain, and contextual framing. In this sense, the findings contribute to a deeper understanding of the nature of language and help delineate the actual boundaries of the relationship between sound and meaning.

II. METHODOLOGY

A. Participants

A total of 55 participants took part in the study. All participants were adult native speakers of Kazakh, aged between 18 and 66 years (mean age = 41). Participation was voluntary, and informed consent was obtained through participation in the online questionnaire. The study was conducted anonymously, and no personally identifiable information was collected.

B. Stimulus Texts

Six short fairy-tale-like texts were used as experimental stimuli. Each text presented characters or entities structured around a clear binary semantic opposition relevant to sound symbolism (e.g., brave–cowardly, fast–slow, light–dark, strong–weak, smooth–rough, big–small).

1. *The Brave Lion and the Cowardly Rabbit*

Long ago, in a time when humans and animals spoke the same language, there was a sacred land between the endless steppe and the dense forest where great animals lived. In this land, the sunlight was especially warm, and the night breeze was gentle. The animals did not treat one another as enemies and each continued its life in peace.

At the center of the steppe lived a mighty lion. His mane was golden, his voice thundered like lightning, and his steps made the ground tremble. Yet the lion never used his strength against the weak. He revealed his power only when order was broken, acting as a protector of the vulnerable. For this reason, the animals called him the Guardian of the Steppe.

In one corner of the forest lived a small rabbit. His eyes were wide, his ears long, and his heart was constantly filled with fear. Every sound seemed dangerous to him; even the rustling of leaves made him hide in his burrow. The animals did not mock him, but they were surprised by the depth of his fear.

One day, a severe drought struck the land, and a fire broke out in the steppe. Red flames moved toward the forest, and the animals were overcome with panic. Some ran east, others west, but no one knew what to do.

At that moment, the lion climbed onto a high rock and roared:

“Stop! If everyone runs in different directions, we will all perish! Follow me to the river!”

The animals followed him. The rabbit, though terrified, ran after the lion as well. Along the way, he stopped many times, but whenever he looked back and saw the flames approaching, he forced himself to move again.

In the end, they all reached the river and survived. After the fire subsided, the animals bowed to the lion. At that moment, the lion turned to the rabbit and said:

“Even though you were afraid, you did not stop. Bravery is not the absence of fear, but moving forward despite fear.”

2. The Fast Eagle and the Slow Tortoise

Long ago, when the earth and the sky still shared their secrets, living beings dwelled in harmony between the wide steppe and the towering mountains. In this land lived a majestic eagle who ruled the sky. He soared high, vanished from sight in an instant, and reached distant places with great speed. The eagle considered himself a symbol of freedom and believed he was faster than the wind itself.

Below, among springs and green grass, lived a tortoise. His movement was slow, his steps heavy, but every motion was deliberate. He never hurried, yet he always completed what he began.

One day, a harsh drought struck the land. Rivers shrank, springs dried up, and the animals grew anxious in search of water. From high above, the eagle spotted a glimmer of water at the foot of a distant cliff and cried:

“I will reach it first!”

He flew swiftly and arrived quickly, but the water turned out to be only a temporary puddle left by rain, which soon dried up.

The tortoise, sensing moisture in the ground, slowly scraped the soil and discovered the source of an old spring. When water emerged from beneath the earth, he called the other animals.

The animals were saved from thirst. At that moment, the eagle acknowledged that the saying “slow and steady wins the race” was indeed true.

3. The Bright Sun and the Dark Cave

Long ago, when the earth and the sky could still listen to one another, two powerful places existed in the vast land. One was the Bright Sun in the sky, and the other was the Dark Cave inside the mountain.

Every morning, the Sun poured out its golden rays, awakening the earth and giving life to all beings. Wherever its light touched, flowers bloomed and birds sang. Humans and animals alike regarded it as the source of life.

Inside the mountain, the Cave was filled with darkness. No light entered it; it was cool and silent. Yet within that darkness lay ancient secrets, underground waters, and the strength of stone. Those who saw the Cave were afraid, but for bats and insects it was a safe shelter.

One year, intense heat scorched the steppe, and the land began to burn. The Sun gave its light without restraint, yet life started to weaken. The animals fled to the mountains and hid in the Cave. Its coolness saved them.

Seeing this, the Sun realized that even light has its limits. The Cave, in turn, understood that without light, nothing can grow.

4. The Strong Wolf and the Weak Calf

Long ago, on a steppe stretching to the horizon, wild animals and domestic animals grazed in the same pasture. There lived a powerful wolf with well-defined muscles. His run was swift, his teeth sharp, and his voice terrifying. He believed himself to be the strongest of all animals.

In the same pasture wandered a young, weak calf. His steps were unsteady, his voice faint, and he was unable to defend himself. He always lagged behind the herd.

One day, a fierce snowstorm struck, and the cold intensified across the steppe. The animals searched for shelter. The wolf found a cave, but it was narrow. The calf stood outside, shivering with cold.

At that moment, the wolf shared his cave and let the calf inside. Together, they survived the storm. Then the wolf realized that strength lies not only in muscles, but also in compassion.

5. The Smooth Lake and the Rough Rock

Long ago, when mountains and rivers could speak to one another, a Smooth Lake and a Rough Rock lived at the foot of a high peak.

The surface of the lake was smooth like a mirror, gently rippling even when the wind blew. Anyone who looked into it could see their reflection clearly. The Rock, by contrast, was rough and jagged, with sharp edges that seemed capable of wounding anyone who touched it.

One day, a violent storm broke out and heavy rain fell. Water flowed down the mountain, slid over the Rock, and eventually poured into the Lake. The Rock obstructed the water, while the Lake received it and calmed it.

6. The Big Tree and the Small Wind

Long ago, when humans and animals spoke the same language, there was a remarkable forest in the great steppe. In this forest stood a giant tree. Its trunk was thick, its branches reached the sky, and its leaves shaded the land below. When it rained, water gathered at its roots; when the sun shone, all animals gathered in its shade.

The animals called it the Great Tree. It was the heart of the forest. Birds built nests in its crown, wolves rested beneath it, and foxes hid among its roots.

One day, a small wind arrived from afar. It was weak and thin, blowing only in whispers. It tried to move the leaves of the Great Tree, but the tree did not stir. The wind became offended.

“I am small, but I am alive,” said the wind.

“And I am big, but I remain silent,” replied the tree.

Days passed. Autumn came. The Great Tree grew heavy and began to shed its leaves. Then the small wind grew stronger, running around and scattering the fallen leaves. It blew sometimes fast, sometimes slow. The tree creaked.

Finally, when winter arrived, one branch of the giant tree broke. The wind became faster than ever. Though small, it realized that it could move everything.

All texts were specifically constructed to activate semantic domains commonly associated with sound symbolism and were comparable in length, narrative structure, and stylistic simplicity.

C. *Experimental Tool and Procedure*

The experiment was conducted online using the Google Forms platform. The questionnaire structure was identical for all participants.

Each participant read the six fairy-tale texts in a fixed order. After each text, participants were presented with pairs of artificial (nonce) words designed to be phonologically contrasted while lacking any lexical meaning.

The artificial words were grouped into two phonetic types:

- Back-vowel-dominant forms (e.g., momono, bobobo, patata),
- Front-vowel-dominant forms (e.g., mimini, bibibi, kipiti).

These nonce words were selected to ensure that participant judgments were based solely on phonetic structure rather than semantic associations.

D. *Rating Scale*

Participants evaluated how well each artificial word matched the given character or image using a 5-point Likert-type scale:

- 1 – does not match at all
- 2 – weak match
- 3 – neutral
- 4 – good match
- 5 – very good match

Thus, each participant provided a numerical rating for each artificial word associated with each fairy-tale scenario.

E. *Variables*

The primary independent variable was phonetic structure (back-vowel-dominant vs. front-vowel-dominant forms).

The dependent variable was the matching rating provided by participants on the 1–5 ordinal scale.

For additional analysis, a median difference score was calculated to quantify the contrast between back- and front-vowel forms ($\Delta = \text{median_back} - \text{median_front}$).

F. *Statistical Analysis*

Because the ratings were measured on an ordinal scale, non-parametric statistical methods were applied. Differences between back-vowel and front-vowel forms were tested separately for each semantic opposition using the Wilcoxon signed-rank test.

Results were summarized using medians, standard deviations (SD), and p-values. Statistical significance was set at $p < 0.05$. All analyses were conducted in the R statistical computing environment.

G. *Ethical Considerations*

All ethical standards for human-subject research were fully observed. Participants were informed about the purpose of the study, participation was voluntary, and responses were collected anonymously.

III. RESULTS

This section presents the experimental results based on the semantics of fairy-tale characters. The analysis focused on the matching ratings assigned to artificial words dominated by back versus front vowels across different character types. Because all ratings were collected on a 1–5 ordinal scale, the data were analyzed using non-parametric methods in the R statistical computing environment. The results make it possible to identify differences in the evaluation of back- and front-vowel forms across semantic oppositions, as well as to assess the extent to which these differences depend on character

type. Below, the comparative results are presented in sequence for strength–weakness, size, movement speed, light–dark, and textural imagery.

A. Results for *The Brave Lion and the Cowardly Rabbit*

The statistical analysis clearly demonstrated a systematic association between vowel quality (back vs. front) and character semantics (Table 1).

TABLE 1
STATISTICAL RESULTS

No	Character	Median_momono	Median_mimini	SD_momono	SD_mimini	Median_delta	p_value
1	<i>Brave Lion</i>	4	1	1.49	1.25	3	<0.001
2	<i>Cowardly Rabbit</i>	2	4	1.27	1.42	-1	<0.001
3	Delta comparison	NA	NA	NA	NA	NA	<0.001

The brave Lion character was rated significantly higher with the back-vowel-dominant form (momono) than with the front-vowel-dominant form (mimini) (Median = 4 vs. 1; $p < 0.001$). This result provides strong evidence that back vowels are associated with concepts of strength, bravery, and largeness.

In contrast, the Cowardly Rabbit character showed the opposite pattern: the front-vowel-dominant form (mimini) received significantly higher ratings than the back-vowel form (momono) (Median = 4 vs. 2; $p < 0.001$). This finding indicates a close association between front vowels and semantic attributes such as weakness, smallness, and cowardice.

A comparison of the median differences between back- and front-vowel forms ($\Delta = \text{back} - \text{front}$) further confirmed that the effect is dependent on character type. For the Brave Lion, the difference was positive ($\Delta = +3$), whereas for the Cowardly Rabbit, the difference was negative ($\Delta = -1$). This contrast was statistically highly significant ($p < 0.001$).

Overall, these results indicate that back and front vowels function not merely as phonetic features but as sound-symbolic cues that reflect the semantic characteristics of fairy-tale characters.

B. Results for *the Strong Wolf and the Weak Calf*

The statistical data likewise revealed a systematic relationship between vowel quality and character representation within the strength–weakness semantic domain (Table 2).

TABLE 2
STATISTICAL RESULTS

No	Character	Median_bobobo	Median_bibibi	SD_bobobo	SD_bibibi	Median_delta	p_value
1	<i>Strong Wolf</i>	4	2	1.64	1.27	1	< 0.001
2	<i>Weak Calf</i>	2	4	1.37	1.58	-1	0.00242
3	Delta comparison	NA	NA	NA	NA	NA	< 0.001

For the Strong Wolf character, the back-vowel-dominant form (bobobo) was rated significantly higher than the front-vowel-dominant form (bibibi) (Median = 4 vs. 2; SD = 1.64 and 1.27, respectively; $p < 0.001$). This result supports the association of back vowels with powerful, forceful, and potentially aggressive character traits.

By contrast, for the Weak Calf character, the front-vowel-dominant form (bibibi) received significantly higher ratings than the back-vowel form (bobobo) (Median = 4 vs. 2; SD = 1.58 and 1.37, respectively; $p = 0.002$). This pattern indicates a strong link between front vowels and semantic attributes such as weakness, softness, and vulnerability.

The comparison of median differences ($\Delta = \text{back} - \text{front}$) again confirmed the dependence of the effect on character type: a positive difference was observed for the Strong Wolf ($\Delta = +1$), while a negative difference was found for the Weak Calf ($\Delta = -1$). This contrast was statistically significant ($p < 0.001$).

C. *The Fast Eagle and the Slow Tortoise*

For the Fast Eagle character, the front-vowel-dominant form (titiki) received higher ratings than the back-vowel-dominant form (totoko); however, this difference did not reach statistical significance ($p = 0.11$). This result suggests that the sound-symbolic encoding of speed is relatively weak and variable (Table 3).

TABLE 3
STATISTICAL RESULTS

No	Character	Median_titiki	Median_totoko	SD_titiki	SD_totoko	Median_delta	p_value
1	<i>Fast Eagle</i>	3	2	1.65	1.33	0	0.11
2	<i>Slow Tortoise</i>	2	4	1.23	1.51	-2	<0.001
3	Delta comparison	NA	NA	NA	NA	NA	<0.001

In contrast, for the Slow Tortoise character, the back-vowel-dominant form (totoko) was rated significantly higher than the front-vowel form (titiki), and this difference was statistically highly significant ($p < 0.001$). These findings are

consistent with previous research. The back vowel /o/ has been associated with meanings such as slowness, gradualness, and roundness, which appear to align well with the tortoise character.

The comparison of differences between back and front vowels (Delta comparison) further confirmed that this sound-symbolic effect is dependent on character semantics ($p < 0.001$).

D. The Bright Sun and the Dark Cave

In myths and fairy tales, the light–dark contrast represents one of the most salient semantic oppositions, often underlying antonymic pairs such as good–evil and day–night. According to the hypothesis, concepts related to light are expected to be associated with front vowels, whereas back vowels are assumed to be linked to darkness (Ludwig et al., 2011).

However, the results of the present study did not support this prediction. For the Bright Sun character, the difference between the front-vowel-dominant form (pitiki) and the back-vowel-dominant form (potoko) was not statistically significant (Median = 3 vs. 4; SD = 1.47 vs. 1.71; $p = 0.119$) (Table 4).

TABLE 4
STATISTICAL RESULTS

N ^o	Character	Median pitiki	Median potoko	SD pitiki	SD potoko	Median delta	p value
1	Bright Sun	3	4	1.47	1.71	-1	0.119
2	Dark Cave	2	3	1.65	1.54	0	0.278
3	Delta comparison	NA	NA	NA	NA	NA	0.628

Similarly, for the Dark Cave character, no statistically significant difference was observed between the front-vowel (pitiki) and back-vowel (potoko) forms (Median = 2 vs. 3; SD = 1.65 vs. 1.54; $p = 0.278$). The Delta comparison also indicated that the sound-symbolic effect in this semantic opposition was not systematic ($p = 0.628$).

Overall, these findings indicate that the symbolic functions of back and front vowels are not equally activated across all semantic domains. In particular, for abstract concepts such as light and darkness, sound-symbolic encoding appears to be weak and highly variable. This outcome contrasts with several previous studies, which have reported systematic associations between front vowels and lightness, and back vowels and darkness. In the present experiment, however, no such clear distinction emerged for the light–dark opposition.

E. The Smooth Lake and the Rough Rock

For textural imagery, clear differences were observed in the perception of back-vowel (Rorora) and front-vowel (Rereri) forms. For the Smooth Lake character, the median rating of the back-vowel form (Rorora; Median = 3) was higher than that of the front-vowel form (Rereri; Median = 2), and this difference was statistically significant (Wilcoxon signed-rank test, $p = 0.039$). This result suggests that back vowels evoke relatively stronger associations with smooth textures (Table 5).

TABLE 5
STATISTICAL RESULTS

N ^o	Character	Median popora	Median pereri	SD popora	SD pereri	Median delta	p value
1	Smooth Lake	3	2	1.26	1.27	0	0.03866
2	Rough Rock	3	2	1.47	1.35	-1	0.00103
3	Delta comparison	NA	NA	NA	NA	NA	0.07704

A similar pattern was found for the Rough Rock character: the back-vowel form (Rorora; Median = 3) was rated higher than the front-vowel form (Pereri; Median = 2), with a highly significant difference ($p = 0.001$). This indicates that rough and coarse textures are more strongly associated with back vowels in participants' perceptions.

However, when comparing the magnitude of the vowel-based differences (delta) between the smooth and rough conditions, no statistically significant difference was found ($p = 0.077$). Thus, although an overall preference for back vowels was observed in both textural conditions, the strength of the sound-symbolic effect did not systematically increase or decrease within the textural domain. These results suggest that back vowels are associated with both smooth and rough textures, but that the relative strength of this association varies across specific textural contexts.

F. The Big Tree and the Small Wind

In the Big Tree – Small Wind opposition, the symbolic evaluation of back and front vowels revealed clear and statistically significant differences (Table 6).

TABLE 6
STATISTICAL RESULTS

N ^o	Character	Median kipiti	Median patata	SD kipiti	SD patata	Median delta	p value
1	Big Tree	2	3	1.14	1.44	-1	< 0.001
2	Small Wind	4	3	1.41	1.34	1	0.00128
3	Delta comparison	NA	NA	NA	NA	NA	< 0.001

For the Big Tree character, the back-vowel form (patata) was rated significantly higher than the front-vowel form (kipiti) (Median = 3 vs. 2; Wilcoxon paired test, $p < 0.001$). This finding supports the association between back vowels and large, heavy, and stable objects.

Conversely, for the Small Wind character, the front-vowel form (kipiti) received significantly higher ratings than the back-vowel form (patata) (Median = 4 vs. 3; $p = 0.00128$). This result highlights a strong association between front vowels and small, light, and dynamic phenomena.

The Delta comparison demonstrated that the direction of the effect was opposite for the two characters and that the contrast between them was highly significant ($p < 0.001$).

Overall, these results provide strong evidence that back vowels are systematically associated with largeness, whereas front vowels are linked to smallness, confirming that sound symbolism is robust and stable in the domain of size semantics.

IV. DISCUSSION

The present study experimentally examined the sound-symbolic functions of back and front vowels across different semantic oppositions. The results demonstrate that the effects of sound symbolism do not manifest uniformly across all semantic domains, but instead emerge systematically in some domains while remaining weak or absent in others. The discussion below is based exclusively on the empirical findings obtained in the experiment.

From a theoretical perspective, these findings align with cross-linguistic research on sound symbolism, which has repeatedly shown that low or back vowels tend to be associated with concepts such as largeness, heaviness, and strength, whereas high or front vowels are more often linked to smallness, lightness, and weakness (Wichmann et al., 2010; Sidhu & Pexman, 2018). One possible explanation for this pattern is articulatory and perceptual: the production of back vowels involves a lower tongue position and a wider oral cavity, which may perceptually correlate with the conceptual domain of largeness or strength. In contrast, front vowels are produced with a higher tongue position and a narrower oral cavity, which may evoke associations with smaller or lighter entities. The present results therefore support the view that sound symbolism is grounded in both articulatory and perceptual mechanisms.

First, the results related to strength and bravery semantics reveal a clear and robust pattern. For the Brave Lion and Strong Wolf characters, artificial words dominated by back vowels were rated significantly higher than front-vowel-dominant forms ($p < 0.001$). Conversely, for the opposing characters—the Cowardly Rabbit and the Weak Calf—front-vowel-dominant forms received significantly higher ratings. These findings provide strong evidence that back and front vowels are associated in opposite directions with semantic attributes such as strength versus weakness. Moreover, the systematic reversal of the median difference values (Δ) across character types confirms that this effect is not random but tightly linked to character semantics.

A similar pattern was observed for size-related semantics. In the Big Tree condition, the back-vowel-dominant form was rated higher, whereas in the Small Wind condition, the front-vowel-dominant form showed a statistically significant advantage ($p < 0.001$). In this domain, the correspondence between back–large and front–small was clearly expressed in both directions. The highly significant Delta comparison further indicates that sound symbolism operates in a stable and consistent manner in the domain of size semantics.

In contrast, the results for movement speed were less uniform. For the Fast Eagle character, the median rating of the front-vowel-dominant form was higher than that of the back-vowel form; however, this difference did not reach statistical significance ($p = 0.11$). By comparison, for the Slow Tortoise character, the back-vowel-dominant form was rated significantly higher ($p < 0.001$). These findings suggest an asymmetrical pattern in the sound-symbolic encoding of speed: while slowness shows a stable association with back vowels, no comparable systematic pattern emerges for fast movement.

No sound-symbolic effect was observed for the light–dark semantic opposition. For both the Bright Sun and the Dark Cave characters, no statistically significant differences were found between back- and front-vowel-dominant forms ($p > 0.1$). The Delta comparison likewise failed to reach significance ($p = 0.628$). Within the scope of the present material, these results indicate the absence of a systematic relationship between the light–dark semantic contrast and the back–front vowel opposition.

The findings for texture-related imagery showed partial regularities. For both the Smooth Lake and the Rough Rock characters, back-vowel-dominant forms were rated significantly higher than front-vowel-dominant forms ($p = 0.039$ and $p = 0.001$, respectively). However, the comparison of the magnitude of the vowel-based differences between smooth and rough textures did not yield a statistically significant result ($p = 0.077$). This suggests that although back vowels show a general advantage in texture-related evaluations, the strength of the sound-symbolic effect does not systematically increase or decrease within the textural domain itself.

Taken together, the results clearly demonstrate that the effect of sound symbolism is dependent on semantic domain. Domains such as strength, weakness, and size show stable and consistent oppositions between back and front vowels, whereas domains such as speed, light–dark contrast, and texture display weaker, asymmetrical, or non-systematic patterns. In addition, Figure 1 presents the distribution of ratings for each artificial word using violin plots.

An additional factor that may influence these associations is the phonological structure of the Kazakh language itself. Kazakh is characterized by a strong system of vowel harmony that systematically distinguishes front and back vowel classes. Native speakers are therefore highly sensitive to this phonological opposition in their linguistic experience. It is possible that this sensitivity reinforces the perceptual salience of front–back vowel contrasts in experimental tasks such

as the present study. In this sense, the observed sound-symbolic patterns may reflect not only universal tendencies but also language-specific phonological structures (Iskakov, 1991; Khassenov & Ibraimova, 2025).

The distributions indicate that artificial words containing back vowels (momono, potoko, rorora, bobobo, totoko, patata) generally received higher median ratings. For these forms, the bulk of the ratings clustered in the middle-to-high range of the scale (3–5). In contrast, artificial words dominated by front vowels (mimini, pitiki, rereri, bibibi, titiki, kipiti) tended to receive ratings concentrated in the lower-to-middle range (1–3) (Fig. 1).

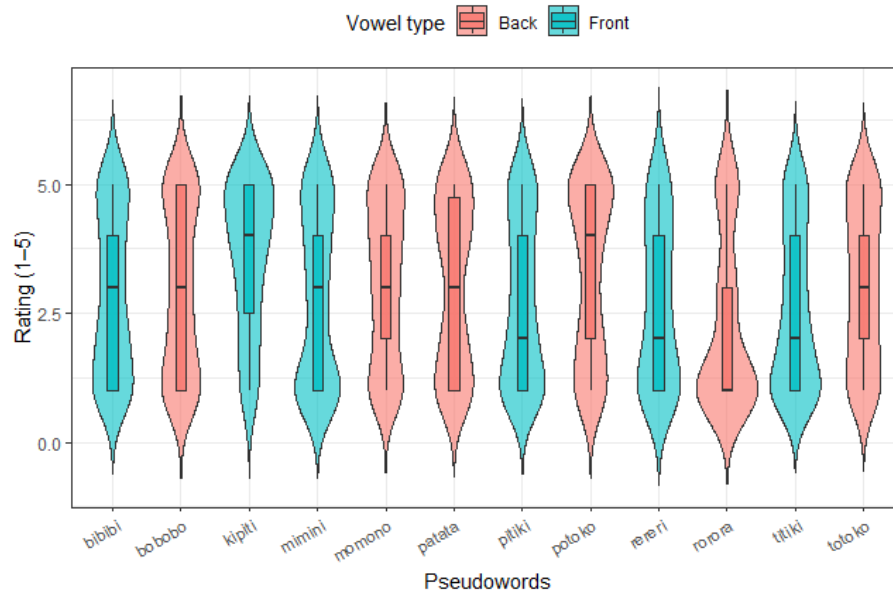


Figure 1. Distribution of Ratings Given to Artificial Words With Thick/Back and Thin/Front Vowels (Violin Plot)

The violin plots further demonstrate that the distinction between back and front vowels is preserved at the level of individual artificial words. Although the distributional shapes differ across stimuli, the direction of the medians consistently indicates higher ratings for back-vowel forms and relatively lower ratings for front-vowel forms. This pattern confirms that the observed differences are not driven by isolated stimuli but reflect a general trend across the entire set of artificial words.

Finally, these findings suggest that sound symbolism may play a particularly important role in the naming of primordial oppositions underlying mythological and fairy-tale discourse. It is well known that characters in ancient myths and fairy tales are often referred to by generalized labels rather than individual names (e.g., the trickster, the poor man, the rich man, the youth). The dualistic nature of fairy tales—manifested in oppositions such as day–night, light–dark, strong–weak, and big–small—appears to align naturally with sound-symbolic patterns. Previous research has shown that in certain Kazakh fairy tales, phonetic elements within character names encode semantic contrasts such as plurality versus singularity or strength versus weakness, in direct correspondence with both character roles and narrative structure. The present study similarly demonstrates that the dualistic structure of fairy-tale narratives aligns closely with sound-symbolic encoding, pointing to the deep historical roots of this phenomenon.

V. CONCLUSION

This study experimentally examined the sound-symbolic functions of back and front vowels across different semantic domains. An online experiment conducted via the Google Forms platform involved 55 participants, who evaluated the degree of correspondence between fairy-tale-based characters and artificial words using a 5-point ordinal scale. The collected data were analyzed in the R statistical computing environment using non-parametric methods.

The results demonstrate that the effect of sound symbolism does not manifest uniformly across all semantic oppositions. In domains related to strength, weakness, and size, the evaluation of back- and front-vowel-dominant forms consistently followed opposing patterns. Artificial words dominated by back vowels received higher ratings for strong, brave, and large characters, whereas front-vowel-dominant forms were preferred for weak, fearful, and small characters. In these domains, the observed differences were statistically significant.

The findings for movement speed revealed an asymmetrical pattern. While back vowels showed a statistically significant advantage in representations of slow movement, no significant difference between back and front vowels emerged in the domain of speed. In the light–dark semantic opposition and in some texture-related conditions, the sound-symbolic effect appeared weak or inconsistent.

Overall, the results indicate that the sound-symbolic potential of back and front vowels is strongly dependent on semantic domain. In concrete and perceptually salient domains, sound-symbolic effects are robust and systematic,

whereas in more abstract or cognitively complex domains, these effects tend to weaken or disappear altogether. Thus, the present study provides experimental evidence for the manifestation of sound symbolism in Kazakh and helps delineate the conditions under which sound–meaning correspondences are most likely to emerge.

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