Magnitude Sound Symbolism in the Names of Fictional Bears and Mice

1. Introduction

The idea that the sounds of words are arbitrary—that is, unrelated to their meanings—is foundational to the field of linguistics (Blasi et al., 2016; Jurafsky, 2015; Nuckolls, 1999). However, a significant body of research indicates that this is not always the case. Instead, according to a literature review in *Annual Review of Anthropology,* certain sounds tend to be associated with specific concepts across cultures and languages. This phenomenon is known as sound symbolism and suggests the influence of innate—rather than solely cultural—tendencies to assign meaning to sound (Nuckolls, 1999).

Nuckolls writes that the best-proven sound-symbolic relationship is between vowel sounds and perceptions of size. Those pronounced with the tongue high at the front of the mouth—such as the [i] in *cheese* and the [ɪ] in *this*—tend to be associated with smallness, lightness in color and weight, thinness, quickness, weakness, and prettiness. By contrast, back vowels such as [u] (as in *you)* and low vowels such as [a] (as in *pod)* are made with the tongue towards the back of the throat and/or low in the mouth and are associated with things that are large, dark, heavy, thick, slow, and strong. While the former relationship is well-documented, there is significantly less evidence for the latter (Nuckolls, 1999).

This study seeks to determine whether these symbolic relationships are reflected in the names of fictional mouse and bear characters. Compared to humans and other commonly anthropomorphized animals, such as dogs, cats, horses, and rabbits, bears are significantly larger, darker, heavier, fatter and stronger. On the other hand, mice are much smaller, weaker, lighter and quicker than these same animals. While some studies have explored magnitude symbolism in

names, comparing those of men and women (Pitcher et al., 2013), Pokémon of varying sizes and strengths (Kowahara et al., 2018), and large and small characters in Chinese children's literature (Wang, 2021), the differences between bears and mice are more dramatic and encompass nearly every component of magnitude symbolism. By comparing vowels in the names of such different species to each other and to each vowel's frequency in English, I hope to provide more evidence for the existence of vowel-related magnitude sound symbolism overall, and augmentative symbolism (the link between back vowels and largeness) specifically.

2. Review of the Literature

2.1. The Existence of Sound Symbolism

"The Case for Sound Symbolism," a review of the subject in *Annual Review of Anthropology,* describes sound symbolism research as a "controversial subject" among linguists because it conflicts with a central axiom of the field: that the relationship between sounds and their meanings is arbitrary. That axiom is mostly true—if it were not, the meaning differences between words like "tip" and "dip" could be easily understood by non-English speakers. However, Nuckolls writes that some anthropological evidence suggests that specific sounds may be more likely to be associated with certain meanings across languages, implying a species-wide tendency to associate some sounds with certain concepts (1999).

The most comprehensive support for sound symbolism's existence comes from a 2016 analysis of vocabulary in 62% of the world's languages. This study found that, across continents and language families, a considerable number of words are biased toward or away from certain sounds. For example, words for *nose* were more likely to contain the nasal sound [n] and the back vowel [u] (as in *glue*); words for *round* were associated with [r]; and words for *full* often

contained the bilabial stops [p] and [b], which leave the mouth full of air (Blasi et al., 2016). If the sounds of words were completely unrelated to their meanings, such a strong correlation would not exist. The extent to which terms from unrelated languages share sounds is very unlikely to be coincidental; the probable explanation is that those sounds carry some symbolic associations.

2.2. Magnitude Symbolism: Vowels and Size

Magnitude sound symbolism–the idea that sounds can signify qualities related to *big* and *small*–is the most widely-evidenced sound-symbolic claim. Most studies on this subject focus on two qualities of vowel sounds: vowel backness and vowel height (Nuckolls, 1999). In his book *The Language of Food*, Jurafsky explains that *front vowels*, such as [i] (as in *cheese*) and [ɪ] (as in *hit*), are articulated with the tongue in the front of the mouth. [i] and [ɪ] are also *high vowels*, meaning that they are pronounced with the tongue near the top of the palate. Both front and high vowels can symbolize smallness, while *back vowels* (articulated toward the back of the throat, like the [u] sound in *you*) and *low vowels* (made with the tongue low in the mouth, like the [ɑ] in *pod*) are associated with largeness (2015).

The best-documented association in magnitude symbolism is between front vowels—especially [i], the highest and furthest front—and diminutive size, while there is comparatively less evidence for an association between back vowels and large size. Blasi et al., for example, found that words for *small* were likely to contain [i], but they saw no corresponding relationship between words for *big* or *large* and low back vowels such as [o] (2016). But several other—albeit more limited—analyses indicate the presence of both sound symbolic relationships (Nuckolls, 1999). One example is a 1994 survey of Huambisa, an indigenous language of Peru and Ecuador, which found that smaller species of birds and fish tend to be named with high front

vowels, while the names of larger species contain more low back vowels like [a] and [u] (Berlin, 1994). Therefore, while the symbolic link between front vowels and smallness is better proven than that between back vowels and largeness, evidence for the latter relationship does exist.

Many studies of magnitude symbolism suggest that the contrasting symbolism of front and back vowels extends to attributes related to size, such as weight, speed, distance, light or dark color, and even gender and personability (Nuckolls, 1999). In his 2000 experiment, researcher Richard Klink tested these connections. Subjects were presented with pairs of made-up product brands with names that were identical except for the front-ness or back-ness of their vowels. Participants answered questions like "Which brand of ketchup seems thicker, Nidax or Nodax?" and "Which internet service seems faster, Nellar or Nullar?". Participants consistently rated brands with front vowels as smaller, lighter in weight and color, thinner, softer, faster, colder, friendlier, weaker, more feminine, and prettier than those with back vowels (Klink, 2000). A similar experiment found that these principles held true in Chinese, French and Spanish, at least for subjects proficient in English (Shrum et al., 2012). These experiments with invented brand names show that our magnitude-related associations are complex. However, as Jurafski (2015) notes, some conceptual links–like, in this case, those between smallness and prettiness or friendliness–may not exist in all cultures.

2.3. Magnitude Sound Symbolism and Names

Experiments like Klink's (2000) show that the sounds of made-up names can affect people's perception of their referents. Fewer studies have investigated the influence of magnitude vowel sound symbolism in the *choosing* of names, but those that have indicated it to be a rich and relevant subject of sound-symbolic study. One analysis of the 50 most common American, English, and Australian baby names found that, from 2001 to 2010, girls' names were

more likely to have stressed front vowels than boys', which contained more stressed low and back vowels. This trend, the authors suggest, is due to the fact that larger and taller men are considered closer to a masculine ideal, while smallness and thinness is valued in women (Pitcher et al., 2013).

Other studies have explored the influence of sound symbolism on names assigned to fictional characters. One analysis of Japanese Pokémon names found that vowel height (how high the tongue is in the mouth), rather than vowel backness, had an influence–though not a very large one–on naming conventions, with high first vowels being associated with smaller, lighter Pokemon (Kawahara et al., 2018). Although an even more recent study of character names in Chinese children's literature found no association between vowel backness and the size of animal characters, it did find that the names of monsters were more likely to contain the backmost back vowel [u] (Wang, 2021). This study seeks to build on Pitcher, Kowahara and Wang's findings, adding to the relatively small body of evidence supporting the influence of sound symbolism on naming conventions.

3. Methodology

3.1. Data Source

I compiled and analyzed two corpora: one of the names of anthropomorphic bears, and one of the names of anthropomorphic mice. These corpora were selected to address variables that previous studies may have missed. Although Pitcher et al. (2017) found magnitude symbolism in human names, it can be assumed that the naming of children involves more factors unrelated to simple physical description–such as complex cultural values and the names of friends and relatives–than the naming of fictional characters. Anthropomorphic animals are a good choice

because they are often different in size, but neither Kowahara nor Wang compared two species as different in nearly every magnitude-symbolic category—size, strength, speed, weight, shape and color—as bears and mice. It is also unclear whether the large species of animal in Wang's children's books are actually drawn to be significantly larger than the small ones (2021), but bears and mice are rarely depicted as similarly-sized. Finally, while the names of Pokémon were developed by a single team of creators, my corpora draw from the works of many different artists.

Data for this study was collected from a website called Ranker, which ranks the 50 most popular items in a category (in this case, fictional bears and mice) according to user votes. Using Ranker's lists as a base, I excluded the names of animals that were not of the correct species, such as rats and Pokémon; those that were not alive, such as teddy bears and mascots; those that were not anthropomorphized; and those belonging to non-English-language media or franchises. I also removed characters referred to only by species (e.g., Grizzly and Dormouse) or role (Mama and Papa) and groups of animals such as the Berenstain Bears or the Three Blind Mice. Finally, I excluded the names of human characters who are turned into animals but kept the names of shapeshifting characters. For characters with multiple names, such as Winnie the Pooh, I recorded the most commonly used name (e.g. Pooh). At the end of this elimination process, the names of 37 bears and 42 mice remained; these were the corpora that I analyzed.

3.2. Methods

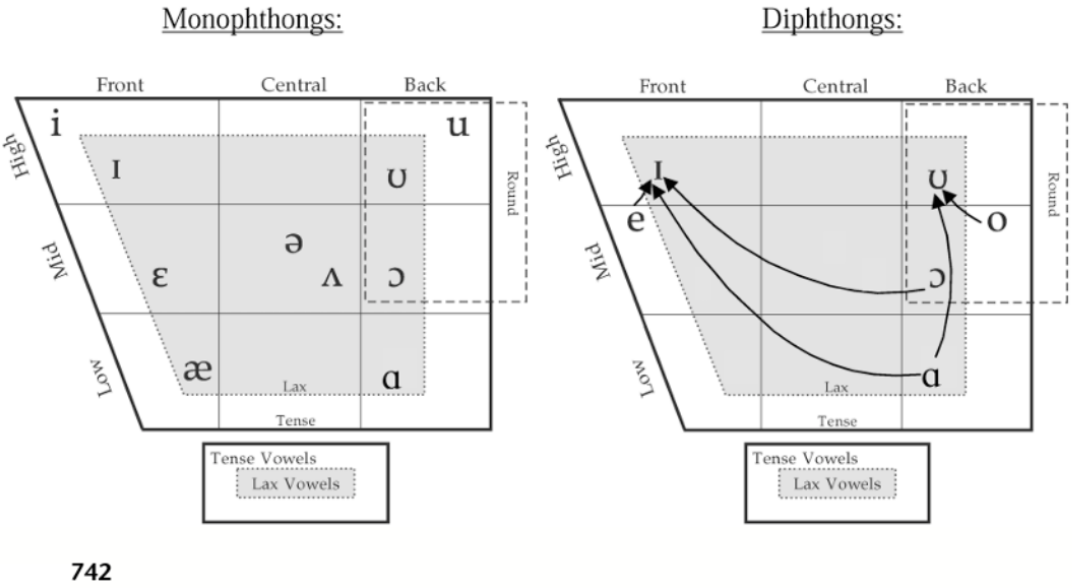
The following hypotheses were developed according to the principles of magnitude sound symbolism: (1) the names of fictional anthropomorphized bears contain more stressed low and back vowels than mouse names and English words as a whole, and (2) the names of fictional

anthropomorphized mice contain more stressed high and front vowels than bear names and English words as a whole.

To test these hypotheses, the first stressed vowel of each name was transcribed into IPA (International Phonetic Alphabet) notations and recorded, then categorized according to height and backness as represented on IPA pronunciation charts (see Figure 1).

Figure 1.

Vowels of American English



Note. From *Language Files: Materials for an Introduction to Language and Linguistics* (12th ed.), by H. Dawson & M. Phelan, 2016.

The vowels [i] (as in *feet*), [ɪ] (*this*), [ɛ] (*sweat*), [æ] (*bat*) and the diphthong [eɪ] (*day*) were labeled as "front vowels." Those classified as "back vowels" were [u] (as in *you*), [ʊ] (*put*), [ɔ] (*caught*), [ɑ] (*cot*), and the diphthongs [oʊ] (*oh*) and [ɑʊ] (*loud*). The diphthongs [ɔɪ] (*boy*) and [ɑɪ] (*high*), which contain both high and low vowels, were classified separately as "front-

back diphthongs." It is worth noting that, of the front vowels, [i] and [ɪ] are the furthest front. Of the back vowels, [u] is the furthest back.

Vowels were classified similarly according to height, with [i], [ɪ], [u] and [ʊ] as "high vowels," [ɛ], [ə], [ʌ] and [ɔ] as "mid vowels," and [æ] and [ɑ] as "low vowels." All diphthongs were classified separately.

The percentage of bear names where each of these 15 vowels were stressed was compared to that percentage of mouse names, as well as to similar data describing the frequency of stressed vowels in English words as a whole, which was sourced from a phonetic analysis of British English in the *Journal of the Acoustical Society of America* (Denes, 1963).

4. Results and Analysis

4.1. Vowel Backness

I found strong evidence for symbolic links between front vowels and diminutive attributes and back vowels and augmentative ones, but only for the furthest front and furthest back vowels. Figures 2 and 3 show that [i] and [ɪ] are overrepresented in the names of mice, where they occur more than twice as often as in English words as a whole and, in the case of [i], three times more than in bear names. Even more strikingly, the backmost vowel [u] appears in bear names about five times more often than in English words and nine times more than in mouse names.

Figure 2.

Frequency of Occurrence of Stressed Vowels in the Names of Bears and Mice

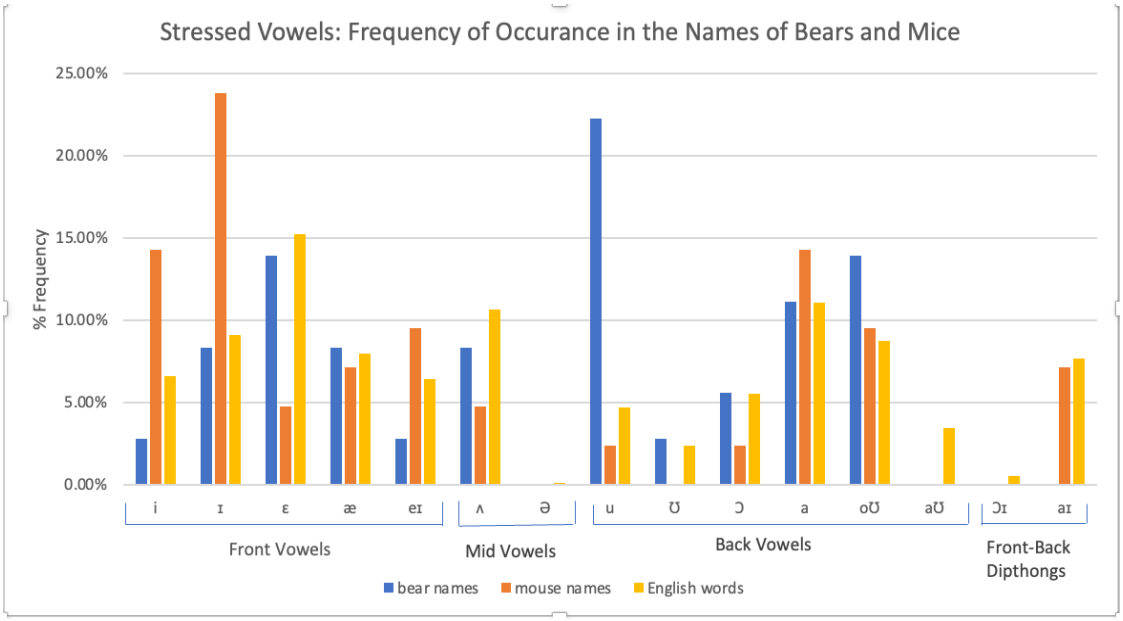
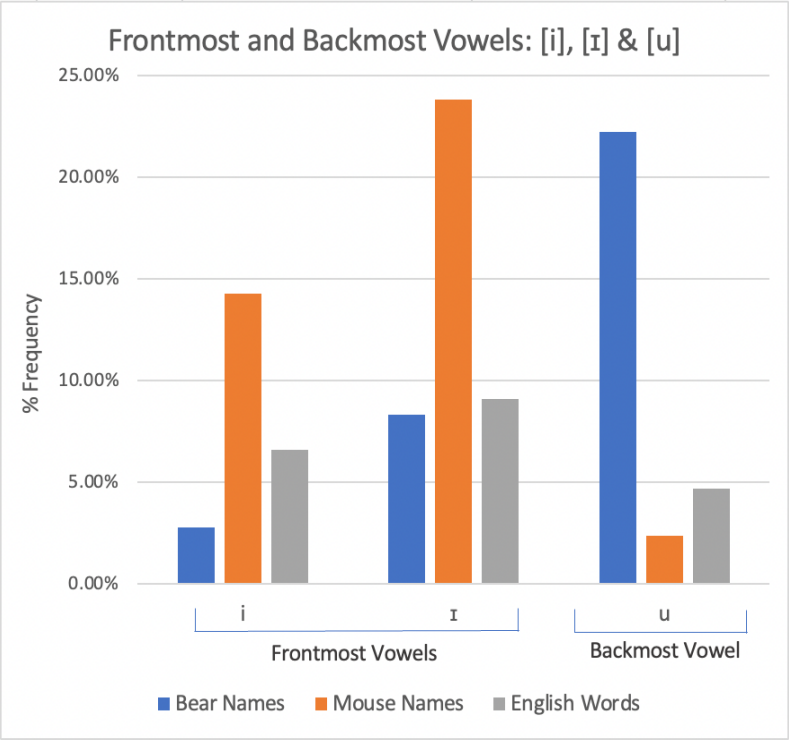


Figure 3.

Frontmost and Backmost Vowels: [i], [ɪ], & [u]



These results indicate the presence of vowel-magnitude symbolism in the names of fictional bears and mice. Given that evidence for augmentative vowel symbolism is scarcer than evidence for diminutive symbolism, the strength of the association between the backmost vowel [u] and bears in this study is especially interesting. The prevalence of [u] in bear names—such as Boo Boo, Pooh, and Baloo—echoes the findings of Wang (2021), who noted that this vowel occurred more frequently in the names of monsters. This correspondence could be due to the fact that both monsters and bears are dramatically larger, stronger, and more menacing than humans and most animals, though the anthropomorphized bears in my corpus were more cuddly than frightening.

4.2) Vowel Height

No pattern was found regarding vowel height in bear or mouse names (see Fig. 2). In fact, while the vowel [u] is among the furthest back, it is also one of the highest (see Fig.1). This

indicates a distinction between the symbolism of vowel height and vowel backness that is not always articulated in studies of sound symbolism. Linguists like Jurafsky (2015) and Blasi et al. (2016) tend to combine these two vowel qualities in their descriptions, with Jurafsky referring to back vowels being made low in the mouth as well as further back towards the throat (Jurafsky, 2015). While it is true that the frontmost vowels—[i] and [ɪ]—are also the highest, it is not the case that lower vowels are necessarily further back. The results of studies like mine, Wang's (2021) (which also found that back vowels, but not low vowels, are linked to largeness) and Kawahara's (2018) (which found that low vowels, but not back vowels, are linked to largeness) suggest that, at least in the names of fictional animals, height and backness are distinct.

5. Conclusion

Nuckolls writes that, in natural languages across the world, certain sounds have specific symbolic associations. This claim is especially well-proven in the case of magnitude-vowel symbolism, which describes the relationship between qualities of vowels and concepts related to *big* and *small.* Front and high vowels such as [i] and [ɪ] tend to be related to diminutive size, while low vowels like [a] and back vowels like [u] are linked to largeness (1999). The goal of this study was to determine the extent to which these symbolic principles are reflected in the names of fictional anthropomorphized bears and mice. My results showed that the front vowels [i] and [ɪ] are disproportionately represented in mouse names, while the back vowel [u] is overrepresented in bear names, indicating that symbolic associations related to vowel backness--but not vowel height--influence the naming of English-language animal characters.

These findings are significant because they add to a small but growing body of evidence for the existence of sound symbolism in naming practices. They show that the impact of

magnitude symbolism is not limited to the nonsense words invented for studies like Klink's (2000), but instead that it can implicitly influence the names chosen for differently sized, (and weighted, -colored, -shaped etc.) referents. Notably, these results also support the existence of augmentative vowel symbolism (the link between back vowels and largeness), for which scholars like Nuckolls (1999) agree there has been comparatively less proof.

Limits of this study include the small sample size, consisting of only 36 bears and 42 mice. Also, while the stressed vowels in those names were recorded and analyzed according to their pronunciation in modern American English, the data on stressed vowels to which they were compared comes from British English in 1963 (Denes, 1963).

My results open new paths for future sound-symbolic study. Analyses of larger samples of bears and mice could produce more reliable evidence. Further research could explore whether my English-language findings are reflected in the names of bears and mice in other languages. Finally, researchers could investigate how the extent to which names are made-up—if, for instance, they are existing human names (such as Bruno), based on existing words (like Corduroy), or invented wholecloth (like Baloo)—relates to their sound-symbolic character.

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