

# Decoding Phonetic Meaning in a Semantically Meaningful Lexicon: Sound Symbolism in Steam Game Titles

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**Abstract:** It is widely believed that the marriage between a word's sound and meaning is not an arranged one. A major exception to this, however, is sound symbolism. Inspired by previous research on the extensive use of sound symbolic associations in naming practices, this study directed attention towards the titles of popular games on Steam, which, unlike brand names, are mostly composed of semantically meaningful lexical items. The results showed that Action/Adventure/RPG game titles contained more voiced obstruents and fewer low vowels than Strategy/Simulation game titles. Additional research could delve into the interplay between semantic and phonetic meanings conveyed by names and titles.

**Keywords:** Sound Symbolism, Steam, Game Titles, Game Genre.

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## 1. Introduction

The absence of intrinsic connection between sounds and meaning, commonly referred to as the arbitrariness of the linguistic sign, is well evidenced by the simple fact that German and French speakers call the same thing by markedly different names [1].

This time-honoured view, however, fails to capture the full complexity of the issue, as an abundance of recent studies shed light upon the prevalence of sound symbolism, a linguistic phenomenon in which certain words do sound like what they mean. For instance, most people associate bouba and maluma with round shapes, whereas kiki and takete are consistently matched to spiky shapes [2]. Termed the bouba/kiki effect, the peculiar yet consistent connection between nonce words and visual symbols has garnered extensive research focus over the years. [3] examined the influence of orthography, alluding to the possibility that the round shapes of bouka in Roman orthography, for example, might contribute to its perceptual association with roundness, whereas [4] maintained the orthography only played a minimal role, arguing that the bouba/kiki effect remained largely consistent when the experiment was conducted with speakers of 25 languages with 10 different writing systems. Likewise, an overwhelming majority of individuals speaking a variety of languages pair round shapes to maluma, and spiky shapes to takete [5]. As a rule, nasals like /l/, /m/, and /n/, and voiced stops like /b/, /d/, and /g/ mark roundness, whilst voiceless stops like /p/, /t/, and /k/ are perceived as indicative of sharpness [6].

In addition to conveying sharpness and roundness, sound symbolic associations can decode various sensory attributes like colour [7, 8], shape [9] and size [9, 10, 11, 12]. Certain sound-meaning mappings can be elucidated by the articulatory mechanisms involved and/or the acoustic properties exhibited in sound production [10, 13]. For instance, the larger resonance cavity used in producing [a] may clarify why it is more suitable for describing large shapes compared to [i] [14, 15].

## 2. Literature Review

### 2.1. Sound Symbolism in Names

Sound symbolism is commonly used in crafting brand names to convey a wide range of product-related information in terms of size, weight, speed, strength [16], taste [17] or even eco-responsibility [18]. In like manner, costumers are apt to draw on sound symbolic cues to predict product features [19], and, therefore, favour brand names containing sounds that match product attributes, whereas a mismatch between sounds and product features may reduce product marketability [20].

Top brand names typically begin with letters like c, p, and k [21], a pattern that is largely in line with [22]'s claim that word-initial plosives enhance recognisability. In addition, these names often feature an overrepresentation of preferable sounds with positive meaning associations, including [s], [m], [l] and [i] [23, 24]. Similarly, affricates, back/high/stressed vowels and nasals are credited with lending an air of luxury to brand names [25].

Moreover, sound symbolic associations remain operative even when used to address non-native speakers, regardless of their second language proficiency levels or the orthographic forms of brand names [26], or when brands names are translated into the native language of the target audience [27]. Such findings substantiated the primordial importance of sound symbolism for international brands desirous of global market expansion [26, 27].

Despite the extensive research on brand names, other forms of naming practices have garnered relatively less research attention. A series of studies on the fictional creatures known as "Pokémon" highlighted the cross-linguistic relationship between the phonetic features of Pokemons' names and their external qualities such as type [28, 29, 30], size [10, 31, 32], weight [31, 32], strength [31, 32], etc. Likewise, [33] identified sound-symbolic associations between the chosen names and nicknames of Major League Baseball (MLB) players and their physical attributes. However, these associations did not extend to the players' given names, which were assigned well before their physical characteristics were

evident.

## 2.2. Classification of Game Genres on Steam

Steam (Valve Corporation) is one of the world’s biggest game platforms [34]. It mandates that game developers apply a minimum of 5 tags, and ideally more than 20, to a single game, so that gamers can use tags to identify their preferred genres when shopping for games [35]. Additionally, Steam also allows its users to apply their own tags to a game, and the most popular tags will not only appear on the game’s store page, but also affect its visibility in the store [35].

Game genres aren’t easy to categorise. One primary reason is that many video games encompass a wide array of gameplay features emblematic of multiple genres [36, 37]. Therefore, different game tags on Steam are closely intertwined, resulting in significant overlaps. In particular, the “action” and “adventure” tags are applied to a variety of games due to the ubiquity of “action-like” and “adventure-like” elements in modern video games [37]. Utilising a network analysis of Steam tags, [37] identified 4 main genres, namely Strategy & Simulation, Puzzle & Arcade Games, RPG Games and Shooter Games, each encompassing a multitude of game tags.

## 3. Methodology

The navigation bar on Steam’s homepage includes a “categories” button. A hovering mouse over the button opens a dropdown menu showing six different categories, namely Action, Role-Playing, Strategy, Adventure, Simulation, Sports & Racing. However, for the reasons mentioned in the literature review, this study focuses on two eminent genres, namely Strategy/Simulation (SS) and Action/Adventure/RPG (AAR): both Strategy and Simulation games are connected to a common set of games tags like multiplayer, early access, open world and co-op [37]; action, adventure and RPG games are often conflated due to their interconnectedness and similarities in terms of gameplay [38, 39]. This binary classification helps minimise the overlap between different genres on Steam.

[40] shows all the games available in mainland China on Steam, after DLCs, demos, bundles, soundtracks and games that don’t support English are filtered out. For the SS genre, the “Strategy” and “Simulation” tags are selected as filters, while the games tagged “Action”, “Adventure”, “RPG”, “Sports” or “Racing” are excluded. For the AAR genre, the “Action”, “Adventure” and “RPG” tags are used as filters, while “Strategy”, “Simulation”, “Sports” and “Racing” games are excluded. Additionally, unpopular games with less than 1000 user reviews are taken off the list. After filtering out games that don’t meet the selection criteria, the top 50 games from the list are selected. The data collection process lasted 4 days from 6 May to 9 May, 2024. The data is processed in accordance with the set of rules outlined below:

1) Edition and year numbers are not included. (e.g., “2” in “Counter-strike 2”).

2) Numerals that are integral to the titles are included (e.g., “four” in “back 4 blood”).

3) Edition names are omitted (e.g., “Complete Edition” in “Horizon Forbidden West Complete Edition”).

4) Titles that contain neologisms, special characters, abbreviations, loanwords, foreign or uncommon names are excluded due to differing views on their pronunciations (e.g., “Astra: Knights of Veda”, “DOTA”). However, neologisms composed of affixes are included (e.g., “Bioshock”).

5) Different editions of the same game franchise are not compiled repeatedly (e.g., “Call of Duty: Infinite Warfare” and “Call of Duty: Black Ops”).

6) The words’ pronunciations are encoded according to British English conventions.

7) The pronunciations were referenced from the Cambridge Dictionary [41].

8) Certain plosives are elided where appropriate (e.g. [p] in “Turnip boys commits tax evasion”).

9) The schwa sound [ə], elided in certain varieties of English, is retained. (e.g. [ə] in “dragon” [drag(ə)n]).

10) Diphthongs are encoded as two separate vowels.

The word-final [ɪ] is not retained, as is common with British English.

11) The analysis is centred on some of the most prominent phonetic properties with cross-linguistically robust sound-symbolic associations, including obstruent voicing, vowel backness and height [10]. Specifically, [i], [ɪ], [ʊ] and [u] are encoded as high vowels, [e], [ɘ], [ɐ], [ɜ] and [ʌ] as mid vowels, [a], [æ] and [ɑ] as low vowels, [i], [ɪ], [e] and [æ] as front vowels, [ɘ], [ɜ], [ʌ] and [a] as central vowels, and [ɔ], [ɒ], [u], [ʊ] and [ɑ] as back vowels, [b], [d], [g], [dʒ], [ʒ], [z], [v] and [ð] as voiced obstruents, and [p], [t], [k], [tʃ], [ʃ], [s], [f] and [θ] as voiceless obstruents. [42].

## 4. Results

I used Microsoft Excel to tally the numbers of high/mid/low/front/central/back vowels and voiced/voiceless obstruents contained in each title. The total counts for each category were then tabulated.

### 4.1. Vowel Height

**Table 1.** Number of High, Mid and Low Vowels by Game Genre

Frequency	High Vowel	Mid Vowel	Low Vowel	Total
SS	105	128	22	255
AAR	83	132	46	261
Total	188	260	68	516

A chi-square test of independence was performed to examine the relation between game genre and vowel height. The relation between these variables was significant,  $X^2(2, N = 516) = 11.04, p = .004$ .

Post hoc comparisons were conducted to decipher which pairs were significantly different, with the Bonferroni-corrected alpha level of significance set at  $\alpha = .017$ . The results revealed significant differences between high and low vowels,  $X^2(1, N = 256) = 11.03, p < .001$ , as well as between mid and low vowels,  $X^2(1, N = 328) = 6.19, p = .013$ . However, high and mid vowels were not found to differ significantly,  $X^2(1, N = 448) = 1.92, p = .166$ . Therefore, SS game titles contain more high or mid vowels and fewer low vowels than AAR game titles.

### 4.2. Vowel Backness

**Table 2.** Frequency of Front, Central and Back Vowels by Game Genre

Frequency	Front Vowel	Central Vowel	Back Vowel	Total
SS	109	93	53	255
AAR	95	112	54	261
Total	204	205	107	516

A chi-square test of independence showed that there was no significant association between game genre and vowel backness,  $X^2(2, N = 516) = 2.66, p = .264$ .

### 4.3. Obstruent Voicing

**Table 3.** Frequency of Voiced and Voiceless Obstruents by Game Genre

Frequency	Voiced Obstruent	Voiceless Obstruent	Total
SS	75	138	213
AAR	113	105	218
Total	188	243	431

There is a significant relationship between game genre and obstruent voicing. AAR game titles have significantly more voiced obstruents and fewer voiceless obstruents than SS game titles,  $X^2(1, N = 431) = 12.11, p < .001$ .

## 5. Discussion and Conclusion

Previous literature suggests vowel backness, vowel height and construent voicing are all robustly associated with various physical attributes: low/back vowels sound larger than high/front vowels [10, 12, 43]; voiced obstruents evoke largeness, heaviness and strength [10, 31, 32, 33, 44]. However, these findings fall short of fully elucidating the preference of AAR games for voiced obstruents and back vowels, since AAR games are apparently not larger nor heavier than SS games. In addition, it is found that few of the words used in the game titles are suggestive of size or weight. Moreover, while low and back vowels are both associated with largeness, no significant difference in vowel backness was found between the two genres.

Therefore, it is more likely that the discrepancies between the two game genres are due to differences on an abstract level. For instance, voiced obstruents are believed to evoke a sense of evilness or darkness [13, 29, 30], presumably because they are relatively difficult to articulate [45]. These findings might justify the use of certain voiced obstruents in words like “ghost”, “dark”, “grim”, “dark”, “dragon” and “dungeon”, which are common in AAR game titles. Three hypotheses are proposed: (a) the association between voiced obstruents and evilness is rooted in the English lexicon; (b) English words related to evilness don’t have more voiced obstruents than do general vocabulary words, and yet game developers purposely selected words that are rich in obstruent voicing to convey certain characteristics of the games; (c) both factors are at play. In this respect, further studies are needed to decipher the precise reasons for the sound symbolic associations observed in game titles.

Finally, the notion that AAR games might be linked to evilness exposes a fundamental limitation of the methodology employed, in that the classificatory method relies heavily on user-generated tags and focuses primarily on gameplay elements, overlooking other crucial facets such as vibes, themes, moods and artistic styles, all of which are pivotal in delineating contemporary video games [36, 46]. Thus, further investigation is warranted to address this limitation by adopting a multi-dimensional approach to game genre classification.

## Acknowledgments

I would like to thank Mengxuan Huang and Shun Li for

their invaluable assistance in drafting the research proposal for a class assignment.

My heartfelt thanks also go to the entire faculty of the College of Foreign Languages at Zhejiang Normal University for their continuous support throughout my studies and beyond.

## References

- [1] F. De Saussure: *Course in General Linguistics (Literary Theory: an Anthology)*, (2004).
- [2] W. Köhler: *Gestalt Psychology, Psychologische Forschung*, Vol. 31 (1994) No.1, p.18-30.
- [3] C. Cuskley, J. Simner and S. Kirby: *Phonological and Orthographic Influences in the Bouba-Kiki Effect*, *Psychological Research*, Vol. 81 (2017) No.1, p.119-130.
- [4] A. Ćwiek, S. Fuchs, C. Draxler, E.L. Asu, D. Dediu, K. Hiovain, S. Kawahara, S. Koutalidis, M. Krifka, P. Lippus, G. Lupyan, G.E. Oh, J. Paul, C. Petrone, R. Ridouane, S. Reiter, N. Schümchen, Á. Szalontai, Ö. Ünal-Logacev, J. Zeller, M. Perlman and B. Winter: *The Bouba/Kiki Effect is Robust across Cultures and Writing Systems*, *Philosophical Transactions of the Royal Society B: Biological Sciences*, Vol. 377 (2021) No.1841.
- [5] S.J. Styles and L. Gawne: *When Does Maluma/Takete Fail? Two Key Failures and a Meta-Analysis Suggest That Phonology and Phonotactics Matter*, *I-Perception*, Vol. 8 (2017) No.4.
- [6] D.M. Sidhu and P.M. Pexman: *The Sound Symbolism of Names*, *Current Directions in Psychological Science*, Vol. 28 (2019) No.4, p.398-402.
- [7] N. Johansson, A. Anikin and N. Aseyev: *Color Sound Symbolism in Natural Languages*, *Language and Cognition*, Vol. 12 (2020) No.1, p.56-83.
- [8] M. Wrembel and K. Rataj: *“Sounds Like a Rainbow”-Sound-Colour Mappings in Vowel Perception*, (2019), p.237-240.
- [9] K. Knoeferle, J. Li, E. Maggioni and C. Spence: *What Drives Sound Symbolism? Different Acoustic Cues Underlie Sound-Size and Sound-Shape Mappings*, *Scientific Reports*, Vol. 7 (2017) No.1, p.5562.
- [10] K. Shinohara and S. Kawahara: *A Cross-Linguistic Study of Sound Symbolism: the Images of Size*, *Annual Meeting of the Berkeley Linguistics Society*, (2010), p.396-410.
- [11] R. Tsur: *Size-Sound Symbolism Revisited*, *Journal of Pragmatics*, Vol. 38 (2006) No.6, p.905-924.
- [12] B. Winter and M. Perlman: *Size Sound Symbolism in the English Lexicon*, *Glossa: a Journal of General Linguistics*, Vol. 6 (2021) No.1.
- [13] S. Kawahara: *Inferring Pokémon Types Using Sound Symbolism: The effects of Voicing and Labiality*, *Speech Research*, Vol. 23 (2019), p.111-116.
- [14] J.J. Ohala: *The Phonological End Justifies Any Means*, *Proc. of the XIIIth Int. Cong. of Linguists*, (1983), p.232-243.
- [15] J.J. Ohala: *The Frequency Code Underlies the Sound-Symbolic Use of Voice Pitch*, *Sound Symbolism*, (1995), p.325-347.
- [16] R.R. Klink: *Creating Brand Names with Meaning: the Use of Sound Symbolism*, *Marketing Letters*, Vol. 11 (2000) No.1, p.5-20.
- [17] K. Motoki, T. Saito, J. Park, C. Velasco, C. Spence and M. Sugiura: *Tasting Names: Systematic Investigations of Taste-Speech Sounds Associations*, *Food Quality and Preference*, Vol. 80 (2020), p.103801.

- [18] P. Joshi and A. Kronrod: Sounds of Green: How Brand Name Sounds Metaphorically Convey Environmental Friendliness, *Journal of Advertising*, Vol. 49 (2020) No.1, p.61-77.
- [19] E. Yorkston and G. Menon: A Sound Idea: Phonetic Effects of Brand Names on Consumer Judgments, *Journal of Consumer Research*, Vol. 31 (2004) No.1, p.43-51.
- [20] T.M. Lowrey and L.J. Shrum: Phonetic Symbolism and Brand Name Preference, *Journal of Consumer Research*, Vol. 34 (2007) No.3, p.406-414.
- [21] I. Schloss: Chickens and Pickles, *Journal of Advertising Research*, Vol. 21 (1981), p.47-49.
- [22] B.G.V. Bergh, J. Collins, M. Schultz and K. Adler: Sound Advice on Brand Names, *Journalism Quarterly*, Vol. 61 (1984) No.4, p.835-840.
- [23] R. Pogacar, E. Plant, L.F. Rosulek and M. Kouril: Sounds Good: Phonetic Sound Patterns in Top Brand Names, *Marketing Letters*, Vol. 26 (2015) No.4, p.549-563.
- [24] R. Pogacar, M. Kouril, T.P. Carpenter and J.J. Kellaris: Implicit and Explicit Preferences for Brand Name Sounds, *Marketing Letters*, Vol. 29 (2018) No.2, p.241-259.
- [25] A. Pathak, G.A. Calvert and E.A.C. Lim: How the Linguistic Characteristics of a Brand Name can Affect its Luxury Appeal, *International Journal of Market Research*, Vol. 59 (2017) No.5, p.567-600.
- [26] L.J. Shrum, T.M. Lowrey, D. Luna, D.B. Lerman and M. Liu: Sound Symbolism Effects across Languages: Implications for Global Brand Names, *International Journal of Research in Marketing*, Vol. 29 (2012) No.3, p.275-279.
- [27] G.A. Athaide and R.R. Klink: Creating Global Brand Names: the Use of Sound Symbolism, *Journal of Global Marketing*, Vol. 25 (2012) No.4, p.202-212.
- [28] S. Kawahara, M.C. Godoy and G. Kumagai: Do Sibilants Fly? Evidence from a Sound Symbolic Pattern in Pokémon Names, *Open Linguistics*, Vol. 6 (2020) No.1, p.386-400.
- [29] S. Kawahara, M.C. Godoy and G. Kumagai: English Speakers can Infer Pokémon Types Based on Sound Symbolism, *Frontiers in Psychology*, Vol. 12 (2021), p.648948.
- [30] R. Uno, K. Shinohara, Y. Hosokawa, N. Atsumi, G. Kumagai and S. Kawahara: What's in a Villain's Name?: Sound Symbolic Values of Voiced Obstruents and Bilabial Consonants, *Review of Cognitive Linguistics*, Vol. 18 (2020) No.2, p.428-457.
- [31] S. Kawahara, A. Noto and G. Kumagai: Sound Symbolic Patterns in Pokémon Names, *Phonetica*, Vol. 75 (2018) No.3, p.219-244.
- [32] S.S. Shih, J. Ackerman, N. Hermalin, S. Inkelas, H. Jang, J. Johnson and A. Yu: Cross-linguistic and language-specific sound symbolism: Pokémonastics, (2019).
- [33] S.S. Shih and D. Rudin: On Sound Symbolism in Baseball Player Names, *Names*, (2020), p.1-18.
- [34] T. Guzsvinecz and J. Szűcs: Length and Sentiment Analysis of Reviews about Top-Level Video Game Genres on the Steam Platform, *Computers in Human Behavior*, Vol. 149 (2023).
- [35] Information on: <https://partner.steamgames.com/doc/store/tags>
- [36] R.I. Clarke, J.H. Lee and N. Clark: Why Video Game Genres Fail: A Classificatory Analysis, *Games and Culture*, Vol. 12 (2017) No.5, p.445-465.
- [37] X. Li and B. Zhang: A Preliminary Network Analysis on Steam Game Tags: Another Way of Understanding Game Genres, *Proceedings of the 23rd International Conference on Academic Mindtrek*, (2020), p.65-73.
- [38] H.P. Gerber: from the FPS to the RPG: Using Video Games to Encourage Reading YAL, *the ALAN Review*, Vol. 36 (2009) No.3.
- [39] K.T. Nam: A Study on the Priority for Fun Factors by Genres: Focusing Action, Adventure, Role-Playing Games, *Journal of the Korean Society for Computer Game*, Vol. 35 (2022) No.3, p.55-64.
- [40] Information on: [https://store.steampowered.com/search/?ignore\\_preferences=1&category1=998&supportedlang=english&ndl=1](https://store.steampowered.com/search/?ignore_preferences=1&category1=998&supportedlang=english&ndl=1).
- [41] Information on: <https://dictionary.cambridge.org/>.
- [42] P. Roach: British English: Received Pronunciation, *Journal of the International Phonetic Association*, Vol. 34 (2004) No.2, p.239-245.
- [43] R. Ultan: Size-Sound Symbolism, *Universals of Human Language*, Vol. 2 (1978), p.525.
- [44] S.S. Newman: Further Experiments in Phonetic Symbolism, *The American Journal of Psychology*, Vol. 45 (1933) No.1, p.53-75.
- [45] J.J. Ohala: *The Production of Speech* (Sprinter New York, the United States 1983), p. 189-216.
- [46] J.H. Lee, N. Karlova, R.I. Clarke, K. Thornton and A. Perti: Facet Analysis of Video Game Genres, *iConference 2014 Proceedings*, (2014), p.125-139.