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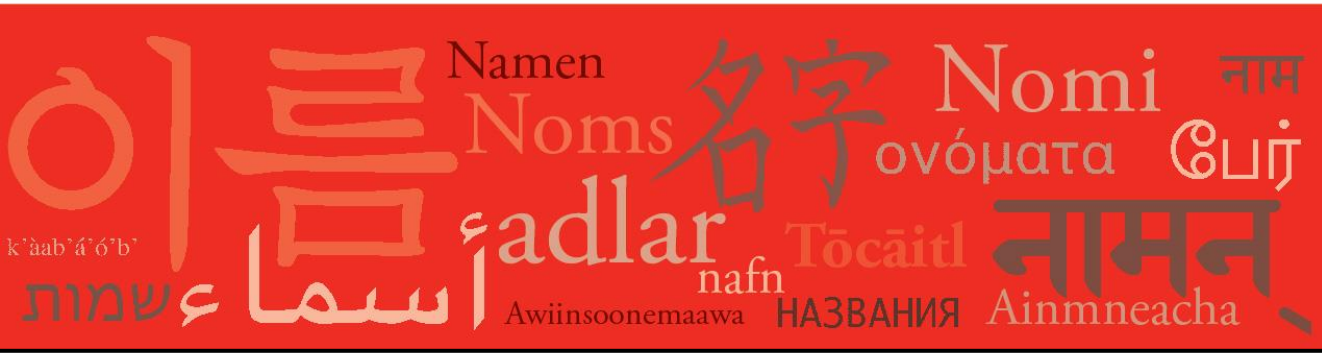

Voiced Obstruents in Foreign Player Names Show a Small Association with Hit-by-Pitch but Not Intentional Walks: Evidence from Japanese Professional Baseball

Ryota Sakakibara
Showa Women's University, JAPAN

ans-names.pitt.edu
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Abstract

This study examined, from the perspective of sound symbolism, whether the phonological properties of foreign player names in Japanese professional baseball are associated with hit-by-pitch (HBP) and intentional walks (IW). Data were collected from 682 foreign batters who played in Nippon Professional Baseball between 1952 and 2023. For each player, the number of morae and voiced obstruents (VOs) such as [b], [d], [g], and [z] in their katakana-registered names was recorded. Generalized linear models were used to analyze the associations between these phonological features and the counts of HBP and IW. Players whose names contained two VOs had a significantly higher HBP rate, whereas no significant effects were observed for morae or IW. These findings suggest that, in line with sound-symbolic effects, VOs in names are associated with a slight increase in HBP. More broadly, these findings raise the possibility that sound-symbolic properties of names may extend beyond impression formation and be reflected in actual performance-related outcomes, albeit weakly. However, the observed association was small in magnitude and is unlikely to be practically meaningful.

Keywords: psychoonomastics, anthroponymy, sound symbolism, voiced obstruents, phonology, Japan, baseball

Introduction

In the last decade, a growing body of research has examined sound symbolism in names (Sidhu & Pexman 2019). Sound symbolism refers to non-arbitrary associations between sounds and meaning (Kumagai 2022). Investigating sound symbolism in names offers important theoretical insights. Unlike traditional studies that rely on non-words (e.g., Nielsen & Rendall 2013; Ramachandran & Hubbard 2001), names provide a means to assess whether sound-meaning correspondence influences the processing of real lexical items. Moreover, as names can evoke both perceptual and abstract associations, they serve as a valuable domain to explore the breadth and limits of sound-symbolic effects (Sidhu & Pexman 2018). Previous studies have provided valuable insights into how phonemes in names relate to perceptions of various aspects of personality (e.g., Sidhu & Pexman 2015; Sidhu et al. 2019, 2025).

Research interest in the sound symbolism of fictional names has also increased. Kawahara et al. (2018) demonstrated that in Japanese *Pokémon*, the number of VOs in names correlates with attributes such as size and strength. Similar patterns have been reported across languages, including English and Portuguese (Godoy et al. 2021; Kawahara et al. 2021). Furthermore, Kawahara (2017) demonstrated that the names of magic spells in *Dragon Quest*[1] tended to contain more morae, a basic timing unit in Japanese phonology, as their power increased. Along similar lines, Kumagai (2021) demonstrated that the effect of morae of *Harry Potter* spells differed, depending on familiarity with the series. That is, individuals unfamiliar with Harry Potter judged longer spells as more powerful, whereas those familiar with the series showed no such effect.

Previous findings on sound symbolism are valuable and thought-provoking. Nonetheless, much of the research has been limited to examining how specific sounds are associated with subjective perceptions or mental imagery, such as perceiving phonemes as larger or heavier (Hamano 1994). A small number of studies have examined links between sound symbolism and behavioral performance, such as grip actions (Vainio & Vainio 2022) and vocal reaction times to directional or positional stimuli (Vainio et al. 2023). However, the body of work in this area remains limited. To advance our understanding of sound symbolism in real-world names, it is necessary to go beyond these perceptual associations and investigate whether phonological features actually influence behavior and performance.

Nevertheless, the effects of sound symbolism may be less apparent in real words, such as names, because semantic content associated with those words can also be activated (Sidhu & Pexman 2018). Importantly, names differ in their degree of semantic transparency. That is, some names convey relatively clear lexical or character-based meanings, whereas others are more semantically opaque. For example, the Japanese family name *Morikawa* is composed of *mori* 'forest' and *kawa* 'river', making its character-based meaning relatively transparent. Thus, identifying contexts in which phonological features of names can be examined with reduced semantic confounds is essential. The present study addresses this issue by focusing on the relationship between the names and performances of foreign players in Nippon Professional Baseball (NPB), the top level of professional baseball in Japan.

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In the NPB, the names of foreign players are typically written in katakana, a phonetic script primarily used for foreign words and names. Unlike kanji, which is ideographic and visually conveys meaning, katakana characters represent only sounds and lack inherent semantic content. This feature makes katakana particularly suitable for studying sound symbolism because it minimizes the confounding influences of semantic interpretation. In addition, foreign names are often less strongly associated with specific individuals compared to Japanese names. As a result, foreign names may be processed more like non-words than Japanese names, thereby making the contribution of phonological cues relatively more pronounced (Coltheart et al. 2001). Of course, widely recognized foreign player names in Japan, such as *Babe Ruth* and *Aaron Judge*, are exceptions. However, such cases are relatively limited compared with the names of prominent Japanese players. Beyond these linguistic advantages, baseball has a clearly defined separation between offensive and defensive roles, making it easier to analyze player performance in this sport than in sports with more continuous player interactions and less structured role divisions.

To the best of the author's knowledge, Shih and Rudin (2021) is the only study to have examined the relationship between player names and performance in baseball. They investigated the associations between players' real first names, chosen first names[2], and nicknames in Major League Baseball (MLB) and physical or performance-related variables, such as height, weight, and power metrics (slugging percentage, batting average, batting average on balls in play [BABIP[3]], and on-base plus slugging [OPS]). The results showed no significant associations for real names. However, for chosen names, high vowels—such as the [i] sound added in diminutive forms like Bobby from Bob—were negatively correlated with height and weight. Specifically, shorter or less heavy players tended to choose names ending in high vowels, whereas larger players tended to adopt shortened name forms. With respect to nicknames, the presence of VOs was positively correlated with height (ρ = .186), and name length was positively correlated with BABIP (ρ = .089).

These findings are also broadly consistent with insights from phonetics. Ohala (1994) argues that high fundamental frequency (F0) is associated across species with submission, non-threat, and appeasement because it is characteristic of the vocalizations of smaller individuals. He also proposes that smiling and lip-corner retraction create an impression of smallness and non-threat by shortening the vocal tract and raising resonance frequencies. Extending this frequency-code account to vowel sound symbolism, he explains that [i] is associated with smallness not because of F0 itself, but because of its high second formant (F2). Relatedly, Kawahara, Isobe et al. (2018) suggest that front vowels such as [i] and [e] are associated with perceptions of smallness because, relative to back vowels, they involve a smaller oral cavity. Shinohara and Kawahara (2010) similarly suggest that VOs are associated with perceptions of largeness because their production involves expansion of the oral cavity.

However, it is difficult to draw a direct causal inference from the results of Shih and Rudin (2021) regarding the relationship between phonological features and performance. In particular, the association between nicknames and performance measures may reflect either an effect of the phonological features of nicknames on performance, or the reverse possibility that players with particular levels of performance were given nicknames with certain phonological characteristics. By contrast, because real names are assigned prior to any later athletic performance, an observed association between real names and performance would make it relatively easier to infer a causal direction from names to performance than in the case of chosen names or nicknames. It should be noted, however, that the measures used by Shih and Rudin (2021)—slugging percentage, batting average, BABIP, and OPS—all depend on batted-ball outcomes. Such outcomes can be influenced not only by the batter's ability but also by opposing defense (Bouzarth et al. 2021), ballpark characteristics (Goodman & McAndrew 1993), environmental conditions (Koch & Panorska 2013), and luck (Bailey et al. 2020). Therefore, even if a genuine association existed between the phonological features of names and player performance, it may have been attenuated by these external factors and thus been difficult to detect.

Building on the above, the present study focused on two specific outcomes for batters: hit-by-pitch (HBP) and intentional walk (IW). HBP and IW are suitable for the purposes of this research because both are largely determined by the pitcher's control and tactical decisions, leaving the batter with relatively little agency during the plate appearance. Moreover, unlike batted-ball measures, these events do not depend on the outcome of a ball put into play, and are therefore less susceptible to variation arising from defensive skill or ballpark conditions. Thus, if a relationship is observed between a batter's name and the frequency of HBP or IW, it would be consistent with the possibility that pitchers respond—consciously or unconsciously—to phonological features of the batter's name, resulting in a loss of control, a change in pitching strategy, or an intentional decision to avoid direct confrontation.

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Hypotheses

The hypotheses of the present study are based on the possibility that the phonological features of a batter's name subtly influence the impression a pitcher forms of that batter. In Japanese professional baseball, player names are routinely vocalized in the stadium environment, including through player announcements and organized cheering, making such phonological cues at least potentially available to pitchers. However, the present study does not directly demonstrate that pitchers consciously attend to batters' names before each pitch. The proposed mechanism should, therefore, be understood as a plausible interpretation, rather than a confirmed process. If the phonological features of a batter's name contribute to the impression that the batter is a power hitter, they may influence the pitcher's strategic decisions in several ways. First, the pitcher may be more likely to pitch inside aggressively in order to move the batter off the plate. Although this strategy may increase the likelihood of retiring the batter, it also increases the risk of HBP. Second, the pitcher may increase the use of breaking balls. This may further elevate the risk of HBP because breaking balls are often thrown inside and are generally more difficult to control than fastballs (e.g., Kawamura et al. 2004). Finally, the pitcher may be more inclined to avoid direct confrontation by opting for an intentional walk. Based on these considerations, the following two hypotheses are proposed:

> Hypothesis 1: Batters whose names contain a greater number of morae or VOs receive more HBP.
>
> Hypothesis 2: Batters whose names contain a greater number of morae or VOs receive more IW.

Methods

Data Source and Sample

Data were collected from the official websites of the NPB and Japanese Baseball Records (https://2689web.com/). The dataset included all foreign non-pitchers who played in NPB from 1952 (when the first foreign player appeared in the league) to 2023. Although some players with Japanese nationality are registered under katakana names (e.g., *Ichiro*, *Saburo*), these are familiar Japanese names to Japanese speakers and thus do not allow for a pure examination of phonological effects. In addition, some players of Japanese nationality have names of non-Japanese origin and are registered under katakana names, such as *Bright*, *Okoye*, and *Richard*. However, these players also have either family names or given names written in kanji; hence, the influence of the katakana-registered name cannot be clearly separated from the influence of the kanji-written part of the player's name. Therefore, the present study focused only on foreign nationals whose registered names were written in katakana.

Foreign players are generally registered using their family names. They are sometimes registered using their given names, nicknames, or full names, when their family names are difficult for Japanese speakers to pronounce or evoke undesirable associations. It is often difficult for Japanese speakers to determine whether a registered name represents a family name, a given name, or a nickname. However, when a full name is used—typically indicated by a middle dot (" · ") separating multiple name elements—the total number of morae becomes disproportionately large. Such cases were excluded from the analysis. In addition, one player whose katakana name corresponded to a common Japanese name (*Wakamatsu*) was excluded. The final dataset comprised 682 players, representing 577 unique katakana names, because IW has been officially recorded in NPB only since 1955.

Variables

The total number of morae and VOs ([b], [d], [g], [z]) was recorded for each player's name. The number of HBP (hit by pitch), IW (intentional walk), and PA (plate appearances) was also recorded. HBP and IW served as the outcome variables, whereas PA was included as an offset on the log scale in the statistical models, because both outcomes are defined at the plate-appearance level.

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Statistical Analyses

Descriptive statistics were calculated for all variables. Given that HBP and IW depend on PA, the incidence rates per 1,000 PA were also computed. Next, generalized linear models (GLMs) were fitted using either the number of HBP or IW as the dependent variable, and the number of morae and VOs as predictors. PA is included as an offset term. Given that both HBP and IW are count variables, Poisson or negative binomial distributions are considered appropriate. Analyses were conducted using both distributions and the model with the lowest Akaike Information Criterion (AIC) was selected. Descriptive statistics were computed using the *psych* package (Revelle 2025), and GLMs were fitted using the *MASS* package (Venables & Ripley 2002) in R version 4.5.0.

Results

Table 1 presents example player names for each VO type. First, the frequency distributions of the variables were examined. VO counts were distributed as follows: 321 players had VO = 0; 285 for VO = 1; 70 for VO = 2; and 6 for VO = 3, indicating that cases with VO = 3 were extremely rare. Therefore, VO was treated as a categorical variable, and those with a frequency of 3 were excluded from the analyses. Dummy variables were created for VO (VO0, VO1, and VO2). In the GLMs, VO1 and VO2 were included when 0 was used as the reference category, and VO0 and VO2 were included when 1 was used as the reference category. In addition, the rates of HBP and IW were 9.37 and 6.28 per 1,000 plate appearances, respectively. Descriptive statistics for each variable, excluding cases with VO equal to 3, are provided in table 2.

Table 1: Example Player Names for Each Voiced Obstruent (VO) Type

VO Type	Katakana Examples	Original Spellings
/b/	*バルディリス, バース, バンクス, バトル, ブーマー*	Baldiris, Bass, Banks, Battle, Boomer
/d/	*デスパイネ, デービス, ロドリゲス, ディアス, デュラン*	Despaigne, Davis, Rodriguez, Diaz, Duran
/g/	*ゴメス, グスマン, ゲレーロ, グリーン, グラシアル*	Gomez, Guzman, Guerrero, Green, Gracial
/z/	*ジョーンズ, ジェンセン, ズレータ, ゴンザレス, ブラゼル*	Jones, Jensen, Zuleta, Gonzalez, Brazell

Table 2: Descriptive Statistics for Each Variable (After Excluding VO = 3)

	M	SD	Min.	Max.
Mora	4.09	0.94	2	7
PA	746.01	1026.18	2	7320
HBP	6.99	11.88	0	109
IW	4.70	10.32	0	95

Note: PA: Plate Appearances; HBP: Hit-by-Pitch; IW: Intentional Walk.

GLMs were fitted with HBP or IW as the dependent variable, and morae and VO dummy variables as predictors. Given that both outcomes were count data, Poisson and negative binomial distributions were tested with and without interaction terms. The models were compared using AIC. For both outcomes, the negative binomial model without interactions provided the best fit. The results are presented in tables 3 and 4.

When HBP was used as the outcome variable, VO2 was positively associated with HBP (B = 0.263, p = .015). The incidence rate ratio (IRR) of 1.301 indicated that players with VO = 2 had an HBP rate per PA approximately 1.30 times higher than players with VO = 0. By contrast, when VO1 was used as the reference category, neither VO0 nor VO2 showed a significant association with HBP. Furthermore, the number of morae was not significantly associated with HBP. These results partially support hypothesis 1. In contrast, when IW was the outcome variable, none of the explanatory variables were significantly associated. Therefore, hypothesis 2 was not supported.

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Table 3: Results of Negative Binomial Regression Analysis Predicting Hit-by-Pitch (HBP)

	B	*SE*	95% CI	*p*	*B*	*SE*	95% CI	*p*
Intercept	-4.869	0.142	-5.150 ~ -4.584	<.001	-4.741	0.150	-5.042~-4.438	<.001
Mora	0.027 (1.027)	0.034	-0.042~0.096 (0.959~1.101)	.435	0.027 (1.027)	0.034	-0.042~0.096 (0.959~1.101)	.435
VO0	—	—	—	—	-0.127 (0.880)	0.068	-0.260~0.005 (0.771~1.005)	.060
VO1	0.127 (1.136)	0.068	-0.005~0.260 (0.995~1.297)	.060	—	—	—	—
VO2	0.263 (1.301)	0.108	0.051~0.477 (1.053~1.612)	.015	0.136 (1.145)	0.108	-0.075~0.349 (0.928~1.418)	.208

Note: Unstandardized regression coefficients are shown first, followed by the corresponding incidence rate ratios (IRRs) in parentheses. CI denotes the confidence interval. The results in the left set of columns are based on VO = 0 as the reference category, whereas those in the right set of columns are based on VO = 1 as the reference category. The right set of columns was included as a supplementary analysis to allow pairwise comparisons among VO0, VO1, and VO2. The number of plate appearances was included as an offset.

Table 4: Results of Negative Binomial Regression Analysis Predicting Intentional Walk (IW)

	B	*SE*	95%CI	*p*	*B*	*SE*	95%CI	*p*
Intercept	-5.412	0.187	-5.761~-5.060	<.001	-5.367	0.199	-5.742~-4.989	<.001
Mora	0.022 (1.023)	0.045	-0.063~0.108 (0.939~1.114)	.623	0.022 (1.023)	0.045	-0.063~0.108 (0.939~1.114)	.623
VO0	—	—	—	—	-0.045 (0.956)	0.089	-0.214~0.124 (0.807~1.131)	.612
VO1	0.045 (1.046)	0.089	-0.124~0.214 (0.884~1.239)	.612	—	—	—	—
VO2	-0.065 (0.937)	0.147	-0.337~0.212 (0.714~1.236)	.658	-0.110 (0.895)	0.147	-0.382~0.167 (0.682~1.181)	.453

Note: Unstandardized regression coefficients are shown first, followed by the corresponding incidence rate ratios (IRRs) in parentheses. CI denotes the confidence interval. The results in the left set of columns are based on VO = 0 as the reference category, whereas those in the right set of columns are based on VO = 1 as the reference category. The right set of columns was included as a supplementary analysis to allow pairwise comparisons among VO0, VO1, and VO2. The number of plate appearances was included as an offset.

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Discussion and Conclusion

The analysis showed that players with two VOs had a higher rate of HBP than those whose names contained no VOs. This result partially supports hypothesis 1. As stated in the Introduction, the presence of VOs may lead pitchers to perceive the batter as a power hitter, thereby increasing the likelihood of brushback pitches or the use of breaking balls, which, in turn, may result in more HBP. However, the effect of VOs appears to be small in practical terms. Compared with players whose names contained no VOs, those with two VOs had an incidence rate approximately 1.30 times as high. Given a baseline HBP rate of 9.37 per 1,000 PA, this corresponds to about 1.4 additional HBP over 500 PA. Because the overall effect across a full season is very small, it is unlikely to be of practical relevance for player acquisition or utilization strategies.

Nonetheless, the present findings are noteworthy from an onomastic perspective. Although there remains room for debate regarding the specific mechanisms and causal processes through which VOs in batters' names are associated with hit-by-pitches, the fact that registered names temporally precede performance suggests that name sound symbolism may be reflected not only in subjective perceptions and mental imagery but also in behavioral outcomes. Previous research has shown that name sound symbolism is associated with subjective perceptions and mental imagery (e.g., Sidhu & Pexman 2015, 2019; Sidhu et al. 2019, 2025). The present findings suggest that name sound symbolism may have effects beyond subjective perceptions and mental imagery, thereby offering a broader perspective on onomastic research.

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In contrast, VOs were not significantly associated with IW. The decision to issue an IW is influenced not only by the batter being faced but also by multiple situational factors, such as the number of outs, base runners, score difference, and on-deck hitter. Therefore, the absence of an effect of VO count on IW may be due to the influence of contextual factors beyond the characteristics of the batter.

Furthermore, the number of morae was not significantly associated with either HBP or IW. As noted in the Introduction, Kumagai (2021) found that the effect of morae on judgments of spell power disappeared among individuals familiar with the Harry Potter series. Applying this reasoning to the present study, players may already have recognized the existence of both power hitters with short names and non-power hitters with long names, which weakened the effect of morae. Additionally, Japanese family names generally consist of relatively few morae, with the 100 most common family names containing only two to four morae (Meiji Yasuda Life Insurance Company 2018). Because foreign players' family names may often be longer than common Japanese family names, greater name length may have been perceived as a typical characteristic of foreign player names rather than as a cue to power. This may have reduced the likelihood of detecting an effect of mora count. However, because the present study did not directly assess how players perceived the typicality or length of foreign players' names, this interpretation should be regarded as speculative.

When interpreting the present findings, it is important to consider the extent to which pitchers recognized batters' names and paid attention to them. In NPB games, each batter's name is announced throughout the stadium before he comes to the plate. During the game, the names of players on the field are also displayed on the electronic scoreboard in center field, and the identity of the batter currently at the plate is clearly indicated. Moreover, in NPB games, each team's cheering section repeatedly chants cheers that include the batter's name during the team's offensive innings. Of course, the extent to which pitchers recognize or attend to batters' names may vary depending on the situation. Nevertheless, given this game environment, it is reasonable to assume that pitchers were at least exposed to batters' names during games.

This study has several limitations. First, the analysis did not account for situational factors that varied according to PA. Pitchers' strategies are likely to change depending on factors such as the number of outs, presence of base-runners, and score differences. Therefore, future research should incorporate these situational variables into the analysis. Second, the performance data of foreign batters include matchups against foreign pitchers. Although the proportion is relatively small owing to the foreign player quota, foreign pitchers also play NPB. The influence of the names of foreign batters, who may even share their country of origin, may differ from that of Japanese pitchers. Therefore, analyses that consider the identity of the opposing pitchers are necessary. Third, whether the same association would be observed in baseball leagues outside Japan remains unclear. Future research should examine the extent to which the findings of this study are cross-cultural by considering cultural factors. Finally, because this study was observational, the causal mechanisms underlying the observed association remain to be tested. Incorporating situational moderators and pitcher-batter matchup data would help clarify when and how batters' names are associated with HBP.

Notes

[1] Dragon Quest is a long-running Japanese role-playing video game series in which characters use named magic spells during battles.

[2] MLB players can register an official first name different from their legal first name. For example, although his real first name was *Robert*, *Bob Gibson* was officially registered under the name *Bob Gibson*.

[3] BABIP is the rate at which fair balls in play, excluding home runs, result in hits.

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Disclosure Statement

The author declares no conflicts of interest.

AI Disclosure Statement

The author used ChatGPT (OpenAI) to assist with English language editing and the preparation of R code for the statistical analyses. All AI-generated output was reviewed and edited by the author, who takes full responsibility for the final manuscript and the analyses.

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Notes on Contributor

Ryota Sakakibara is an associate professor at Showa Women’s University, Japan. He holds a Ph.D. in Education from The University of Tokyo. His research interests span a wide range of topics, including baseball analytics, scientific reasoning, conspiracy beliefs, and affective science.

Correspondence to: Ryota Sakakibara. Email: r-sakakibara@swu.ac.jp

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