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Who Rates Words as More or Less Iconic?

Exploration of Personality and Experiential Sources of Individual Differences in Iconicity Ratings

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Abstract

Iconicity has been widely studied in relation to language acquisition, processing, and evolution. Recent work has emphasized the subjective nature of iconicity and the role of individual construal, yet it remains unclear when and under what conditions individual differences in iconicity perception arise. As a first step toward addressing this issue, the present study examines how personality traits (Big Five) and individual background factors relate to iconicity ratings of Japanese words. We observed substantial individual variability in iconicity ratings. Among the traits, extraversion showed a small but reliable negative association with perceived iconicity, such that lower extraversion was associated with higher iconicity ratings. In addition, self-reported ideophone use emerged as a consistent positive correlate of iconicity ratings, whereas no other background factors showed reliable independent associations. These findings suggest that iconicity is not merely an intrinsic property of linguistic forms, but a perceptual phenomenon that varies across individuals. At the same time, the results indicate that such variability is not systematically structured by broad background factors, suggesting a selective role for specific forms of linguistic experience. Overall, the study highlights the importance of considering who rates words as more or less iconic, and under what experiential conditions, in theoretical accounts of iconicity in language.

Keywords: Iconicity; individual differences; personality traits; ideophones; Japanese

Background

Iconicity—the resemblance between linguistic form and meaning—is increasingly recognized as a foundational property of human language across modalities, with demonstrated roles in word learning, language processing, and language evolution (e.g., Imai & Kita, 2014; Perniss & Vigliocco, 2014; Perlman & Lupyan, 2018). A recent definition of iconicity characterizes it as follows: *a signal in any modality or medium exhibits iconicity when its production and/or interpretation involves a sense of resemblance between at least some aspect of its form and at least some aspect of its meaning* (Winter et al., 2026). Crucially, the notion of “a sense of resemblance” highlights that iconicity is not simply an objective property of linguistic forms themselves but rather arises from subjective construals of form–meaning relationships on the part of language users.

This subjective dimension makes lexical iconicity ratings a useful empirical method for studying iconicity in words, as they quantify the extent to which speakers perceive

resemblance between word forms and meanings (e.g., Winter et al., 2024). Although such ratings are subjective judgments, they have been shown to capture systematic aspects of perceived form–meaning mappings, revealing meaningful patterns across lexical categories as well as associations with other psycholinguistic variables, such as age of acquisition (see Winter & Perlman, 2021). In this sense, iconicity ratings offer a window onto how language users construe the relationship between linguistic form and meaning.

Because iconicity ratings depend on perceived resemblance, they may also be shaped by the linguistic and cultural experience of the rater. Consistent with this view, previous research has shown that linguistic and cultural experience influences iconicity ratings. For example, words in one’s native language are generally perceived as more iconic than those in a non-native language, a pattern observed in both signed and spoken modalities (Occhino et al., 2017; Sehyr & Emmorey, 2019; Iida & Akita, 2024). These findings demonstrate that iconicity can be shaped by language experience and familiarity, rather than objective properties of lexical items.

While such studies provide important evidence for cross-linguistic and cross-experiential variation, individual differences within a single language community remain largely unexplored. If iconicity is fundamentally subjective, we would expect iconicity judgments to vary not only across languages or levels of familiarity, but also across individuals. However, it is still unclear when, how, and for whom such individual differences emerge, and which characteristics systematically affect sensitivity to form–meaning resemblance.

Importantly, individual variation in iconicity perception should not be treated as mere noise in the data. Instead, it may reflect meaningful differences in cognitive style, attention, social engagement, or language use. In this respect, personality traits—particularly those captured by well-established frameworks such as the Big Five (McCrae & John, 1992)—provide a theoretically grounded starting point for investigating systematic sources of individual variation in iconicity judgments. Previous work suggests that personality traits are related to language in multiple ways, including patterns of language use (Pennebaker & King, 1999) and language learning and communicative behavior (Dewaele & Furnham, 1999).

Building on this background, the present study takes an exploratory, hypothesis-generating first step toward

examining individual differences in iconicity perception. Specifically, we investigate how personality traits, operationalized through the Big Five, and a range of individual background factors—including age, gender, language use, occupational background, and leisure activities—relate to iconicity ratings of Japanese words. By shifting the focus from item-level average iconicity judgments to variability across individuals, the study asks which individual characteristics are associated with rating words as more or less iconic.

Method

Stimuli

The stimuli were drawn from a previously published dataset of Japanese iconicity ratings (Thompson et al., 2020). From this dataset, we selected 100 words in total, comprising 20 items from each of five lexical categories: nouns, verbs, adjectives, function words, and ideophones. Items were selected such that average iconicity ratings varied widely within each category, ensuring substantial variability in perceived iconicity across the stimulus set.

Participants

A total of 202 native speakers of Japanese were recruited via the Japanese crowdsourcing platform CrowdWorks and participated in the study. Given the nature of the task, participants were required to report no significant visual or auditory impairments. Four participants did not report their gender, which was included as one of the explanatory variables in the analysis, and were therefore excluded. The final sample consisted of 198 participants.

Procedure and Instructions

The experiment was conducted using Google Forms and consisted of three parts. Prior to participation, all participants provided informed consent, agreeing that their responses would be anonymized, that no personally identifiable information would be stored or published, and that anonymized data might be made publicly available for research purposes.

First, participants completed the iconicity rating task. All instructions and rating scales were presented in Japanese. Participants were presented with words one at a time and asked to indicate the extent to which the sound of each word was perceived as resembling its meaning. They were instructed to say each word out loud to themselves and to think about its meaning before providing a rating (Winter et al., 2024). To familiarize participants with the concept of iconicity, we provided three examples of words with low and high iconicity, drawn from a previous iconicity rating dataset. Importantly, these examples included not only highly iconic ideophones (e.g., *shakishaki* ‘crisp’), but also highly iconic words that are not strongly tied to sound alone, such as *sugoi*

‘amazing’ and *tateru* ‘to stand/raise’. Ratings were collected using a seven-point Likert scale, anchored at (1) “The sound and the meaning are not similar at all” and (7) “The sound and the meaning are very similar” (Motamedi et al., 2019; Winter et al., 2024).

Second, participants completed a questionnaire assessing personality traits using the Japanese version of the Ten Item Personality Inventory (TIPI-J; Oshio et al., 2012). The TIPI is a brief instrument consisting of 10 items designed to measure the five dimensions of the Big Five personality framework: *extraversion*, *agreeableness*, *conscientiousness*, *neuroticism*, and *openness*. The order of the items was kept identical to that recommended in the original instrument.

Third, participants provided background information, including *age*, *gender*, *educational background*, *occupation*, *hobbies*, *frequency of book reading per week*, *frequency of manga reading*, *parenting status*, *the number of foreign languages in which they reported fluency*, and their primary areas of *interest* (e.g., humanities, environmental issues, economics). Participants also indicated whether they were familiar with the terms *sound symbolism*, *bouba/kiki*, and *iconicity*. In addition, participants reported how *frequently they use ideophones* and imitative words in everyday life, using a seven-point Likert scale. Ideophones are widely regarded as highly iconic linguistic forms, with many such words receiving very high iconicity ratings in previous norming studies (Thompson et al., 2020). This measure was therefore included as an index of participants’ experiential familiarity with highly iconic linguistic expressions.

Statistical Analyses

All statistical analyses were conducted in R (version 4.4.0; R Core Team, 2024). To analyze the ordinal iconicity ratings, we employed cumulative link mixed models (CLMMs), which are appropriate for response variables with an inherent order but potentially unequal intervals between categories. The models were fitted using the ordinal package (Christensen, 2019). Iconicity ratings served as the ordinal response variable, and the models included random intercepts for participants and items¹.

Personality trait scores were derived from the Japanese version of the Ten Item Personality Inventory (TIPI-J; Oshio et al., 2012). Following the scoring procedure described in the original manual, *extraversion*, *agreeableness*, *conscientiousness*, *neuroticism*, and *openness* scores were computed for each participant. All personality trait scores were *z*-standardized prior to analysis.

For the remaining background variables, dummy coding was applied as appropriate, depending on the structure of each variable (e.g., binary or categorical predictors). Reading frequency for books and manga was dummy-coded to capture whether participants reported any reading activity versus none. This binarization was used because approximately half of participants reported zero books per week, yielding a

¹ All data and R scripts are available via the Open Science Framework (OSF) at the following link: <https://osf.io/uyr95/>.

highly zero-inflated distribution and sparse higher-frequency categories. Educational background was recoded as a binary variable indicating higher education (junior college or above) versus lower education. Prior knowledge of iconicity-related concepts was dummy-coded based on whether participants reported familiarity with the term.

Language experience was recoded into an ordinal numeric variable reflecting the number of foreign languages in which participants reported fluency. Free-text responses for hobbies and occupation were converted into a small set of binary indicator variables using keyword-based pattern matching. Hobby categories included reading-related activities, visual/artistic activities, music, digital media, physical activities, and travel. Occupational categories captured language-related work, care-related work, and self-employment. Areas of interest were coded into three categories: humanities (e.g., literature, education, arts), sciences (e.g., medicine, natural and agricultural sciences), or both.

Finally, to validate the rating task against existing norms, item-level mean ratings were computed by averaging numeric ratings across participants for each word. These means were then correlated with the corresponding average iconicity estimates from an independent reference dataset (Thompson et al., 2020).

Results

Comparison With the Previous Dataset

At the item level, mean ratings were moderately correlated with independent estimates of average iconicity, $r = .53$, $p < .001$. This indicates meaningful convergence between the present dataset and the previous iconicity norms (Thompson et al., 2020), despite differences in rating scales. Specifically, Thompson et al. (2020) used a -5 to $+5$ scale, whereas the present study used a unidirectional $1-7$ scale. This difference in scale format is relevant because the negative, anti-iconic half of such scales has been found to be relatively underused in iconicity rating tasks (Motamedi et al., 2019).

Item-level standard deviations ranged from 0.94 to 1.99 ($M = 1.75$), indicating that some words elicited more variable iconicity judgments than others. Descriptively, ideophones received the highest mean iconicity ratings among the five lexical categories ($M = 5.61$), followed by adjectives ($M = 3.87$), verbs ($M = 3.75$), nouns ($M = 3.46$), and function words ($M = 3.41$). This pattern is also consistent with Thompson et al. (2020). Ideophones also showed the lowest average item-level standard deviation ($M = 1.53$), indicating relatively greater agreement in ratings for this category.

Big Five Traits

The random-effects structure revealed substantial variability across participants ($SD = 1.36$), indicating marked individual differences in overall iconicity ratings. This suggests that

some individuals consistently perceive words as more iconic than others, independent of specific lexical items.

To examine the relationship between personality traits and iconicity perception, we fitted cumulative link mixed models predicting iconicity ratings from z -standardized Big Five personality traits (Table 1). Pairwise correlations among the Big Five predictors were low to moderate ($|r| \leq .39$). Multicollinearity was further assessed using variance inflation factors (VIFs) computed from models without random effects; all VIF values were below 2, indicating no problematic multicollinearity.

As shown in Table 1, extraversion was negatively associated with perceived iconicity, indicating that individuals scoring lower on this trait tended to assign higher iconicity ratings. In contrast, no reliable associations were observed for the remaining Big Five traits (agreeableness, conscientiousness, neuroticism, and openness).

Table 1: Cumulative link mixed-effects model predicting iconicity ratings from Big Five traits. The model includes random intercepts for participants and items. Personality trait scores were z -standardized. Positive estimates indicate higher perceived iconicity.

Predictors	Estimate	SE	z	p
Extraversion	−0.22	0.10	−2.11	.035
Agreeableness	0.03	0.11	0.28	.780
Conscientiousness	−0.10	0.11	−0.95	.342
Neuroticism	−0.07	0.12	−0.62	.537
Openness	0.09	0.11	0.81	.419

Ideophone Use

To examine whether iconicity ratings are related to language experience beyond broad personality traits, we next focused on self-reported ideophone use. We fitted cumulative link mixed-effects models predicting iconicity ratings from z -standardized ideophone use, with random intercepts for participants and items. Even when ideophone use was included, substantial variability across participants remained ($SD = 1.34$), indicating robust individual differences in overall iconicity ratings.

When ideophone use was entered together with the Big Five personality traits (Table 2), ideophone use emerged as a significant positive predictor of iconicity ratings ($\beta = 0.28$, $SE = 0.11$, $z = 2.67$, $p = .008$), indicating that participants who reported more frequent ideophone use tended to rate words as more iconic overall. Among the personality traits, only extraversion showed a reliable negative association with iconicity ratings, and this effect remained significant after controlling for ideophone use.

Variance inflation factors computed from auxiliary linear models indicated no problematic multicollinearity among predictors (all VIFs below 2). Taken together, these results suggest that individual differences in iconicity perception are selectively associated with specific linguistic experience—

namely, habitual use of ideophonic expressions—rather than being broadly explained by stable personality traits.

Table 2: Cumulative link mixed-effects model predicting iconicity ratings from Big Five personality traits and ideophone use.

Predictors	Estimate	SE	<i>z</i>	<i>p</i>
Extraversion	−0.30	0.11	−2.81	.005
Agreeableness	−0.02	0.11	−0.16	.873
Conscientiousness	−0.04	0.11	−0.40	.692
Neuroticism	−0.14	0.12	−1.15	.252
Openness	0.11	0.11	1.05	.296
Ideophone use	0.28	0.11	2.67	.008

Full Model Including Background Variables

Even in the full model including personality traits, ideophone use, and a wide range of background variables, substantial participant-level variability remained ($SD = 1.30$). This suggests that most individual differences in iconicity ratings are not explained by broad personality traits or background factors captured in the present analyses.

In the model including the Big Five personality traits, ideophone use, and a broad range of background variables, ideophone use remained a significant positive predictor of iconicity ratings, $\beta = 0.26$, $SE = 0.12$, $z = 2.25$, $p = .025$. Extraversion also showed a significant negative effect, $\beta = -0.23$, $SE = 0.12$, $z = -1.98$, $p = .048$. Other background variables—including age, gender, interests, hobbies, occupation, reading habits, parenting status, and educational attainment—did not reach significance (Table 3).

Multicollinearity among predictors was assessed using variance inflation factors computed from auxiliary linear models without random effects. All VIF values were below 2, indicating no problematic multicollinearity.

Table 3: Cumulative link mixed-effects model predicting iconicity ratings from personality traits, ideophone use, and background variables. Reference level for Interest type is Both.

Predictors	Estimate	SE	<i>z</i>	<i>p</i>
Extraversion	−0.23	0.12	−1.98	.048
Agreeableness	−0.03	0.11	−0.28	.783
Conscientiousness	0.01	0.11	0.12	.902
Neuroticism	−0.14	0.12	−1.13	.258
Openness	0.09	0.11	0.83	.407
Ideophone use	0.26	0.12	2.25	.025
Gender (male)	0.08	0.26	0.29	.775
Age	−0.07	0.12	−0.56	.579
Reading (books)	0.25	0.26	0.96	.337
Reading (manga)	0.10	0.20	0.48	.628
Higher education (yes)	−0.36	0.23	−1.56	.119

Number of languages	−0.30	0.24	−1.24	.214
Interest: Humanities	−0.18	0.23	−0.79	.431
Interest: Sciences	−0.48	0.55	−0.88	.380
Hobby: Reading	−0.04	0.26	−0.17	.864
Hobby: Visual arts	0.04	0.28	0.15	.879
Hobby: Music	0.21	0.21	1.01	.312
Hobby: Digital	−0.03	0.20	−0.13	.898
Hobby: Physical	−0.37	0.26	−1.43	.153
Hobby: Travel	−0.08	0.21	−0.38	.706
Job: Language-related	0.40	0.49	0.82	.414
Job: Self-employed	0.05	0.31	0.17	.866
Job: Care-related	0.33	0.38	0.87	.383
Parenting status	−0.13	0.23	−0.57	.572
Prior knowledge of iconicity (yes)	0.09	0.42	0.21	.831

General Discussion

The present study investigated individual differences in iconicity perception by integrating personality traits with a broad range of experiential and demographic background variables. Across all models, substantial participant-level variability was observed, indicating that iconicity judgments are not solely properties of lexical items but also show consistent variation across individuals.

At the same time, the present analyses showed that most of this individual variability could not be explained by broad personality traits or commonly measured background factors. Even in the full model including personality traits, ideophone use, and a wide range of demographic and experiential variables, large participant-level random effects remained. This suggests that while individual differences in iconicity perception are robust, their underlying sources are not readily captured by standard individual-difference measures.

Personality Traits and Iconicity Ratings

With respect to personality traits, the present results provided limited evidence for a broad role of stable personality dispositions in shaping iconicity perception. Among the Big Five traits, extraversion showed a small but reliable negative association with iconicity ratings, such that more introverted participants tended to assign higher iconicity ratings overall.

One possible interpretation is that more introverted individuals may engage more reflectively with linguistic form, attending more closely to subtle phonological cues that support iconic form–meaning mappings. Such differences may not be restricted to the explicit rating task used here, but could also extend to language use in communicative contexts, where sensitivity to fine-grained form-based cues may similarly shape interpretation. In contrast, more extraverted individuals may focus more on communicative goals and rely less on detailed phonological information when evaluating or processing words. However, the underlying mechanisms of this effect remain unclear, and further research is required to determine whether it reflects differences in attentional style,

task engagement, or broader cognitive–affective tendencies rather than iconicity perception itself.

Importantly, traits that might intuitively be expected to relate to iconicity sensitivity—most notably openness, often associated with imagination, creativity, and receptiveness to novel associations—did not show reliable effects once other variables were controlled. This is noteworthy given theoretical accounts that characterize iconicity as involving flexible interpretation (Wilcox, 2004) and sensory-based, perceptuomotor analogies (Dingemanse et al., 2015).

Ideophone Use and Iconicity Ratings

Beyond broad personality traits, the present results highlight the importance of specific forms of linguistic experience that contribute to individual differences in iconicity perception. In particular, self-reported ideophone use showed a reliable positive association with iconicity ratings across models, indicating that greater use of and familiarity with ideophonic expressions were associated with higher overall iconicity ratings.

This finding is consistent with accounts that conceptualize iconicity as emerging from language experience (Occhino et al., 2017; Iida & Akita, 2024), according to which repeated exposure to a given language strengthens perceptual and interpretive links between linguistic form and meaning. As noted by Dingemanse et al. (2016), ideophones are typically produced as multimodal performances, characterized by marked prosody and often accompanied by iconic gestures. Repeated engagement with such performances may therefore attune listeners to phonological structure as a meaningful cue, making iconic correspondences more salient in explicit judgment tasks.

Importantly, the association between ideophone use and iconicity ratings remained reliable even when personality traits and a wide range of demographic and background variables were included in the model. This suggests that ideophone use captures variance in iconicity perception that is not readily reducible to broad personality dispositions or general background factors. At the same time, substantial participant-level variability remained unexplained, indicating that while ideophone use constitutes one identifiable experiential factor, it accounts for only a limited portion of individual differences in iconicity perception.

In contrast, other experiential and background variables—including reading habits, hobbies, occupational background, and prior knowledge of iconicity—did not show reliable independent associations once ideophone use and personality traits were controlled. This pattern suggests that experience-based effects on iconicity perception may be selective rather than general: not all forms of cultural or linguistic engagement are equally related to sensitivity to iconic form–meaning mappings. Instead, experiences involving systematic and recurrent exposure to sound-symbolic structure—such as habitual use of ideophonic expressions—appear to be more closely associated with variation in iconicity ratings.

Limitations and Future Directions

The present study revealed substantial individual differences in iconicity perception, indicating that iconicity judgments are not solely intrinsic properties of linguistic forms but depend on how individuals attend to and interpret form–meaning relations. These differences were largely unexplained by broad personality traits or background factors, pointing instead to a selective role of experience-related variables such as ideophone use.

Several limitations should be noted. First, the stimulus set was relatively small. Although the 100 words were selected to vary in iconicity across five lexical categories, this sample cannot fully capture the uneven distribution of iconicity across the Japanese lexicon. Because iconicity tends to cluster in particular lexical categories and semantic domains (e.g., Winter et al., 2024), a larger and more representative sample of words is needed before stronger generalizations can be made about individual differences in iconicity perception.

Second, the range of individual-difference measures included in the present study was necessarily limited. Although personality traits, self-reported language experience, and demographic variables capture broad dimensions of variation, they do not directly assess more fine-grained cognitive and perceptual factors that may be relevant to iconicity perception. In addition, ideophone use was measured via self-report and may not fully reflect actual language use in naturalistic communicative contexts.

Third, the present analyses were correlational in nature and focused on the independent contributions of individual-difference factors. As a result, the causal and developmental relationships among these factors could not be addressed. For example, it remains unclear whether greater use of ideophonic expressions leads individuals to rate words as more iconic overall, whether individuals who tend to give higher iconicity ratings are more likely to use ideophones, or whether both are shaped by other aspects of linguistic experience. Moreover, higher overall ratings should not be equated with greater sensitivity to iconicity, if sensitivity is understood as distinguishing more iconic words from less iconic ones. Future research should therefore distinguish between general rating tendencies and item-level sensitivity to iconicity, for example by examining how strongly individual participants' ratings align with independently established item-level iconicity norms.

Finally, the present study focused on Japanese speakers, whose language makes extensive and systematic use of ideophonic expressions. While this makes Japanese a valuable test case for examining experience-based effects on iconicity perception, it also limits the generalizability of the findings to languages with fewer iconic resources or different typological profiles.

Building on the present findings and addressing the limitations discussed above, future research could further clarify the nature of individual differences in iconicity perception. One important direction is to examine whether the observed individual-difference patterns generalize across

languages. Because languages differ in how extensively and systematically they employ iconic resources, cross-linguistic comparisons may help determine whether the present results reflect language-specific experience or more general properties of iconicity perception. One additional direction for future research is to examine response times during iconicity judgments. More introverted individuals may engage in more deliberate reflection, potentially allowing them to identify a greater number of form–meaning correspondences.

Another promising direction concerns potential interactions among individual-difference factors, particularly in communicative contexts. Future work could investigate how differences in personality, linguistic experience, or sound-oriented expertise interact between speakers and listeners, shaping how effectively iconic cues are produced, perceived, and used during communication. Adopting such an interactional perspective may help clarify how individual differences jointly influence communicative alignment and mutual understanding, and how they may contribute to the conventionalization of linguistic forms over time (Winter et al., 2026).

Overall, the study of individual differences in iconicity perception remains in its early stages. By moving beyond average effects and attending to who perceives iconicity, under what conditions, and in interaction with whom, future research can advance our understanding of iconicity as a dynamic, experience-sensitive, and socially embedded phenomenon.

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