

# The nature of orthographic–phonological and orthographic–semantic relationships for Japanese kana and kanji words

Yasushi Hino · Shinobu Miyamura · Stephen J. Lupker

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**Abstract** It is generally assumed that orthographic–phonological (O-P) consistencies are higher for Japanese kana words than for kanji words and that orthographic–semantic (O-S) consistencies are higher for kanji words than for kana words. In order to examine the validity of these assumptions, we attempted to measure the O-P and O-S consistencies for 339 kana words and 775 kanji words. Orthographic neighbors were first generated for each of these words. In order to measure the O-P consistencies of the words, their neighbors were then classified as phonological friends or enemies, based on whether the characters shared with the original word were pronounced the same in the two words. In order to measure the O-S consistencies, the similarity in meaning of each of the neighbors to the original word was rated on a 7-point scale. Based on the ratings, the neighbors were classified as semantic friends or enemies. The results indicated that both the O-P consistencies for kanji words and the O-S consistencies for kana words were greater than previously assumed and that the two scripts were actually quite similar on both types of consistency measures. The implications for the nature of the reading processes for kana and kanji words are discussed.

**Keywords** Orthographic-phonological consistency · Orthographic-semantic consistency · Japanese kana words · Japanese kanji words

One of the most salient characteristics of the Japanese language is that words are printed in multiple scripts: kanji, hiragana, and katakana. Kanji is a logographic script, and each kanji character directly represents meaning. Thus, each kanji character is considered to be a morpheme. In contrast, kana scripts, consisting of hiragana and katakana, are phonetic scripts, and hence each kana character corresponds to a mora, a rhythmic unit of a constant duration consisting of either a single vowel or a combination of a consonant and a vowel. Although any kanji word can be transcribed into either katakana or hiragana based on its pronunciation, most words are typically printed in only a single script. In Japanese sentences, nouns, adverbs, and verb and adjective stems are typically written in kanji. Grammatical elements such as auxiliary verbs and particles are typically written in hiragana, whereas a number of special types of words (e.g., foreign loan words, animal names, scientific terms, etc.) are typically written in katakana.

For most Japanese words, therefore, word frequency counts are available only for one script form. There are some exceptions, however. For example, the word “glasses” normally appears in all three scripts (katakana メガネ, hiragana めがね, and kanji 眼鏡), and therefore, all the script forms have their respective frequency counts.<sup>1</sup>

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Y. Hino (✉)  
Faculty of Arts and Sciences, Waseda University,  
1-24-1 Toyama, Shinjuku-ku,  
Tokyo 162-8644, Japan  
e-mail: hino@waseda.jp

S. Miyamura  
Net-Research Department, Custom Research Management Unit,  
INTAGE Inc,  
Tokyo, Japan

S. J. Lupker  
Department of Psychology, University of Western Ontario,  
London, Ontario, Canada

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<sup>1</sup> According to Amano and Kondo's (2003b) word frequency norms, the frequency counts of the word “glasses,” respectively, among 287,792,797 tokens, are 667 for the katakana script form, メガネ; 253 for the hiragana script form, めがね; and 1,314 for the kanji script form, 眼鏡. In contrast, the frequency count for the word ラジオ (radio) is listed only for the katakana script form, which is 8,696. Similarly, the frequency count for the word 台所 (kitchen) is available only for the kanji script form, which is 3,239.

## Different relationships between orthography, phonology, and semantics for kana and kanji words

The central issue investigated in the present research is the suggestion by a number of researchers that the nature of the relationships between orthography and phonology and between orthography and semantics must be quite different for words printed in kana and kanji (e.g., Feldman & Turvey, 1980; Frost, 2005; Kimura, 1984; Saito, 1981; Wydell, Butterworth, & Patterson, 1995). Because each kana character generally corresponds to a single mora, kana is considered a shallow orthography, in which the relationships between the kana characters and their sounds (i.e., the orthographic–phonological [O-P] relationships) are quite transparent. That is, whenever the same kana character is used, it is almost always pronounced the same, as in *イス* (chair, /i.su/) and *リス* (squirrel, /ri.su/). In contrast, kanji is considered a deep orthography, in which the character–sound relationships are rather opaque. Often, kanji characters have at least two potential pronunciations: the so-called kun-reading and on-reading pronunciations.<sup>2</sup> The kun-readings are of Japanese origin and were assigned to the kanji characters based on their meanings. On the other hand, the on-readings are of Chinese origin, and these pronunciations were imported from China together with these characters. In addition, a number of kanji characters have more than one on-reading pronunciation, due to the fact that Chinese pronunciations themselves changed over time for the same characters and that pronunciations were imported from China several times in history. As a result, kanji characters are pronounced in different ways in different contexts [e.g., *親父* (father, /o.ja-zi/) and *親戚* (relatives, /si.N-se.ki/)], suggesting that the O-P relationships for kanji words are much less consistent than those for kana words.<sup>3</sup>

In contrast, it is generally assumed that the orthographic–semantic (O-S) relationships are much more consistent for kanji words than for kana words (e.g., Feldman & Turvey, 1980; Frost, 2005; Ijuin, 2008; Kimura, 1984; Saito, 1981; Wydell et al., 1995). As previously noted, because each kanji character is a morpheme, it denotes a specific meaning. Thus,

it is likely that words containing the same kanji character tend to share (at least a part of) their meaning, such as with *男性* (male, /da.N-se.i/) and *男子* (boy, /da.N-si/). Kana characters, in contrast, are phonetic characters. Therefore, although words sharing the same kana characters may tend to have similar pronunciations, there is no a priori reason to expect that they would share meanings [e.g., *ポケット* (pocket, /po.ke.Q.to/) and *ロケット* (rocket, /ro.ke.Q.to/)].

## Empirical findings

The assumptions that O-P consistencies are much higher for kana words than for kanji words and that O-S consistencies are much higher for kanji words than for kana words appear to lead to the theoretical position that there are definite processing differences for kana and kanji words. For example, some researchers (e.g., Morton & Sasanuma, 1984; Saito, 1981) have suggested that completely different processes are involved in phonological coding for kana and kanji words, along the lines of the assumptions made by the orthographic depth hypothesis (e.g., Frost, 2005; Frost, Katz, & Bentin, 1987). According to this position, phonological coding for a kana word is assumed to be accomplished by simply applying print–sound correspondence rules (i.e., an “assembly” route like that found in the dual-route cascaded model—Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001). In contrast, because word-level information would have to be retrieved first in order to correctly name a kanji word, phonological coding for kanji words can only be accomplished via the mental lexicon (i.e., a “lexical” route—e.g., Wydell et al., 1995). At the same time, given the higher O-S consistencies for kanji than for kana words, this position also assumes that, although the process of retrieving lexical/semantic information is driven directly by orthography for kanji words, this process is mediated by phonology for kana words.

Empirical evidence consistent with this position had been reported in some previous studies. For example, Feldman and Turvey (1980) and Saito (1981) compared naming latencies for the same words written in kana and kanji scripts. Using words normally written in kanji (i.e., color names), the naming latencies were faster when the words were transcribed into hiragana than when they were presented in kanji. In contrast, Saito also reported that, using a task requiring a response based on the meanings of the presented word (a sentence judgment task), response latencies were faster when the words were presented in the familiar kanji script than when they were transcribed into hiragana.

Wydell et al. (1995) also reported data generally consistent with this position in their naming experiments

<sup>2</sup> According to Tamaoka, Kirsner, Yanase, Miyaoka, and Kawakami (2002), 777 out of 1,945 basic kanji characters have only a single pronunciation (40.05%), indicating that about 60% of kanji characters possess multiple pronunciations in Japanese.

<sup>3</sup> When we describe morae using characters from the Roman alphabet, we will use the format from Tamaoka and Makioka (2004), with the following exceptions: (1) a period [.] is used to denote a moraic boundary, (2) a hyphen [-] is used to denote a morphemic boundary [e.g., /si.N-se.ki/ for *親戚* (relatives)], and (3) a prolonged (“long”) vowel is denoted by using two vowel symbols, with the second one being capitalized [e.g., /te.E.pu/ instead of /te.R.pu/ for *テープ* (tape)].

using kanji words. In their experiments, naming performance was compared for kanji words that consisted of kanji characters with only a single pronunciation (the consistent condition) and kanji words that consisted of kanji characters with multiple pronunciations (the inconsistent condition). If the naming of kanji words is performed not only via the lexical route but also through some sort of assembly route using character–sound correspondence rules, naming latencies should be slower for words consisting of kanji characters with multiple pronunciations, because there is a possibility that the assembly route could produce conflicting outputs for these words. In their six naming experiments, however, Wydell et al. failed to find a consistency effect and, hence, concluded that phonological coding for kanji words is accomplished only via a lexical route.

Kimura (1984) also reported data indicating that the process of retrieving lexical/semantic information is directly driven by orthography for kanji words but is mediated by phonology when kanji words are transcribed into kana. Kimura examined the effect of concurrent articulation using a relatedness judgment task with the same word pairs either presented in kanji (their typical script) or transcribed into hiragana. In the concurrent articulation condition, participants were asked to repeatedly count from 1 to 5 aloud while deciding whether or not each word pair was related. In this task, relatedness judgment performance was more disrupted by concurrent articulation when the word pairs were transcribed into hiragana than when they were presented in kanji. Based on these results, Kimura suggested that (1) relatedness judgment performance was more disrupted for hiragana transcription pairs because the concurrent articulation disrupts prelexical phonological coding and that (2) the effect of the concurrent articulation was smaller for kanji word pairs because word meanings could be directly retrieved from orthography for those words.

Although there are now a number of findings that are consistent with the predictions for kanji and kana words derived from an orthographic-depth-type hypothesis, more recently this position has been criticized by some researchers. According to this type of hypothesis, a processing advantage would always be expected for kana-written forms over kanji-written forms of the same words in naming. Yamada (1992), however, reported data inconsistent with this prediction. In his naming task, kanji numerals were named slightly faster than their hiragana transcriptions. In addition, Besner and Hildebrandt (1987) reported data inconsistent with the claim that kana-written words are always named only via a shallow, assembly-like process. If phonological coding for kana-written stimuli is always accomplished through an assembly route, there would be no reason to expect

effects of orthographic familiarity or lexicality on the naming of kana-written stimuli. Besner and Hildebrandt, therefore, compared naming performance for (1) familiar katakana words that are normally written in katakana, (2) unfamiliar katakana transcriptions of words that are normally written in kanji, and (3) katakana-written nonwords. The naming responses for the katakana words were faster than those for the katakana transcriptions of kanji words, which were faster than those for the katakana nonwords. Consistent with these findings, Hino and Lupker (1998) also reported significant word frequency effects for both katakana and kanji words in their naming experiments.

In order to account for the fact that orthographic familiarity, word frequency, and lexicality affect naming performance for the kana-written stimuli, lexical involvement in the phonological-coding process would have to be assumed. Taking a dual-route perspective (e.g., Coltheart, 1978, 2005; Coltheart, Curtis, Atkins, & Haller, 1993; Coltheart et al., 2001), therefore, Besner and Hildebrandt's (1987) and Hino and Lupker's (1998) data suggest that phonological coding for kana-written stimuli involves not only an assembly route but also a lexical route.

Similarly, Fushimi, Ijuin, Patterson, and Tatsumi (1999) suggested that phonological coding for kanji words also involves both routes. As noted, Wydell et al. (1995) failed to observe a consistency effect for kanji words in their naming experiments, with their consistency manipulation being based on the number of pronunciations possessed by the constituent kanji characters. Simply manipulating the number of pronunciations possessed by the constituent characters may not necessarily produce a strong manipulation of O-P consistency, however. That is, even when a kanji character has multiple pronunciations, the inconsistency would be substantially diminished if that character is pronounced the same way whenever it is used in a specific character position in kanji words. In order to address this issue, Fushimi et al. (1999) manipulated the O-P consistency for kanji words based on the pronunciations of their orthographic neighbors (Coltheart, Davelaar, Jonasson, & Besner, 1977), following the procedure used by Jared, McRae, and Seidenberg (1990). Using this consistency manipulation, Fushimi et al. reported a significant consistency effect in the naming of kanji words.

Similarly, using katakana words with macrons, Hino, Kusunose, Lupker, Kawarada, and Maekawa (2011) recently manipulated O-P consistencies for katakana words based on the pronunciations of their orthographic neighbors and reported a consistency effect in the naming of katakana words. A reasonable interpretation of this effect is that it arises due to the competition created by conflicting outputs

from the lexical and assembly routes during the phonological-coding process for the inconsistent words. The consistency effects in the naming of kanji and katakana words, therefore, strongly suggest that, if one takes a dual-route perspective, both the lexical and assembly routes are involved in the naming of both kanji and katakana words.<sup>4</sup>

Note also that some semantic effects have been reported in the naming not only of kanji words (e.g., Hino, Lupker, & Pexman, 2002; Shibahara, Zorzi, Hill, Wydell, & Butterworth, 2003) but also of katakana words (e.g., Hino, Lupker, Sears, & Ogawa, 1998). These data also indicate that neither kanji words nor kana words are named only via an assembly route.

Finally, in contrast to Kimura's (1984) findings, Kinoshita and Saito (1992) observed no effect of concurrent articulation for either kanji words or the hiragana transcriptions in their lexical decision experiment. In order to make a correct "word" decision, presumably, a lexical representation would have to be selected. If the lexical-selection process is accomplished directly from orthography for a kanji word but is always mediated by phonology when that kanji word is transcribed into hiragana, as suggested by Kimura, lexical decision performance for the hiragana transcriptions should be selectively disrupted by concurrent articulation.

As a result of the null effect of concurrent articulation for both kanji words and hiragana transcriptions in their experiments, Kinoshita and Saito (1992) suggested an alternative explanation for the greater effect of concurrent articulation for kana transcription pairs in Kimura's (1984) study. In particular, when a kanji word is transcribed into kana, the kana transcriptions tend to be semantically ambiguous because there are a number of homophones among Japanese kanji words, such as 教会 (church, /kjo.u-ka.i/) and 境界 (boarder, /kjo.u-ka.i/). During the relatedness decisions for kana transcription pairs, therefore, participants would need to maintain the word's phonological code in working memory in order to exhaustively check the relatedness of all the possible meanings. For kanji words, on the other hand, because they are not semantically ambiguous, the decisions would be easier, and there would be no reason to maintain the phonological code for a long period of time. As such, concurrent articulation would disrupt the decisions for the kana transcription pairs much more than those for the kanji word pairs, implying that Kimura's findings cannot be

taken as good evidence that the process of retrieving lexical/semantic information is mediated by phonology for kana transcriptions.

### The present research

On the basis of the current literature, therefore, it isn't at all clear whether the nature of the processes involved in reading kana and kanji words are really different, which raises the further question of whether the O-P and O-S consistencies for kana and kanji words are actually different in the first place. That is, the failure to detect a consistency effect in the naming of kanji words in Wydell et al.'s (1995) experiments may be due to the fact that O-P relationships are not necessarily inconsistent for kanji words, even when they consist of kanji characters that have multiple potential pronunciations. At the same time, the consistency effect in the naming of katakana words in Hino et al. (2011) also raises the possibility that the O-P relationships for kana words may not be as consistent as previously assumed. As such, the O-P consistencies for kana and kanji words may not necessarily be as different as previously thought.

Similarly, when considering the relationships between kanji compound words and their constituent kanji characters, the meanings of the compound words are not necessarily predictable from the meanings of their constituents. As noted by Zhou and Marslen-Wilson (2000), although the meanings of English and Chinese compound words are clearly related to the meanings of their constituent morphemes, it is often not possible to predict the meaning of a compound word based on the meanings of its constituents, because the way the constituents contribute to the meaning of the compound word is not always the same. To use an English example, a "snowman" is a man made of snow, but a "mailman" is not a man made of mail. In a similar fashion, the meanings of kanji compound words appear to be unpredictable on the basis of their constituent kanji characters, because the same kanji character is used in different senses in constructing the meanings of different kanji compounds [e.g., 助手 (assistant) and 右手 (right hand), in which the shared kanji character, 手 denotes "a person" and "a hand," respectively]. As a result, kanji words sharing the same character are not necessarily very similar in meaning, and hence, the O-S relationships for kanji words may not really be as consistent as previously assumed.

In the present research, therefore, the goal was to measure the degrees of O-P and O-S consistencies for kana and kanji words in order to examine (1) whether O-P

<sup>4</sup> Needless to say, consistency effects in the naming of kanji and katakana words can be explained in terms of parallel distributed processing perspective as well (Fushimi et al., 1999, and Hino et al., 2011, contain detailed accounts of this type).

relationships truly are more consistent for kana words than for kanji words and (2) whether O-S relationships truly are more consistent for kanji words than for kana words, as previously suggested by a number of researchers (e.g., Feldman & Turvey, 1980; Frost, 2005; Kimura, 1984; Saito, 1981; Wydell et al., 1995).

### Stimulus selection

Because it would not be possible to measure the O-P and O-S consistencies for all existing kana and kanji words, we needed to select representative sets of kana and kanji words for our analysis. In order for the measured consistencies to best reflect the nature of the kana and kanji words in general, we attempted to select kana and kanji words that are as typical as possible. As such, we first examined the characteristics of kana and kanji words in general using the words found in a relatively small computerized Japanese dictionary (National Language Research Institute, 1993) with 36,780 word entries. These word entries were first classified in terms of script type. They included 22,198 kanji words (60.35%) and 6,548 kana words (17.80%). The rest of the word entries consisted of those printed in combinations of kana and kanji characters (7,966 words, 21.66%) and those involving specific characters from other alphabets (68 words, 0.18%). When these kana and kanji words were classified in terms of character length, 82.88% of the kanji words (18,397 words) consisted of two kanji characters, whereas 80.39% of kana words (5,268 words) were longer, from three to five characters in length. This difference is due to differences in how morae are represented by kana versus kanji characters. Most Japanese words have three to five morae. For example, when kana and kanji words involved in the familiarity rating norms of Japanese words (Amano & Kondo, 2003a) were classified in terms of the number of morae, 71.53% of kana words (7,571 out of 10,585 kana words) and 83.17% of kanji words (42,859 out of 51,534 kanji words) consisted of three to five morae. While each kana character corresponds to a single mora, kanji characters generally correspond to multiple morae. As a result, words with three to five morae are generally printed in three to five characters in kana, but they are mostly printed in two characters in kanji. Given this situation, we decided that it would be necessary to use kanji words that are two characters in length and kana words that are three to five characters in length in our analysis.

In order to select the specific stimuli for our analysis, we began by examining nouns from Amano and Kondo's (2003a) syntactic class database. There are

59,850 nouns in the database. These nouns were classified in terms of script type, and then sets of kana words (7,085 words) and kanji words (43,122 words) were selected. In order to further reduce the number of items, we eliminated all of the items that were not listed in the National Language Research Institute's (1970) word frequency norms. Virtually all proper nouns were also eliminated.<sup>5</sup> In addition, homophones (words having multiple entries sharing the same pronunciation) and homographs (words having multiple entries sharing the same orthographic form) were identified using Amano and Kondo's (2003a) familiarity-rating database, and those words were also eliminated in order to make the computations of the O-P and O-S consistencies as straightforward as possible. As a result, 339 katakana words that were three to five characters in length and 775 kanji words that were two characters in length were selected as stimuli for the present research.<sup>6</sup>

### The O-P consistency index

For these 339 katakana and 775 kanji words, we measured their O-P and O-S consistencies. Because consistency is the degree of transparency or predictability from one domain to the other, in order to measure the O-P and O-S consistencies for a target word, we first needed to collect a group of words that were similar in orthography to the target word. Therefore, we generated orthographic neighbors for each of the 1,114 words using the National Language Research Institute (1993) database. That is, following Coltheart et al. (1977), all of the words generated by changing one character from the target word were listed as orthographic neighbors for each of the 1,114 words.

<sup>5</sup> An attempt was made to remove all of the proper nouns. However, because Amano and Kondo's (2003a) syntactic class database does not discriminate common nouns from proper nouns, the removal of proper nouns was based only on the second author's intuition.

<sup>6</sup> National Language Research Institute (1970) lists only words whose word frequency counts are more than 4 per 940,533. As a result, it only contains 13,176 words in total. We used this (relatively small) set of frequency norms because, as will be described later, we needed to reduce the number of items as much as possible in order to conduct subjective ratings (to measure the O-S consistencies). We had no qualms about using these norms, because they have been used successfully in the past (e.g., Hino & Lupker, 1998, reported significant frequency effects in their lexical decision and naming tasks by manipulating frequency based on the National Language Research Institute norms). According to Amano and Kondo (2003b), the frequency counts in their frequency norms are strongly correlated with those in the National Language Research Institute norms ( $r = .56$ ).

Because the O-P consistency for a word was defined in terms of the degree of similarity in pronunciations for similarly spelled words (orthographic neighbors), we classified the orthographic neighbors as phonological friends or enemies, based on whether or not the shared characters were pronounced the same (at the moraic level) in the target word and the orthographic neighbor (e.g., Fushimi et al., 1999; Jared et al., 1990). After classifying the orthographic neighbors as phonological friends or enemies, we computed the sum of the frequencies of the phonological friends as well as the sum of the frequencies of the phonological enemies using the National Language Research Institute (1970) frequency norms. The word frequency of the target word was added to the summed frequency of the phonological friends, to produce a value that represented the frequency of usage of the character–mora correspondences involved in the target word. In contrast, the summed frequency of phonological enemies was taken to represent the frequency of usage of different character–mora correspondences for the characters involved in the target word.

Using these values, we computed an index of the O-P consistency for each of the 1,114 target words using the following formula:

$$\text{O-P Consistency Index} = \frac{(\text{Target Frequency} + \text{Summed Frequency of Phonological Friends})}{(\text{Target Frequency} + \text{Summed Frequency of All Neighbors})}$$

In this formula, the summed frequency of the phonological friends was added to the target frequency, and this value was divided by the value of the summed frequency of all of the neighbors plus the target frequency. This index produces a value between 0 and 1 depending on the degree of O-P consistency. The O-P consistency index should be close to 1 for words with more consistent O-P correspondences, whereas for words with highly inconsistent O-P correspondences, the value should be close to 0. In addition, as noted above, because we classified the orthographic neighbors as phonological friends or enemies in terms of whether the shared characters between a target word and its neighbors are pronounced the same *at the moraic level*, the O-P consistency index reflects the nature of character–mora relationships.

### The O-S consistency index

Although the similarity in pronunciations between the target word and its orthographic neighbors could be easily

determined in terms of whether or not the shared characters are pronounced the same, it is somewhat more difficult to determine the similarity in meaning between the target word and its orthographic neighbors. In order to estimate the degree of the O-S consistency for each target word, we asked participants to rate the similarity in meaning between the target word and its orthographic neighbors using a 7-point scale, ranging from 1 (*very dissimilar*) to 7 (*very similar*). After collecting the ratings, we classified the neighbors as semantic friends if the mean similarity rating was 4.00 or higher. Otherwise, the neighbors were classified as semantic enemies. Then, the summed frequencies of the semantic friends and enemies were calculated in order to compute the O-S consistency index for each of the 1,114 words, using the following formula:

$$\text{O-S Consistency Index} = \frac{(\text{Target Frequency} + \text{Summed Frequency of Semantic Friends})}{(\text{Target Frequency} + \text{Summed Frequency of All Neighbors})}$$

In this formula, the summed frequency of the semantic friends was added to the target frequency, and this value was divided by the value of the summed frequency of all of the neighbors plus the target frequency. Similar to the O-P consistency index, the O-S consistency index took a value between 0 and 1. The O-S consistency index should be close to 1 for words with more consistent O-S correspondences, but the value should be close to 0 if the O-S correspondences are highly inconsistent.

By computing the O-P and O-S consistency indices for the 339 katakana and 775 kanji words, we were able to compare these indices between the katakana and kanji words in order to examine (1) whether the O-P consistencies are higher for kana words than for kanji words and (2) whether the O-S consistencies are higher for kanji words than for kana words.

### O-P analysis

#### Method

*Stimuli and procedure* As noted, 339 katakana nouns (3.95 characters in length on average, ranging from three to five characters) and 775 kanji nouns with two characters were selected from Amano and Kondo's (2003a) syntactic class database. The mean numbers of morae were 3.83 for the 339 katakana words and 3.66 for the 775 kanji words. All of these words were non-

homophonic and nonhomographic according to Amano and Kondo's (2003a) familiarity-rating database and were listed in the National Language Research Institute's (1970) word frequency norms.<sup>7</sup>

For each of the 1,114 words, orthographic neighbors were generated using the National Language Research Institute (1993) database and were classified as phonological friends or enemies, as illustrated in Table 1. Then, the summed frequencies of the phonological friends and enemies were computed using the frequency norms of the National Language Research Institute (1970). When a neighbor was not listed in the norms, the frequency count was assumed to be zero. Based on the target frequency and the summed frequencies of the phonological friends and enemies, the O-P consistency index was computed for each of the 1,114 words.

## Results

The mean O-P consistency indices and the mean summed frequencies of the phonological friends and enemies for the 339 katakana words and the 775 kanji words are shown in Table 2, along with their mean word frequencies and orthographic neighborhood sizes. In addition, the target frequency, orthographic neighborhood size, summed frequency of the phonological friends plus target frequency, summed frequency of the phonological enemies, numbers of phonological friends and enemies, and the O-P consistency indices for each of the 1,114 words are listed in the Appendix. As shown in Table 2, the O-P consistency index was higher for the katakana words (.94) than for the kanji words (.82), a difference that was significant in a one-way ANOVA,  $F(1, 1112) = 65.83$ ,  $MSE = .05$ ,  $p < .001$ ,  $\eta^2 = .056$ .

Note, however, that the 1,114 words involved a number of words with no orthographic neighbor listed in National Language Research Institute (1970) frequency norms. Although the computed O-P consistency index is 1.00 for all of these words, the words clearly possess unique spelling patterns and, hence, unique O-P relationships,

much like the so-called "strange" words in English (e.g., Seidenberg, Waters, Barnes, & Tanenhaus, 1984). Therefore, giving the consistency indices for these words the same weight as those for words that actually have neighbors when calculating mean consistencies may produce a somewhat misleading result. Specifically, doing so may artificially inflate the mean consistency index for both katakana and kanji words.

Note also that, because the number of orthographic neighbors is, in general, negatively correlated with word length (e.g., Forster, Davis, Schoknecht, & Carter, 1987) and because katakana words were longer than kanji words in our stimulus set, the mean number of orthographic neighbors was significantly smaller for the katakana words (1.77) than for the kanji words (47.59), a difference that was significant in a one-way ANOVA,  $F(1, 1112) = 900.80$ ,  $MSE = 549.85$ ,  $p < .001$ ,  $\eta^2 = .448$ . As a result, there were 213 katakana words with no neighbors listed in National Language Research Institute (1970) norms and only 7 kanji words of this sort. Therefore, it's possible that the degree of O-P consistency was overestimated more for the katakana words than for the kanji words in our stimulus set. In order to address this issue, we recomputed the mean O-P consistency indices for the katakana and kanji words after removing the words with unique spelling patterns. The results of that analysis are shown in Table 3. As seen in the table, after removing the 213 katakana words and 7 kanji words with unique spelling patterns, the mean O-P consistency index for katakana words was decreased to .83 (from .94 as shown in Table 2), whereas the mean for the kanji words was unchanged (.82). As a result, the O-P consistency indices were essentially the same for the 126 katakana words (.83) and 768 kanji words (.82), a nonsignificant difference in a one-way ANOVA,  $F(1, 892) = 0.31$ ,  $MSE = .06$ ,  $\eta^2 = .000$ .<sup>8</sup>

In addition, because there were small correlations between the O-P consistency indices for the 894 words and both target frequency,  $r = .088$ ,  $p < .01$ , and orthographic neighborhood size,  $r = -.196$ ,  $p < .001$ , we attempted to ascertain whether these factors might have

<sup>7</sup> Mean word lengths, numbers of morae, word frequencies, and orthographic neighborhood sizes were compared for the 339 katakana words and 775 kanji words. As expected, mean word lengths were significantly greater for the katakana words (3.95) than for the kanji words (2.00),  $F(1, 1112) = 5,175.23$ ,  $MSE = 0.17$ ,  $p < .001$ ,  $\eta^2 = .823$ . Mean numbers of morae were also greater for the katakana words (3.83) than for the kanji words (3.66),  $F(1, 1112) = 17.37$ ,  $MSE = 0.36$ ,  $p < .001$ ,  $\eta^2 = .015$ . Mean word frequencies were higher for the kanji words (27.15) than for the katakana words (18.67),  $F(1, 1112) = 7.67$ ,  $MSE = 2,213.46$ ,  $p < .01$ ,  $\eta^2 = .007$ , and mean orthographic neighborhood sizes were much higher for the kanji words (47.59) than for the katakana words (1.77),  $F(1, 1112) = 900.80$ ,  $MSE = 549.85$ ,  $p < .001$ ,  $\eta^2 = .448$ .

<sup>8</sup> After removing the 213 katakana and 7 kanji words with unique spelling patterns, the mean word lengths were 3.45 for the remaining 126 katakana words and 2.00 for the remaining 768 kanji words,  $F(1, 892) = 4,712.95$ ,  $MSE = 0.05$ ,  $p < .001$ ,  $\eta^2 = .841$ . The mean numbers of morae were 3.42 for the katakana words and 3.66 for the kanji words,  $F(1, 892) = 22.43$ ,  $MSE = 0.28$ ,  $p < .001$ ,  $\eta^2 = .025$ . The mean word frequencies were 17.81 for the katakana words and 27.15 for the kanji words,  $F(1, 892) = 3.73$ ,  $MSE = 2,531.93$ ,  $p < .06$ ,  $\eta^2 = .004$ , and the mean orthographic neighborhood sizes were 4.36 for the katakana words and 47.96 for the kanji words,  $F(1, 892) = 306.73$ ,  $MSE = 670.84$ ,  $p < .001$ ,  $\eta^2 = .256$ .

**Table 1** An example of computing the O-P consistency index for a katakana word, ペース (pace, /pe.E.su/)

	Frequency		Frequency
Target			
ペース (pace, /pe.E.su/)	6		
Phonological friends		Phonological Enemies	
ケース (case, /ke.E.su/)	20	アース (earth, /a.A.su/)	0
ベース (base, /be.E.su/)	12	コース (course, /ko.O.su/)	66
レース (race, /re.E.su/)	22	ソース (source, /so.O.su/)	0
ページ (page, /pe.E.zi/)	36	ダース (dozen, /da.A.su/)	0
		ホース (horse, /ho.O.su/)	0
Total	96		66

Orthographic neighbors generated using the National Language Research Institute (1993) database were classified as phonological friends or enemies based on whether the shared characters between the neighbor and target were pronounced the same at the moraic level. The frequency counts were taken from National Language Research Institute (1970). The O-P consistency index of ペース =  $96 / (96 + 66) = .59$

affected our contrast between katakana and kanji words.<sup>9</sup> To do so, we also conducted a multiple regression analysis on the O-P consistency indices for the 894 words in order to determine whether the script type difference (katakana vs. kanji words) could explain a unique amount of variance in the O-P consistency indices after removing the variance explained by target frequency and orthographic neighborhood size. In this analysis, orthographic neighborhood size, target frequency, and script type were used as predictor variables and entered into the equation in that order, in a stepwise manner. For the script type variable, katakana and kanji words were coded as 0 and 1, respectively. The regression equation explained a significant amount of variance in the O-P consistency indices,  $R^2 = .055$ ,  $F(3, 890) = 17.43$ ,  $MSE = .06$ ,  $p < .001$ . A summary of the results from the regression analysis is shown in Table 4.

As illustrated in Table 4, orthographic neighborhood size was a significant predictor variable,  $\beta = -.252$ ,  $t(890) = -6.67$ ,  $p < .001$ , reflecting the fact that the O-P consistency indices decrease for words with more orthographic neighbors. Target frequency was also a significant predictor variable,  $\beta = .091$ ,  $t(890) = 2.78$ ,  $p < .01$ , reflecting the fact that the O-P consistency indices were higher for higher-frequency words. In addition, script type

was also a significant predictor variable after the variance explained by the other two variables was removed,  $\beta = .103$ ,  $t(890) = 2.72$ ,  $p < .01$ . Surprisingly, the  $\beta$  for script type was positive, indicating that the O-P consistency index was now higher for the kanji words than for the katakana words.<sup>10</sup>

Finally, because the sample sizes were so dramatically different for the katakana and kanji words in our analyses, we attempted to carry out an analysis involving the same numbers of katakana and kanji words, with the word sets being equated on word frequency and orthographic neighborhood size. A subset of 38 katakana words and 38 kanji words were selected from the 894 words. The mean word frequencies were virtually identical for the katakana words (17.32) and the kanji words (17.50),  $F(1, 74) = 0.00$ ,  $MSE = 361.83$ ,  $\eta^2 = .000$ , as were mean orthographic neighborhood sizes for the katakana words (8.92) and the kanji words (9.61),  $F(1, 74) = 1.78$ ,  $MSE = 5.00$ ,  $\eta^2 = .023$ . Consistent with the results from the regression analysis, the

<sup>9</sup> Given how the O-P and O-S consistency indices were defined, it was almost inevitable that small correlations of this sort would arise. Target frequency contributes to both the numerator and denominator of the formulas, however, the numerator is, of necessity, a smaller number than the denominator. Therefore, target frequency will contribute relatively more to the numerator than to the denominator, leading to small positive correlations between target frequency and the consistency indices. In contrast, orthographic neighborhood size will contribute more to the denominator than to the numerator, because all of the neighbor frequencies are counted in the denominator total, while only a subset of the neighbor frequencies are counted in the numerator total. As a result, one would expect a small negative correlation between orthographic neighborhood size and the consistency indices.

<sup>10</sup> An identical multiple regression analysis was also conducted for the entire set of the katakana and kanji words. The regression equation explained a significant amount of variance in the O-P consistency indices,  $R^2 = .112$ ,  $F(3, 1110) = 46.61$ ,  $MSE = .05$ ,  $p < .001$ . In addition, both orthographic neighborhood size,  $\beta = -.298$ ,  $t(1110) = -7.84$ ,  $p < .001$ , and target frequency,  $\beta = .084$ ,  $t(1110) = 2.97$ ,  $p < .01$ , were significant predictor variables. In contrast, script type was not a significant predictor variable,  $\beta = -.044$ ,  $t(1110) = -1.15$ , suggesting that the O-P consistency indices were comparable for the katakana and kanji words when the words with unique spelling patterns were included in the analysis.

Note that, as shown in Table 2, the mean word frequencies and orthographic neighborhood sizes were smaller for the 339 katakana words than for the 775 kanji words. Further, the standard deviations of these variables were also smaller for the katakana words than for the kanji words (word frequencies, 26.56 for the katakana words and 53.59 for the kanji words; orthographic neighborhood sizes, 2.94 for the katakana words and 28.04 for the kanji words). As such, the ranges of frequencies and orthographic neighborhood sizes were more limited for the katakana words. As a result, it's possible that it was somewhat more difficult to detect the effects due to these variables on the O-P consistency indices for the katakana words in our regression analyses.



**Table 2** Mean word frequency (Freq.), mean orthographic neighborhood size (*N*), mean O-P consistency index (O-P Index), mean of target frequency plus summed frequency of the phonological friends

Script type	Freq.	<i>N</i>	O-P index	Friends	Enemies
339 katakana words	18.67	1.77	.94	31.85	5.33
775 kanji words	37.25	47.59	.82	481.13	120.69

mean O-P consistency index for the kanji words (.88) was significantly higher than that for the katakana words (.70) in a one-way ANOVA,  $F(1, 74) = 7.94$ ,  $MSE = .08$ ,  $p < .01$ ,  $\eta^2 = .097$ .

## Discussion

The results of our analysis of the O-P consistencies for the katakana and kanji words indicated that the degrees of O-P consistency were somewhat more comparable for katakana and kanji words than has previously been assumed. In our initial analysis, the mean O-P consistency index was slightly higher for the 339 katakana words than for the 775 kanji words, as shown in Table 2. But because katakana words were longer than kanji words, katakana words generally possessed fewer orthographic neighbors, and as a result our stimulus set involved 213 katakana words, but only 7 kanji words, with unique spelling patterns and, hence, an O-P consistency index of 1.00. Because words having unique spelling patterns have unique relationships between orthography and phonology, as with the “strange” words in English, it may be misleading to conclude that these words actually possess what has been conventionally considered to be consistent O-P relationships. To address this potential issue, we removed these words from our stimulus set and recomputed the mean O-P consistency indices for both katakana and kanji words. With these words removed, the O-P consistency indices were now identical for the 126 katakana and 768 kanji words.

In order to resolve another potentially important issue, the potential confound with target frequency and orthographic neighborhood size, we conducted a regression analysis in which the factors target frequency and orthographic neighborhood size were included as predictors along with script type. When the variance explained by target frequency and orthographic neighborhood size was

(Friends), and mean summed frequency of the phonological enemies (Enemies) for the 339 katakana words and the 775 kanji words

removed, the O-P consistency indices were actually higher for kanji words than for katakana words. Similar results were also observed in the ANOVA using the 38 katakana and 38 kanji words having equivalent word frequencies and orthographic neighborhood sizes.

The upshot of these analyses is that the O-P consistencies were actually quite comparable for the katakana and kanji words. What is likely to seem most surprising about these results would be that our set of katakana words would actually have a consistency index less than 1.00 (i.e., this fact might seem more surprising than the fact that kanji words are actually fairly consistent once context—that is, the other constituent character in the word—is taken into account). Kana words have been assumed to have highly consistent O-P relationships; however, what the present results document is that that assumption is actually incorrect. In particular, katakana words with macrons possess inconsistent O-P relationships. The macron, which is a quite common character, is a dash-like character [e.g., the  $\bar{\text{—}}$  in ソース (source, /so.O.su/)] that denotes that the vowel involved in the previous character is a prolonged (“long”) vowel. Combining the macron with the previous katakana character, therefore, creates a single syllable with a long vowel (i.e., a /CVV/ syllable). That is, the long-vowel syllable (which has two morae, /CV/ and /V/) has a duration twice as long as a syllable with a single mora, with a macron being pronounced the same as the vowel involved in the previous katakana character. Because there are five different vowels in Japanese phonology (e.g., /a/, /e/, /i/, /o/, and /u/), a macron has five different possible pronunciations at the moraic level. Hence, katakana words with macrons clearly involve inconsistent character–mora relationships.

Although Tamaoka and Terao (2004) suggested that the syllabic units play a major role and the moraic units play essentially no role in the naming of kana-written strings, as

**Table 3** Mean word frequency (Freq.), mean orthographic neighborhood size (*N*), mean O-P consistency index (O-P Index), mean of target frequency plus summed frequency of the phonological friends

Script type	Freq.	<i>N</i>	O-P index	Friends	Enemies
126 katakana words	17.81	4.36	.83	53.23	14.34
768 kanji words	27.15	47.96	.82	485.27	121.79

(Friends), and mean summed frequency of the phonological enemies (Enemies) for the 126 katakana words and the 768 kanji words after removing the words with unique spelling patterns

**Table 4** Summary of the results from the multiple regression analysis on the O-P consistency indices for the 126 katakana and 786 kanji words

Predictor variable	$\beta$	$t$
Orthographic neighborhood size	-.252	-6.67**
Target frequency	.091	2.78*
Script type (katakana = 0, kanji = 1)	.103	2.72*

$df = 890$ . \*  $p < .01$ . \*\*  $p < .001$

previously noted, Hino et al. (2011) reported a significant effect of character–mora consistency in the naming of katakana words when examining words containing macrons. Hino et al.’s findings in their naming task, as well as the results of our analysis, indicate that the O-P relationships (i.e., character–mora relationships) for kana words are actually less consistent than previously assumed.

Our results also suggest, of course, that the O-P relationships for kanji words are more consistent than previously assumed. Although most kanji characters correspond to multiple pronunciations, what our results show is that when each character is used in a specific position in compound words, it tends to be pronounced the same. This analysis provides a reasonable explanation of Wydell et al.’s (1995) results. As previously noted, Wydell et al. failed to observe a consistency effect in the naming of kanji words when O-P consistency was manipulated based on the number of pronunciations possessed by the constituent characters. Because there is a strong tendency for each kanji character to be pronounced the same when it is used in a specific position in the word, O-P consistency was not strongly manipulated in Wydell et al.’s experiments.

For the present purposes, however, the point is that our results indicate that the O-P consistencies are quite comparable for kana and kanji words. Based on our results, therefore, it becomes somewhat harder to make the argument that there are processing differences in the phonological coding of kana and kanji words due to differences in the nature of the relationships between orthography and phonology.

### O-S analysis

The next issue to be addressed is the question of the O-S consistencies for kana and kanji words. In particular, we attempted to evaluate whether the O-S relationships really are more consistent for kanji than for kana words.

### Method

**Participants** A total of 876 undergraduate and graduate students from Waseda University participated in this study

in exchange for a small amount of money (¥500). All of the students were native Japanese speakers.

**Stimuli** For each of the 339 katakana and 775 kanji words used in the analysis of the O-P consistencies, orthographic neighbors were generated using the National Language Research Institute (1993) database, and each of the neighbors was paired with the target word only if it was listed in the frequency norms of National Language Research Institute (1970). This procedure was employed to reduce the number of word pairs used in the subjective ratings. Nonetheless, 12,407 word pairs were created with this procedure. The 12,407 word pairs were then randomly divided into 31 sets of word pairs, each of which consisted of either 400 or 401 word pairs. Based on the 31 sets of word pairs, 31 versions of a questionnaire were created. In each questionnaire, the instructions to the participants were printed on the first page. Starting on the second page, word pairs were randomly ordered and printed with a 7-point scale ranging from 1 (*very dissimilar*) to 7 (*very similar*). The rating scale was printed below each word pair. Because 32 word pairs were printed on one page, each questionnaire consisted of 14 pages in total.

**Procedure** The data collection was conducted in groups in a normally lit room. A group of participants was gathered in the room, and an experimenter handed a pencil and a questionnaire to each of the participants. At the front of the room, the experimenter read aloud the instructions printed on the first page of the questionnaire. That is, the experimenter asked participants to rate the similarity in meanings for each of the word pairs printed in the questionnaire by circling the appropriate number on the scale. The participants were also instructed (1) to use the entire scale in their ratings, (2) to be consistent in their use of the scale across all of the word pairs, (3) to quickly preview all of the word pairs in order to get an idea of their range, and (4) to be careful not to skip any of the pairs. At least 27 participants were assigned to each version of the questionnaire. The entire session took about 30 min.<sup>11</sup>

### Results

After collecting the 876 participants’ rating data, mean ratings were computed for all of the 12,407 word pairs. Based on the mean ratings, orthographic neighbors of each

<sup>11</sup> For 10 versions of questionnaire, there were 27 participants assigned to each version. A total of 28 participants were assigned to each of another 10 versions, 29 participants to each of a further 5 versions, and 30 participants to each of another 5 versions. Finally, 31 participants were assigned to 1 version.

of the 1,114 words were classified as semantic friends or enemies. An orthographic neighbor was classified as a semantic friend if the mean rating of the target–neighbor pair was greater than or equal to 4.00. Otherwise, the orthographic neighbor was classified as a semantic enemy. After classifying the orthographic neighbors, summed frequencies of semantic friends and enemies were computed using the National Language Research Institute (1970) frequency norms, and an O-S consistency index was computed for each of the 1,114 words. Table 5 illustrates an example of computing the O-S consistency index for the kanji word 簡素 (simple).

The mean O-S consistency indices and the mean summed frequencies of the semantic friends and enemies for the 339 katakana words and the 775 kanji words are shown in Table 6, along with their mean word frequencies and orthographic neighborhood sizes. The summed frequency of the semantic friends plus the target frequency, the summed frequency of the semantic enemies, the numbers of semantic friends and enemies (involving only those that were listed in National Language Research Institute, 1970), and the O-S consistency indices for each of the 1,114 words are also listed in Appendix. In contrast to the predictions, as shown in Table 6, the O-S consistency index was actually higher for the katakana words (.76) than for the kanji words (.26), a difference that was highly significant in a one-way ANOVA,  $F(1, 1112) = 689.73$ ,  $MSE = .08$ ,  $p < .001$ ,  $\eta^2 = .383$ .

As with O-P consistency, however, it was possible that the degree of O-S consistency was overestimated more for the katakana words than for the kanji words because the katakana word set involved more words with unique spelling patterns (as previously noted, there were 213 katakana and 7 kanji words of this sort). As with the O-P consistency index, the O-S consistency index will result in

a value of 1.00 when there is no orthographic neighbor listed in the frequency norms. Therefore, once again we removed the 213 katakana and 7 kanji words with unique spelling patterns and recomputed the mean O-S consistency indices for the remaining 126 katakana and 768 kanji words. The results are shown in Table 7. As can be seen in that table, after removing the 220 words with unique spelling patterns, the O-S consistency indices were still higher for the 126 katakana words (.34) than for the 768 kanji words (.25), a difference that was, once again, significant in a one-way ANOVA,  $F(1, 892) = 14.31$ ,  $MSE = .06$ ,  $p < .001$ ,  $\eta^2 = .016$ .

In addition, as with the O-P consistency indices, the O-S consistency indices for the 894 words were positively correlated with target frequency,  $r = .244$ ,  $p < .001$ , and negatively correlated with orthographic neighborhood size,  $r = -.419$ ,  $p < .001$ . To address concerns raised by this issue, we conducted a multiple regression analysis on the O-S consistency indices for the 894 words in order to determine whether the script type difference (katakana vs. kanji words) could explain a unique amount of variance in the O-S consistency indices after removing the variance explained by target frequency and orthographic neighborhood size. Similar to the regression analysis on the O-P consistency indices, katakana and kanji words were coded as 0 and 1, respectively, for script type, which was used as a predictor variable, together with target frequency and orthographic neighborhood size. These predictor variables were, then, entered into the regression equation in a stepwise manner, just as in the analysis of the O-P consistency indices. The regression equation explained a significant amount of variance in the O-S consistency indices,  $R^2 = .251$ ,  $F(3, 890) = 99.52$ ,  $MSE = .05$ ,  $p < .001$ . A summary of the results from the regression analysis is shown in Table 8.

**Table 5** An example of computing the O-S consistency index for a kanji word, 簡素 (simple, /ka.N-so/)

	Rating	Frequency		Rating	Frequency
Target					
簡素 (simple)		5			
Semantic Friends			Semantic Enemies		
簡易 (simple)	6.28	15	要素 (element)	2.21	20
簡單 (easy)	5.78	46	炭素 (carbon)	1.29	8
			酵素 (enzyme)	1.25	9
			酸素 (oxygen)	1.13	39
			水素 (hydrogen)	1.07	9
Total		66			85

Orthographic neighbors generated using the National Language Research Institute (1993) database were classified as semantic friends or enemies based on the mean similarity ratings for the target–neighbor pairs. The frequency counts were taken from National Language Research Institute (1970). The O-S consistency index of 簡素 =  $66 / (66 + 85) = .44$

**Table 6** Mean word frequency (Freq.), mean orthographic neighborhood size (*N*), mean O-S consistency index (O-S Index), mean of target frequency plus summed frequency of the semantic friends

Script type	Freq.	<i>N</i>	O-S index	Friends	Enemies
339 katakana words	18.67	1.77	.76	18.74	18.42
775 kanji words	37.25	47.59	.26	108.78	492.85

As illustrated in Table 8, orthographic neighborhood size was a significant predictor variable,  $\beta = -.480$ ,  $t(890) = -14.27$ ,  $p < .001$ , reflecting the fact that the O-S consistency indices were lower for words with more orthographic neighbors. Target frequency was also a significant predictor variable,  $\beta = .256$ ,  $t(890) = 8.81$ ,  $p < .001$ , reflecting the fact that the O-S consistency indices were higher for higher-frequency words. In addition, script type was a significant predictor variable when the variance explained by the other two variables was removed,  $\beta = .101$ ,  $t(890) = 2.99$ ,  $p < .01$ . Because the  $\beta$  for script type was positive, the results suggested that the O-S consistency indices were now higher for the kanji words than for the katakana words. Thus, when the impacts of both word frequency and orthographic neighborhood size were removed for the katakana and kanji words, the O-S consistency indices were higher for the kanji than for the katakana words.<sup>12</sup>

Finally, as in the analyses of the O-P consistency indices, we also compared the O-S consistency indices for the 38 katakana and 38 kanji words that were selected in the O-P analysis using a one-way ANOVA. For these words, the mean O-S consistencies were significantly higher for the kanji words (.50) than for the katakana words (.17),  $F(1, 74) = 30.69$ ,  $MSE = .07$ ,  $p < .001$ ,  $\eta^2 = .293$ . As such, consistent with the results from the regression analysis, the O-S consistencies were higher for the kanji than for the katakana words when target frequency and orthographic neighborhood size were equated for katakana and kanji words.

<sup>12</sup> An identical multiple regression analysis was also conducted for the entire set of the katakana and kanji words. This equation explained a significant amount of variance in the O-S consistency indices,  $R^2 = .492$ ,  $F(3, 1110) = 358.62$ ,  $MSE = .07$ ,  $p < .001$ . Further, both orthographic neighborhood size,  $\beta = -.395$ ,  $t(1110) = -13.74$ ,  $p < .001$ , and target frequency,  $\beta = .154$ ,  $t(1110) = 7.17$ ,  $p < .001$ , were significant predictor variables. In addition, script type was also a significant predictor variable,  $\beta = -.367$ ,  $t(1110) = -12.73$ ,  $p < .001$ . Because all of the words with unique spelling patterns were involved in this analysis, the  $\beta$  for script type was negative, indicating that the O-S consistency indices were higher for the katakana than for the kanji words.

(Friends), and mean summed frequency of the semantic enemies (Enemies) for the 339 katakana words and the 775 kanji words

## Discussion

In order to examine whether the O-S consistencies are higher for kanji words than for kana words, we attempted to measure the O-S consistencies for 339 katakana and 775 kanji words. As shown in Table 6, the O-S consistency indices for these words were higher for the katakana words than for the kanji words. Because the katakana words were longer than the kanji words, the number of orthographic neighbors was smaller for the katakana words (1.77) than for the kanji words (47.59). As a result, there were many more katakana words than kanji words that had no orthographic neighbor listed in the word frequency norms. According to the formula used to compute the O-S consistency index, that index was always 1.00 for these words. Because these words are considered to have unique spelling patterns and unique O-S relationships, one could argue that giving those words the same weight as words with neighbors when calculating mean O-S consistencies tends to artificially inflate the calculated means.

In order to examine this issue more closely, we recomputed the mean O-S consistency indices for the katakana and kanji words after removing the words with unique spelling patterns. Even when the words of this sort were removed, however, the O-S consistency indices were still significantly higher for the 126 katakana words (.34) than for the 768 kanji words (.25).

Only when the variance explained by target frequency and orthographic neighborhood size was removed in a regression analysis were the O-S consistency indices higher for the kanji than for the katakana words. Similar results emerged in an ANOVA in which target frequency and orthographic neighborhood size were equated for 38 katakana and 38 kanji words. Both of these analyses demonstrate that the O-S consistency index is strongly modulated by the orthographic neighborhood size of a word, even after removing the words with unique spelling patterns. Regardless of script type, when a word has more orthographic neighbors, almost by necessity, it increases the probability of having semantic enemies in the orthographic neighborhood. Such would more likely be true for katakana words, because katakana characters are phonetic in nature,

**Table 7** Mean word frequency (Freq.), mean orthographic neighborhood size (*N*), mean O-S consistency index (O-S Index), mean of target frequency plus summed frequency of the semantic friends

Script type	Freq.	<i>N</i>	O-S index	Friends	Enemies
126 katakana words	17.81	4.36	.34	18.01	49.57
768 kanji words	27.15	47.96	.25	109.52	497.34

and there is no reason to expect that words sharing the same katakana characters will also share meanings [e.g., ポケット (pocket) and ロケット (rocket)]. As a result, katakana words with more orthographic neighbors would tend to have more semantic enemies and, hence, less consistent O-S relationships.

For kanji words, on the other hand, it had been expected that words having the same kanji characters would tend to have similar meanings, because kanji characters are morphemes. According to our data, however, this expectation receives only limited support. Rather, as discussed by Zhou and Marslen-Wilson (2000), the meaning of a compound word does not appear to always be transparent and predictable from the meanings of its constituent morphemes, not only in English and Chinese, but also with Japanese kanji words. As a result, for words written in either script, the probability of having semantic enemies was not small, and the O-S relationships were less consistent when there were more orthographic neighbors. This tendency does appear to be somewhat weaker for kanji words than for katakana words, however. Thus, when the variance explained by orthographic neighborhood size and target frequency was removed in the regression analysis (and when these two variables were equated as much as possible in the word sets used in the ANOVA), the O-S consistency indices were higher for kanji than for katakana words.

What is also clear, however, based on our results, is that the conclusion that the O-S relationships are more consistent for kanji than for kana words is, at best, a weak one. Rather, because kanji words are generally shorter than kana words and because the numbers of orthographic neighbors are also generally larger for kanji words than for kana words, kanji words generally possess numerous semantic enemies, and hence, the potential advantage in O-S consistencies for kanji words due to their morphemic structure appears to be, to a large extent, negated. Therefore, a reasonable conclusion from these results would be that, in contrast to what has been previously assumed, the O-S relationships appear to be reasonably similar for kana and kanji words.

(Friends), and mean summed frequency of the semantic enemies (Enemies) for the 126 katakana words and the 768 kanji words after removing the words with unique spelling patterns

## General discussion

On the basis of the assumption that Japanese kana and kanji words possess qualitatively different relationships between orthography and phonology, the suggestion has been made that the nature of the phonological-coding process is also different for kana than for kanji words. In particular, according to a position that follows from the orthographic depth hypothesis (see, e.g., Frost, 2005; Frost et al., 1987), because the O-P relationships are quite transparent for kana-written words, kana words are assumed to be named only via assembly-type processes (e.g., Kimura, 1984; Morton & Sasanuma, 1984; Saito, 1981). In contrast, because kanji characters generally possess multiple pronunciations (e.g., on-reading and kun-reading pronunciations), the O-P relationships are considered to be fairly complicated for kanji words. As a result, kanji words are assumed to always be named as a result of processing on a lexical route (e.g., Kimura, 1984; Saito, 1981; Wydell et al., 1995).

According to this theoretical position, the nature of the semantic-coding process is also assumed to be different for kana and kanji words. Because kanji characters carry meaning (i.e., morphemes), words sharing the same kanji characters are expected to have similar meanings. In contrast, because kana characters are phonetic, there is no reason to expect that words sharing the same kana characters will also share meanings. If so, the relationships between orthography and semantics should be more consistent for kanji words than for kana words. Based on these assumptions, therefore, lexical/seman-

**Table 8** Summary of the results from the multiple regression analysis on the O-S consistency indices for the 126 katakana and 786 kanji words

Predictor variable	$\beta$	<i>t</i>
Orthographic neighborhood size	-.480	-14.27**
Target frequency	.256	8.81**
Script type (katakana = 0, kanji = 1)	.101	2.98*

*df* = 890. \* *p* < .01. \*\* *p* < .001

tic coding has been assumed to be carried out based directly on orthography for kanji words but to always be mediated by phonology for kana words (e.g., Kimura, 1984; Saito, 1981).

More recent empirical findings have appeared to challenge this theoretical position. For example, word frequency and familiarity effects have been reported in the naming not only of kanji words but also of kana words (e.g., Besner & Hildebrandt, 1987; Hino & Lupker, 1998). Some semantic effects have also been reported in the naming of both kanji words (e.g., Hino et al., 2002; Shibahara et al., 2003) and kana words (e.g., Hino et al., 1998). Further, print–sound consistency effects have also been reported in the naming of both kanji words (e.g., Fushimi et al., 1999) and kana words (e.g., Hino et al., 2011). In contrast to the position based on the orthographic depth hypothesis, all of these findings suggest lexical/semantic involvement in the naming of both kanji and kana words and, hence, suggest that the phonological-coding processes may be rather more similar in nature for kanji and for kana words than has previously been thought.

Consistent with the original assumption that lexical/semantic coding is carried out directly from orthography for kanji words but is always mediated by phonology for kana-written words, Kimura (1984) reported that performance in a relatedness judgment task was more disrupted by concurrent articulation for hiragana transcription pairs than for the original kanji word pairs. Using a lexical decision task, however, Kinoshita and Saito (1992) reported no effect of concurrent articulation for either the original kanji words or their hiragana transcriptions. Further, because the larger effect of concurrent articulation for the hiragana transcription pairs in Kimura's study could be accounted for in terms of the increased semantic ambiguity for hiragana transcription pairs, it is not at all clear that Kimura's data have much to say about the nature of lexical/semantic coding differences for kana and kanji words.

The bulk of the evidence, therefore, seems to indicate that the nature of the processes involved in phonological coding and lexical/semantic coding are actually somewhat similar for kana and kanji words, with the present findings raising the question of whether the O-P and O-S relationships themselves are really different for kana and kanji words. Wydell et al. (1995), for example, failed to observe a consistency effect in the naming of kanji words when consistency was manipulated by considering the number of possible pronunciations possessed by the constituent kanji characters. Given the fact that a consistency effect does arise in the naming of kanji words when consistency is manipulated using orthographic neighbors (e.g., Fushimi et al., 1999), Wydell et al.'s results appear to reflect the tendency for a kanji character to be pronounced the same

whenever it is used in a specific character position. This fact alone would indicate that the O-P relationships for kanji words are more consistent than previously assumed. In addition, because the meaning of a compound word is not always transparent and predictable from the meanings of its constituent morphemes (e.g., Zhou & Marslen-Wilson, 2000), it is not necessarily the case that words sharing the same kanji characters are inevitably similar in meaning. As such, the O-S relationships for kanji words appear to be somewhat less consistent than previously thought.

### O-P consistencies and the nature of phonological coding for kana and kanji words

In our analysis of the O-P consistencies for 339 katakana words and 775 kanji words, the results clearly indicated that the O-P consistencies were fairly high not only for the katakana words (.94), but also for the kanji words (.82). Equally importantly, when words with unique spelling patterns were removed from the stimulus set, the O-P consistency indices were comparable for the katakana (.83) and kanji words (.82). Further, when the variance explained by target frequency and orthographic neighborhood size was removed using a regression analysis (and when these variables were equated by selecting the small set of katakana and kanji words analyzed with an ANOVA), the O-P consistency index was actually higher for the kanji words than for the katakana words.

These results clearly indicate that, in contrast to what had been previously assumed (e.g., Kimura, 1984; Morton & Sasanuma, 1984; Saito, 1981; Wydell et al., 1995), O-P consistencies are fairly comparable for kana and kanji words. Our results, therefore, suggest that it is not at all unreasonable to assume qualitatively similar processes in the naming of kana and kanji words, a position consistent with more recent findings (e.g., Besner & Hildebrandt, 1987; Fushimi et al., 1999; Hino et al., 2011; Hino & Lupker, 1998; Hino et al., 2002; Hino et al., 1998; Shibahara et al., 2003).

When comparing pronunciations of shared kanji characters across orthographic neighbors, there are some cases in which the constituent kanji character is pronounced differently not because the same character is assigned to different types of pronunciations [e.g., on-reading vs. kun-reading pronunciations such as 食品 (food, /sjo.ku-hi.N/) vs. 手品 (magic, /te-zi.na/)] but because a phonemic alternation occurs at the morphemic boundary [e.g., 食品 (food, /sjo.ku-hi.N/) vs. 新品 (something new, /si.N-pi.N/)]. In our analysis, we always classified phonemic alternations as different pronunciations. One may argue, however, that this

classification is somewhat misleading, because the two characters still share the same type of the pronunciation.

If, instead, we had classified the phonemic alternations as the same pronunciation, the phonological enemies created by the phonemic alternations would have been classified as phonological friends. Hence, the O-P consistency indices for kanji words would have been even higher. In contrast, because most of our katakana words were monomorphemic and because they would be spelled differently whenever a phonemic alternation occurred, the orthographic neighbors for katakana words would not involve phonemic alteration. As such, even if phonemic alternations had been classified as the same pronunciations for kanji words, our general conclusion would be essentially the same. That is, both katakana and kanji words possess highly consistent and reasonably comparable O-P relationships.

### O-S consistencies and the nature of lexical/semantic coding for kana and kanji words

In our analysis of O-S consistencies, we measured the similarity in meanings between the target word and its orthographic neighbors, allowing us to classify the orthographic neighbors as semantic friends or enemies and then to compute an O-S consistency index. Inconsistent with the prediction from the position based on the orthographic depth hypothesis, the computed O-S consistency index was higher for the 339 katakana words (.76) than for the 775 kanji words (.26). Further, when words with unique spelling patterns were removed from the stimulus set, the O-S consistency index was still higher for the katakana words (.34) than for the kanji words (.25). An advantage due to the morphemic structure of kanji words was observed in the regression analysis and in the ANOVA involving a small set of matched items, however. That is, the O-S consistency indices were higher for the kanji words than for the katakana words in the regression analysis when the variance explained by target frequency and orthographic neighborhood size on the O-S consistency indices was removed, and in the ANOVA when these two variables were equated for 38 katakana and 38 kanji words. Based on our results, therefore, it does not appear, to any large degree, that the O-S relationships are noticeably more consistent for kanji words than for kana words.

Together with other empirical findings (e.g., Kinoshita & Saito, 1992), our results therefore appear to provide a challenge to the position based on the orthographic depth hypothesis, in which lexical/semantic coding is assumed to

be carried out directly from orthography for kanji words but to be mediated by phonology for kana words. That is, given the similar O-S and O-P consistencies for kana and kanji words, there would be no reasonable basis for assuming processing differences during lexical/semantic coding as a function of script type.

There are, of course, a number of other characteristics that do seem to be different for kana and kanji words—for example, their morphemic structure. Thus, it is possible that there truly are some qualitatively different aspects of the processing of kana and kanji words, because of those other characteristics that differ between them. For example, assuming that polymorphemic words are, initially, analyzed into the morpheme-level representations and then integrated into a single, whole-word representation, as suggested by Taft (2003, 2004), it may be the case that morphemic processing always takes place when reading kanji compound words.

Note, however, that there are some polymorphemic kana words in Japanese as well [e.g., フライパン (/fu.ra.i.pa.N/, frying pan) and ホームラン (/ho.O.mu.ra.N/, home run)]. Therefore, it is not clear that kanji and kana words actually differ qualitatively on this dimension, either. Although this issue is beyond the scope of the present research, future research will need to address the issue of morphology in order to provide a better understanding of the characteristics of Japanese kana and kanji words, as well as the nature of the processes involved in the reading of those words.

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### Appendix: List of 339 kana and 775 kanji words used in the present research

Character length (Len), number of morae (Morae), word frequency (Freq.), orthographic neighborhood size (N), summed frequency of phonological friends plus target frequency (PF\_F), summed frequency of phonological enemies (PE\_F), number of phonological friends (PF\_N), number of phonological enemies (PE\_N), O-P consistency index (O-P Index), summed frequency of semantic friends plus target frequency (SF\_F), summed frequency of semantic enemies (SE\_F), number of semantic friends (SF\_N), number of semantic enemies (SE\_N), and O-S consistency index (O-S Index) for 339 katakana and 775 kanji words, along with their English translations. See the text and table note at the bottom of [Appendix](#) for more details.

No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship				
								PF_F	PE_F	PF_N	PE_N	OP_Index	SF_F	SE_F	SF_N	SE_N
1	コンテナ	* /ko.N.te.na.A/	container	5	5	5	0	5	0	0	0	0	5	0	0	1.00
2	ドロップ	* /do.ro.Q.pu/	drop, candy	4	4	5	1	5	0	1	0	0	5	0	0	1.00
3	メトロ	* /me.to.ro/	Metro, a subway system in Tokyo	3	3	5	0	5	0	0	0	0	5	0	0	1.00
4	トランス	* /to.ra.N.su/	trance	4	4	5	4	163	0	4	0	4	5	158	0	0.03
5	パスタ	* /pa.su.ta/	pasta	3	3	5	0	5	0	0	0	0	5	0	0	1.00
6	ボール	* /ba.ra.A.do/	ballad	4	4	5	0	5	0	0	0	0	5	0	0	1.00
7	ドクター	* /do.ku.ta.A/	doctor	4	4	5	0	5	0	0	0	0	5	0	0	1.00
8	マガジン	* /ma.ga.zi.N/	magazine	4	4	5	1	5	0	1	0	0	5	0	0	1.00
9	バリケード	* /ba.ri.ke.E.do/	barricade	5	5	5	0	5	0	0	0	0	5	0	0	1.00
10	ボウリング	* /bo.u.ri.N.gu/	bowling	5	5	5	0	5	0	0	0	0	5	0	0	1.00
11	レバー	* /re.ba.A/	lever, liver	3	3	5	1	15	0	1	0	0	5	10	0	0.33
12	ボイラー	* /bo.i.ra.A/	boiler	4	4	5	0	5	0	0	0	0	5	0	0	1.00
13	コメディ	* /ko.me.di.I/	comedy	5	4	5	0	5	0	0	0	0	5	0	0	1.00
14	ガード	# /ga.A.do/	guard	3	3	5	12	39	79	6	6	6	5	113	0	0.04
15	マスター	* /ma.su.ta.A/	master	4	4	5	3	12	0	3	0	3	5	7	0	0.42
16	ヌード	* /nu.U.do/	nude	3	3	5	9	43	56	1	8	5	5	94	0	0.05
17	ブレイン	* /bu.re.E.N/	brain	4	4	5	2	15	0	2	0	0	5	10	0	0.33
18	チーズ	* /tʃi.I.zu/	cheese	3	3	5	4	48	0	2	3	1	5	43	0	0.10
19	ヒロイン	* /hi.ro.I.N/	heroine	4	4	5	1	5	0	1	0	0	5	0	0	1.00
20	フライパン	* /fu.ra.i.pa.N/	frying pan	5	5	5	0	5	0	0	0	0	5	0	0	1.00
21	マッサージ	* /ma.Q.sa.A.zi/	massage	5	5	5	0	5	0	0	0	0	5	0	0	1.00
22	シート	* /si.I.to/	seat, sheet	3	3	5	8	10	43	2	6	2	5	49	0	0.09
23	ストライキ	* /su.to.ra.i.ki/	strike	5	5	5	1	11	0	1	0	0	5	6	0	0.45
24	ポケット	* /po.ke.Q.to/	pocket	4	4	5	3	25	0	3	0	3	5	20	0	0.20
25	チャーター	* /tʃa.A.ta.A/	charter	5	4	5	0	5	0	0	0	0	5	0	0	1.00
26	シングル	* /si.N.gu.ru.su/	singles	5	5	5	1	5	0	1	0	0	5	0	0	1.00
27	コンビ	* /ko.N.bi/	combination, a pair	3	3	5	2	31	0	2	0	0	5	26	0	0.16
28	ユーモア	* /ju.U.mo.a/	humor	4	4	5	0	5	0	0	0	0	5	0	0	1.00
29	バット	* /ba.Q.to/	bat	3	3	5	15	98	0	15	0	0	5	93	0	0.05
30	シンボル	* /si.N.bo.ru/	symbol	4	4	5	0	5	0	0	0	0	5	0	0	1.00
31	オートバイ	* /o.O.to.ba.i/	motorbike	5	5	5	0	5	0	0	0	0	5	0	0	1.00
32	スローガン	* /su.ro.O.ga.N/	slogan	5	5	5	0	5	0	0	0	0	5	0	0	1.00
33	スポンサー	* /su.po.N.sa.A/	sponsor	5	5	5	0	5	0	0	0	0	5	0	0	1.00
34	タイミン	* /ta.i.mi.N.gu/	timing	5	5	5	0	5	0	0	0	0	5	0	0	1.00
35	リポート	* /ri.po.O.to/	report	4	4	5	1	18	0	1	0	1	0	18	0	1.00
36	タイトル	* /ta.i.to.ru/	title	4	4	5	0	5	0	0	0	0	5	0	0	1.00
37	レザー	* /re.za.A/	leather	3	3	6	2	11	0	2	0	0	6	5	0	0.55
38	ピーナッツ	* /pi.I.na.Q.tu/	peanuts	5	5	6	0	6	0	0	0	0	6	0	0	1.00
39	チツク	# /tʃi.Q.ku/	tic	3	3	6	10	45	0	10	0	0	6	39	0	0.13
40	コンドル	* /ko.N.do.ru/	condor	4	4	6	1	15	0	1	0	0	6	9	0	0.40
41	ピクニック	* /pi.ku.ni.Q.ku/	picnic	5	5	6	1	13	0	1	0	0	6	7	0	0.46





(continued)

No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship						
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index	
88	フルート	* /fu.ru.U.to/	flute	4	4	7	1	7	0	0	0	1	1.00	7	0	0	0	1.00
89	タイトル	# /a.i.ru/	title	3	3	7	6	87	0	6	6	0	1.00	7	80	0	4	0.08
90	テクニック	/te.ku.ni.Q.ku/	technique	5	5	7	1	13	0	1	0	0	1.00	7	6	0	1	0.54
91	ダブルス	* /da.bu.ru.su/	doubles	4	4	7	1	7	0	1	0	0	1.00	7	0	0	0	1.00
92	プレハブ	* /pu.re.ha.bu/	prefabrication	4	4	7	0	7	0	0	0	0	1.00	7	0	0	0	1.00
93	シャッター	* /sja.Q.ta.A/	shutter	5	4	7	0	7	0	0	0	0	1.00	7	0	0	0	1.00
94	コスモス	* /ko.su.mo.su/	cosmos	4	4	7	0	7	0	0	0	0	1.00	7	0	0	0	1.00
95	ズボン	* /zu.bo.N/	pants	3	3	7	2	7	0	2	0	0	1.00	7	0	0	0	1.00
96	キャスター	* /kja.su.ta.A/	caster, wheel	5	4	7	0	7	0	0	0	0	1.00	7	0	0	0	1.00
97	コラム	* /ko.ra.mu/	column	3	3	7	1	34	0	1	0	0	1.00	7	27	0	1	0.21
98	ステップ	# /su.te.Q.pu/	step	4	4	7	6	20	0	6	0	0	1.00	7	13	0	1	0.35
99	ラッシュ	* /ra.Q.sju/	rush	4	3	7	0	7	0	0	0	0	1.00	7	0	0	0	1.00
100	ポスター	* /po.su.ta.A/	poster	4	4	7	4	12	0	4	0	0	1.00	7	5	0	1	0.58
101	レベル	* /re.be.ru/	level	3	3	7	2	19	0	2	0	0	1.00	7	12	0	1	0.37
102	フリーザー	* /fu.ri.I.za.A/	freezer	5	5	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
103	ドライヤー	* /do.ra.i.ja.A/	dryer	5	5	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
104	カーボン	* /ka.A.bo.N/	carbon	4	4	8	1	14	0	1	0	0	1.00	8	6	0	1	0.57
105	シューズ	* /sju.U.zu/	shoes	4	3	8	4	8	51	2	2	0	0.14	8	51	0	1	0.14
106	アクリル	* /a.ku.ri.ru/	acrylic	4	4	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
107	ソプラノ	* /so.pu.ra.no/	soprano	4	4	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
108	グラス	* /gu.ra.su/	glass	3	3	8	5	96	0	5	0	0	1.00	8	0	0	0	1.00
109	レスリング	* /re.su.ri.N.gu/	wrestling	5	5	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
110	ジャンパー	* /ja.N.pa.A/	jumper	5	4	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
111	スケール	* /su.ke.E.ru/	scale	4	4	8	2	26	10	1	1	0.72	8	28	0	2	0.22	
112	カレンダー	* /ka.re.N.da.A/	calendar	5	5	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
113	ホルモン	* /ho.ru.mo.N/	hormone	4	4	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
114	アカデミー	* /a.ka.de.mi.I/	academy	5	5	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
115	サイズ	* /sai.zu/	size	3	3	8	2	60	0	2	0	0	1.00	8	52	0	2	0.13
116	ベンチ	# /be.N.cji/	bench	3	3	8	7	119	0	7	0	0	1.00	8	111	0	3	0.07
117	オーナー	* /o.O.na.A/	owner	4	4	8	3	70	0	2	1	0	1.00	8	62	0	1	0.11
118	リース	# /ri.I.su/	lease	3	3	8	10	113	120	2	8	0.48	8	225	0	6	0.03	
119	ステージ	* /su.te.E.zi/	stage	4	4	8	1	8	0	1	0	0	1.00	8	0	0	0	1.00
120	ネット	* /ne.Q.to/	net	3	3	8	10	89	0	10	0	0	1.00	8	81	0	4	0.09
121	フィルム	* /fi.ru.mu/	film	4	3	8	0	8	0	0	0	0	1.00	8	0	0	0	1.00
122	リーダー	* /ri.I.da.A/	leader, reader	4	4	8	1	8	9	0	1	0.47	8	9	0	1	0.47	
123	コルト	* /ko.ru.to/	colt	3	3	9	7	75	0	7	0	0	1.00	9	66	0	4	0.12
124	フェライト	* /fe.ra.i.to/	ferrite	5	4	9	0	9	0	0	0	0	1.00	9	0	0	0	1.00
125	セーラー	* /se.E.ra.A/	sailor	4	4	9	2	34	7	1	1	0.83	9	32	0	2	0.22	
126	エレキ	* /e.re.ki/	electric	3	3	9	0	9	0	0	0	0	1.00	9	0	0	0	1.00
127	サテライト	* /sa.te.ra.i.to/	satellite	5	5	9	0	9	0	0	0	0	1.00	9	0	0	0	1.00
128	ワルツ	* /wa.ru.tu/	waltz	3	3	9	0	9	0	0	0	0	1.00	9	0	0	0	1.00



(continued)

No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship				
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N
175	ブドウ	* /bu.ra.u.su/	brown	4	4	11	0	11	0	0	0	0	11	0	0	1.00
176	デート	# /de.E.to/	date	3	3	11	7	17	37	2	5	0	11	43	4	0.20
177	モチーフ	* /mo.cji.I.fu/	motif	4	4	11	0	11	0	0	0	0	11	0	0	1.00
178	プリント	* /pu.ri.N.to/	print	4	4	11	0	11	0	0	0	0	11	0	0	1.00
179	スープ	# /su.U.pu/	soup	3	3	11	6	11	27	1	5	0	11	27	2	0.29
180	モニター	/mo.ni.ta.A/	monitor	4	4	11	1	41	0	1	0	0	11	30	1	0.27
181	ピンチ	# /pi.N.cji/	pinch	3	3	11	10	129	0	10	0	0	11	118	4	0.09
182	ビジョン	* /bi.zjo.N/	vision	4	3	11	0	11	0	0	0	0	11	0	0	1.00
183	エース	# /e.E.su/	ace	3	3	11	9	65	66	4	5	0	11	120	4	0.08
184	ローン	/ro.O.N/	loan	3	3	11	5	11	6	3	2	0	11	6	1	0.65
185	セミナー	* /se.mi.na.A/	seminar	4	4	11	0	11	0	0	0	0	11	0	0	1.00
186	コーチ	/ko.O.cji/	coach	3	3	11	5	99	0	3	2	1	11	88	2	0.11
187	モデル	* /mo.de.ru/	model	3	3	11	0	11	0	0	0	0	11	0	0	1.00
188	ポスト	# /po.su.to/	post	3	3	11	7	84	0	7	0	0	11	73	3	0.13
189	ミサイル	* /mi.sa.i.ru/	missile	4	4	11	0	11	0	0	0	0	11	0	0	1.00
190	ワンピース	* /wa.N.pi.I.su/	one-piece suit	5	5	12	0	12	0	0	0	0	12	0	0	1.00
191	スタンプ	/su.ta.N.pu/	stamp	4	4	12	1	38	0	1	0	0	12	26	1	0.32
192	サウンド	* /su.u.N.do/	sound	4	4	12	0	12	0	0	0	0	12	0	0	1.00
193	シャンソン	* /sja.N.so.N/	chanson	5	4	12	0	12	0	0	0	0	12	0	0	1.00
194	カウンター	* /ka.u.N.ta.A/	counter	5	5	12	0	12	0	0	0	0	12	0	0	1.00
195	ネクタイ	* /ne.ku.ta.i/	tie	4	4	12	0	12	0	0	0	0	12	0	0	1.00
196	カルテル	* /ka.ru.te.ru/	cartel	4	4	12	1	12	0	1	0	0	12	0	0	1.00
197	プラン	/pu.ra.N/	plan	3	3	12	3	36	0	3	0	0	12	24	2	0.33
198	スタイル	* /su.ta.i.ru/	style	4	4	12	0	12	0	0	0	0	12	0	0	1.00
199	ガソリン	* /ga.so.rin/	gas	4	4	12	0	12	0	0	0	0	12	0	0	1.00
200	ベース	# /be.E.su/	base	3	3	12	7	54	66	2	5	0	12	108	3	0.10
201	キャンプ	/kja.N.pu/	camp	4	3	12	1	21	0	1	0	0	12	9	1	0.57
202	イメージ	* /i.me.E.zi/	image	4	4	12	0	12	0	0	0	0	12	0	0	1.00
203	シネマ	* /si.ne.ra.ma/	cinema	4	4	13	0	13	0	0	0	0	13	0	0	1.00
204	ストラップ	/su.ra.Q.ku.su/	slacks	5	5	13	1	40	0	1	0	0	13	27	1	0.33
205	レポート	* /re.po.O.to/	report	4	4	13	0	13	0	0	0	0	13	0	0	1.00
206	コミュニケーション	* /ko.mju.ni.ke/	communicative	5	4	13	0	13	0	0	0	0	13	0	0	1.00
207	キャベツ	* /kja.be.tsu/	cabbage	4	3	13	0	13	0	0	0	0	13	0	0	1.00
208	パトカー	* /pa.to-ka.A/	patrol car, cop car	4	4	13	0	13	0	0	0	0	13	0	0	1.00
209	ビニール	* /bi.ni.i.ru/	vinyl, plastic	4	4	13	0	13	0	0	0	0	13	0	0	1.00
210	バイク	/ba.i.ku/	motorbike	3	3	13	2	39	0	2	0	0	13	26	2	0.33
211	グラフ	/ga.ra.fi/	graph	3	3	13	1	40	0	1	0	0	13	27	1	0.33
212	ストップ	/su.to.Q.pu/	stop	4	4	13	5	20	0	5	0	0	13	7	1	0.65
213	オープン	* /o.O.pu.N/	open	4	4	13	0	13	0	0	0	0	13	0	0	1.00
214	リスト	# /ri.su.to/	list, wrist	3	3	13	8	97	0	8	0	0	13	84	4	0.13
215	ボクシング	* /bo.ku.si.N.gu/	boxing	5	5	14	0	14	0	0	0	0	14	0	0	1.00

216	スタッフ	*	/suta.Q.fu/	staff	4	4	14	0	14	0	0	0	0	0	1.00	14	0	0	0	1.00
217	パーティー	*	/pa.A.ti.I/	party	5	4	14	0	14	0	0	0	0	0	1.00	14	0	0	0	1.00
218	ゴールド	*	/go.O.ru.do/	gold	4	4	15	0	15	0	0	0	0	0	1.00	15	0	0	0	1.00
219	ホームラン	*	/ho.O.mu.ra.N/	home run	5	5	15	0	15	0	0	0	0	0	1.00	15	0	0	0	1.00
220	カプセル	*	/ka.pu.se.ru/	capsule	4	4	15	0	15	0	0	0	0	0	1.00	15	0	0	0	1.00
221	スペシャル	*	/su.pe.sja.ru/	special	5	4	15	0	15	0	0	0	0	0	1.00	15	0	0	0	1.00
222	パンチ	#	/pa.N.cji/	punch	3	3	15	9	119	0	9	0	0	0	1.00	15	104	0	3	0.13
223	スカート	*	/suka.A.to/	skirt	4	4	15	5	39	18	3	2	0	0	0.68	15	42	0	2	0.26
224	スパイ	*	/supai.I/	spy	3	3	15	1	15	0	1	0	0	0	1.00	15	0	0	0	1.00
225	パイプ	*	/pai.pu/	pipe	3	3	15	2	72	0	2	0	0	0	1.00	15	57	0	2	0.21
226	ツーピース	*	/tu.U.pi.I.su/	two-piece suit	5	5	16	0	16	0	0	0	0	0	1.00	16	0	0	0	1.00
227	ロータリー	*	/ro.O.ta.ri.I/	rotary	5	5	16	0	16	0	0	0	0	0	1.00	16	0	0	0	1.00
228	ナイト	*	/nai.ta.A/	night game	4	4	16	1	16	0	1	0	0	0	1.00	16	0	0	0	1.00
229	ラリー	*	/ra.ri.I/	rally	3	3	16	2	21	0	2	0	0	0	1.00	16	5	0	1	0.76
230	オール	#	/o.O.ru/	all, oar	3	3	16	12	128	63	3	9	0	0	0.67	16	175	0	7	0.08
231	インフレ	*	/i.N.fu.re/	inflation	4	4	16	0	16	0	0	0	0	0	1.00	16	0	0	0	1.00
232	コロナ	*	/ko.ro.na/	corona	3	3	17	0	17	0	0	0	0	0	1.00	17	0	0	0	1.00
233	キャバレー	*	/kja.ba.re.E/	cabaret	5	4	17	0	17	0	0	0	0	0	1.00	17	0	0	0	1.00
234	ジャングル	*	/jja.N.gu.ru/	jungle	5	4	17	0	17	0	0	0	0	0	1.00	17	0	0	0	1.00
235	ポップス	*	/po.Q.pu.su/	pops	4	4	17	0	17	0	0	0	0	0	1.00	17	0	0	0	1.00
236	マイク	*	/ma.i.ku/	microphone	4	4	17	0	17	0	0	0	0	0	1.00	17	0	0	0	1.00
237	ジャズ	*	/jja.zu/	jazz	3	3	17	4	22	0	4	0	0	0	1.00	17	5	0	1	0.77
238	ショック	*	/sjo.Q.ku/	shock	3	2	17	1	17	0	1	0	0	0	1.00	17	0	0	0	1.00
239	プログラム	*	/pu.ro.gu.ra.mu/	program	4	3	17	1	17	0	1	0	0	0	1.00	17	0	0	0	1.00
240	メンバー	*	/me.N.ba.A/	member	4	4	17	1	27	0	1	0	0	0	1.00	17	10	0	1	0.63
241	スケート	*	/suke.E.to/	skating	4	4	18	5	26	39	2	3	0	0	0.40	18	47	0	3	0.28
242	スクリーン	*	/sukuri.I.N/	screen	5	5	18	0	18	0	0	0	0	0	1.00	18	0	0	0	1.00
243	リズム	*	/ri.zu.mu/	rhythm	3	3	18	0	18	0	0	0	0	0	1.00	18	0	0	0	1.00
244	ハロー	*	/ha.ro.O/	hello	3	3	19	1	19	0	1	0	0	0	1.00	19	0	0	0	1.00
245	ガイド	*	/ga.i.do/	guide	3	3	19	1	24	0	1	0	0	0	1.00	19	5	0	1	0.79
246	カーブ	*	/ka.A.bu/	curve	3	3	19	2	29	0	2	0	0	0	1.00	19	10	0	1	0.66
247	ブーム	*	/bu.U.mu/	boom	3	3	19	5	19	89	0	5	0	0	0.18	19	89	0	3	0.18
248	システム	*	/si.su.te.mu/	system	4	4	19	0	19	0	0	0	0	0	1.00	19	0	0	0	1.00
249	タイプスト	*	/tai.pi.N.gu/	typist	5	5	20	0	20	0	0	0	0	0	1.00	20	0	0	0	1.00
250	ロケット	*	/ro.ke.Q.to/	rocket	4	4	20	4	25	0	4	0	0	0	1.00	20	5	0	1	0.80
251	テープ	#	/te.E.pu/	tape	3	3	20	6	54	18	2	4	0	0	0.75	20	52	0	3	0.28
252	ケース	#	/ke.E.su/	case	3	3	20	9	54	66	4	5	0	0	0.45	20	100	0	3	0.17
253	ハイウェイ	*	/ha.i.we.E/	highway	5	4	21	0	21	0	0	0	0	0	1.00	21	0	0	0	1.00
254	パレス	*	/pa.re.su/	palace	3	3	21	1	35	0	1	0	0	0	1.00	21	14	0	1	0.60
255	ファイト	*	/fa.i.to/	fight	4	3	21	0	21	0	0	0	0	0	1.00	21	0	0	0	1.00
256	パトロール	*	/pa.to.ro.O.ru/	patrol	5	5	21	0	21	0	0	0	0	0	1.00	21	0	0	0	1.00
257	ベテラン	*	/be.te.ra.N/	veteran	4	4	21	0	21	0	0	0	0	0	1.00	21	0	0	0	1.00
258	テスト	#	/te.su.to/	test	3	3	21	8	89	0	8	0	0	0	1.00	21	68	0	4	0.24
259	ビタミン	*	/bi.ta.mi.N/	vitamin	4	4	22	0	22	0	0	0	0	0	1.00	22	0	0	0	1.00
260	コート	#	/ko.O.to/	coat	3	3	22	11	144	16	7	4	0	0	0.90	22	138	0	7	0.14
261	タイム	*	/tai.mu/	time	3	3	22	3	82	0	3	0	0	0	1.00	22	60	0	3	0.27

(continued)

No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
262	レース	# /re.E.su/	race, lace	3	3	22	9	54	66	4	5	0.45	22	98	0	3	0.18
263	ピストル	* /pi.su.to.ru/	pistol	4	4	23	1	23	0	1	0	1.00	23	0	0	0	1.00
264	ジャーナル	* /ja.A.na.ru/	journal	5	4	23	0	23	0	0	0	1.00	23	0	0	0	1.00
265	コンテスト	* /ko.N.ku.U.ru/	contest	5	5	23	0	23	0	0	0	1.00	23	0	0	0	1.00
266	クーデター	* /ku.U.de.ta.A/	coup d'état	5	5	23	0	23	0	0	0	1.00	23	0	0	0	1.00
267	サッカー	* /sa.Q.ka.A/	soccer, football	4	4	23	0	23	0	0	0	1.00	23	0	0	0	1.00
268	レーヨン	* /re.E.jo.N/	rayon	4	4	24	0	24	0	0	0	1.00	24	0	0	0	1.00
269	セールス	* /se.E.ru.su/	sales	4	4	24	1	24	7	0	1	0.77	24	7	0	1	0.77
270	ステンレス	* /su.te.N.re.su/	stainless	5	5	24	0	24	0	0	0	1.00	24	0	0	0	1.00
271	スキー	* /su.ki/	ski	3	3	24	3	29	80	1	2	0.27	24	85	0	2	0.22
272	セーター	* /se.E.ta.A/	sweater	4	4	25	5	125	30	3	2	0.81	25	130	0	3	0.16
273	デザイナー	* /de.za.i.na.A/	designer	5	5	25	0	25	0	0	0	1.00	25	0	0	0	1.00
274	ギター	* /gi.ta.A/	guitar	3	3	26	2	106	0	2	0	1.00	26	80	0	1	0.25
275	スタンド	* /su.ta.N.do/	stand	4	4	26	1	38	0	1	0	1.00	26	12	0	1	0.68
276	ボーナス	* /bo.O.na.su/	bonus	4	4	26	1	26	0	0	1	1.00	26	0	0	0	1.00
277	ハウス	* /ha.u.su/	house	3	3	27	0	27	0	0	0	1.00	27	0	0	0	1.00
278	メロディー	* /me.ro.di/	melody	5	4	27	0	27	0	0	0	1.00	27	0	0	0	1.00
279	ヒット	# /hi.Q.to/	hit	3	3	27	12	99	0	12	0	1.00	27	72	0	5	0.27
280	チャンス	* /ja.N.su/	chance	4	3	27	0	27	0	0	0	1.00	27	0	0	0	1.00
281	ホーム	* /ho.O.ru/	home	3	3	28	9	116	80	4	5	0.59	28	168	0	4	0.14
282	マンション	* /ma.N.sjo.N/	condo, apartment	5	4	29	0	29	0	0	0	1.00	29	0	0	0	1.00
283	シネマ	* /si.ne.ma/	cinema	3	3	30	1	30	0	1	0	1.00	30	0	0	0	1.00
284	ハイライト	* /ha.i-ra.i.to/	highlight	5	5	30	0	30	0	0	0	1.00	30	0	0	0	1.00
285	コーラス	* /ko.O.ra.su/	chorus	4	4	30	1	30	0	1	0	1.00	30	0	0	0	1.00
286	ナイロン	* /na.i.ro.N/	nylon	4	4	30	1	37	0	1	0	1.00	30	7	0	1	0.81
287	モーター	* /mo.O.ta.A/	motor	4	4	30	3	30	25	1	2	0.55	30	25	0	1	0.55
288	アルバム	* /a.ru.ba.ru/	album	4	4	30	0	30	0	0	0	1.00	30	0	0	0	1.00
289	サロン	* /sa.ro.N/	salon	3	3	31	3	41	0	3	0	1.00	31	10	0	1	0.76
290	スタジオ	* /su.ta.zi.o/	studio	4	4	31	0	31	0	0	0	1.00	31	0	0	0	1.00
291	シーズン	* /si.I.zu.N/	season	4	4	31	0	31	0	0	0	1.00	31	0	0	0	1.00
292	レストラン	* /re.su.to.ra.N/	restaurant	5	5	32	0	32	0	0	0	1.00	32	0	0	0	1.00
293	ボーイ	* /bo.O.i/	boy	3	3	33	2	53	0	2	0	1.00	33	20	0	2	0.62
294	ポピュラー	* /po.pju.ra.A/	popular	5	4	33	0	33	0	0	0	1.00	33	0	0	0	1.00
295	ローカル	* /ro.O.ka.ru/	local	4	4	35	0	35	0	0	0	1.00	35	0	0	0	1.00
296	ドラマ	* /do.ra.ma/	drama	3	3	36	1	36	0	1	0	1.00	36	0	0	0	1.00
297	デザイン	* /de.za.i.N/	design	4	4	37	0	37	0	0	0	1.00	37	0	0	0	1.00
298	ホステス	* /ho.su.te.su/	hostess	4	4	38	0	38	0	0	0	1.00	38	0	0	0	1.00
299	ムード	# /mu.U.do/	mood	3	3	38	9	43	56	1	8	0.43	38	61	0	6	0.38
300	ドライブ	* /do.ra.i.bu/	drive	4	4	40	0	40	0	0	0	1.00	40	0	0	0	1.00
301	スピード	* /su.pi.I.do/	speed	4	4	40	1	40	0	1	0	1.00	40	0	0	0	1.00
302	クイズ	* /ku.i.zu/	quiz	3	3	42	0	42	0	0	0	1.00	42	0	0	0	1.00

303	バーテン	/ba.A.te.N/	bartender	4	4	43	1	49	0	0	1	0	1.00	43	6	0	0	1	0.88
304	プレス	/pu.re.su/	press	3	3	43	3	76	0	3	3	0	1.00	43	33	0	0	3	0.57
305	ベスト	/be.su.to/	vest, best	3	3	43	8	93	0	8	0	0	1.00	43	50	0	0	4	0.46
306	チーム	/ejj.i.mu/	team	3	3	43	6	48	65	2	4	4	0.42	43	70	0	0	4	0.38
307	カメラ	/ka.me.ra/	camera	3	3	45	0	45	0	0	0	0	1.00	45	0	0	0	0	1.00
308	パレード	/pa.re.E.do/	parade	4	4	46	0	46	0	0	0	0	1.00	46	0	0	0	0	1.00
309	ゴルフ	/go.ru.fu/	golf	3	3	47	0	47	0	0	0	0	1.00	47	0	0	0	0	1.00
310	タイプ	/ta.i.pu/	type	3	3	47	4	97	0	4	4	0	1.00	47	50	0	0	4	0.48
311	タクシー	/ta.ku.si/	taxi	4	4	48	0	48	0	0	0	0	1.00	48	0	0	0	0	1.00
312	シリーズ	/si.ri.i.zu/	series	4	4	51	1	51	0	1	0	0	1.00	51	0	0	0	0	1.00
313	レコード	/re.ko.O.do/	record	4	4	52	0	52	0	0	0	0	1.00	52	0	0	0	0	1.00
314	コンサート	/ko.N.sa.A.to/	concert	5	5	52	0	52	0	0	0	0	1.00	52	0	0	0	0	1.00
315	アパート	/apa.A.to/	apartment	4	4	52	1	136	0	1	0	0	1.00	52	84	0	0	1	0.38
316	プレゼント	/pu.re.ze.N.to/	present	5	5	53	0	58	0	0	0	0	1.00	53	0	0	0	0	1.00
317	アルバイト	/a.ru.bai.to/	part-time job	5	5	58	1	58	0	1	0	0	1.00	58	0	0	0	0	1.00
318	ショー	/sjo.O/	show	3	2	62	0	62	0	0	0	0	1.00	62	0	0	0	0	1.00
319	コーナー	/ko.O.na.A/	corner	4	4	62	1	62	14	0	1	0	0.82	62	14	0	0	1	0.82
320	パート	/pa.A.to/	part	3	3	65	9	73	48	3	6	6	0.60	65	56	0	0	5	0.54
321	グループ	/gu.ru.U.pu/	group	4	4	73	0	73	0	0	0	0	1.00	73	0	0	0	0	1.00
322	ステレオ	/su.te.re.o/	stereo	4	4	74	0	74	0	0	0	0	1.00	74	0	0	0	0	1.00
323	スター	/su.ta.A/	star	3	3	80	5	106	29	2	3	3	0.79	80	55	0	0	3	0.59
324	ピアノ	/pi.a.no/	piano	3	3	83	0	83	0	0	0	0	1.00	83	0	0	0	0	1.00
325	デパート	/de.pa.A.to/	department store	4	4	84	1	136	0	1	0	0	1.00	84	52	0	0	1	0.62
326	センター	/se.N.ta.A/	center	4	4	91	1	116	0	1	0	0	1.00	91	25	0	0	1	0.78
327	サービス	/sa.A.bi.su/	service	4	4	94	1	100	0	1	0	0	1.00	94	6	0	0	1	0.94
328	リクエスト	/ri.kue.su.to/	request	5	5	96	0	96	0	0	0	0	1.00	96	0	0	0	0	1.00
329	メーカー	/me.E.ka.A/	maker, manufacturer	4	4	98	3	98	0	1	2	1	1.00	98	0	0	0	0	1.00
330	ゲスト	/ge.su.to/	guest	3	3	109	8	193	0	8	0	0	1.00	109	84	0	0	4	0.56
331	ラジオ	/ra.zi.o/	radio	3	3	119	0	119	0	0	0	0	1.00	119	0	0	0	0	1.00
332	スポーツ	/su.po.O.tu/	sport	4	4	171	1	171	0	0	0	1	1.00	171	0	0	0	0	1.00
333	テレビ	/te.re.bi/	TV set	3	3	341	0	341	0	0	0	0	1.00	341	0	0	0	0	1.00
334	アイデア	/a.i.de.a/	idea	4	4	11	0	11	0	0	0	0	1.00	11	0	0	0	0	1.00
335	トップ	/to.Q.pu/	top	3	3	20	5	48	0	5	0	0	1.00	20	28	0	0	2	0.42
336	ファン	/fa.N/	fan	3	2	23	1	23	0	1	0	0	1.00	23	0	0	0	0	1.00
337	ダイヤル	/da.i.ja.ru/	dial	4	4	52	0	52	0	0	0	0	1.00	52	0	0	0	0	1.00
338	スピーカー	/su.pi.i.ka.A/	speaker	5	5	6	0	6	0	0	0	0	1.00	6	0	0	0	0	1.00
339	パーマ	/pa.A.ma/	perm	3	3	8	3	14	34	2	1	1	0.29	8	40	0	0	2	0.17
340	力作	/ri.ki.saku/	work-up	2	4	7	56	302	29	51	5	5	0.91	76	25.5	4	12	0.23	
341	人選	/zi.N.se.N/	personnel selection	2	4	8	88	637	478	57	31	31	0.57	130	98.5	1	33	0.12	
342	直売	/jo.ku.ba.i/	direct marketing	2	4	18	49	629	56	29	20	20	0.92	401	284	5	13	0.59	
343	学寮	/ga.ku-fjo.ku/	college house	2	4	5	50	738	350	39	10	10	0.68	109	992	1	25	0.10	
344	今昔	/ko.N.zja.ku/	now and past	2	4	5	24	526	0	18	6	6	1.00	5	521	0	12	0.01	
345	殺虫	/sa.Q-fju.u/	killing insects	2	4	5	25	36	43	10	15	15	0.46	56	23	3	3	0.71	
346	端的	/ta.N-te.ki/	straight	2	4	5	22	55	0	18	4	4	1.00	5	50	0	2	0.09	
347	小皿	/ko.za.ra/	saucer	2	3	5	64	110	189	36	28	28	0.37	5	294	0	13	0.02	
348	厚板	/atu-i.ta/	thick plate	2	4	5	26	28	142	9	17	17	0.16	12	158	1	7	0.07	

(continued)

No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
349	殘星	/zu.N-ru.i/	being stranded	2	4	5	31	249	101	28	3	0.71	21	329	1	12	0.06
350	曲芸	/kjo.ku-ge.i/	acrobatics	2	4	5	30	163	0	26	4	1.00	32	131	1	8	0.20
351	守衛	# /sju-e.i/	gate keeper	2	3	5	13	124	67	10	3	0.65	77	114	4	3	0.40
352	遊覽	/ju-u-ra.N/	sightseeing	2	4	5	38	47	27	35	3	0.64	32	42	2	5	0.43
353	風物	/fu-u-bu.tu/	thing	2	4	5	123	274	111	75	48	0.71	12	384	1	29	0.03
354	獵銃	# /fjo.u-zju.u/	a hunting rifle	2	4	5	7	11	0	7	0	1.00	11	0	1	0	1.00
355	電擊	/de.N-ge.ki/	electric shock	2	4	5	53	1283	0	53	0	1.00	13	1270	1	25	0.01
356	簡素	/ka.N-so/	simplicity	2	3	5	22	151	0	22	0	1.00	66	85	2	5	0.44
357	增勢	/zo.u-se.i/	increasing trend	2	4	5	64	412	14	55	9	0.97	103	323	6	15	0.24
358	良質	/fjo.u-si.tu/	good quality	2	4	5	36	160	0	34	2	1.00	5	155	0	10	0.03
359	廉売	/re.N-ba.i/	bargain sale	2	4	5	17	474	27	15	2	0.95	14	487	1	7	0.03
360	無配	/mu-ha.i/	no dividend	2	3	5	102	288	92	87	15	0.76	5	375	0	19	0.01
361	即売	/so.ku-bai/	spot sale	2	4	5	27	502	129	20	7	0.80	23	608	1	12	0.04
362	充滿	# /zju.u-ma.N/	fullness	2	4	5	12	103	0	12	0	1.00	5	98	0	3	0.05
363	藥學	/ja.ku-ga.ku/	pharmacy	2	4	5	65	1377	25	61	4	0.98	331	1071	6	23	0.24
364	理性	/ri-se.i/	rational nature	2	3	5	58	568	139	51	7	0.80	5	702	0	15	0.01
365	身近	/mi-zi.ku/	being familiar	2	3	5	27	11	325	12	15	0.03	84	252	3	5	0.25
366	転入	/te.N-nju.u/	moving in	2	4	5	61	363	0	61	0	1.00	16	347	2	17	0.04
367	積算	/se.kt-sa.N/	quantity survey	2	4	5	35	344	194	28	7	0.64	5	533	0	13	0.01
368	在外	/za.i-ga.i/	resident abroad	2	4	5	62	302	38	43	19	0.89	5	335	0	14	0.01
369	貧血	/hi.N-ke.tu/	anemia	2	4	5	29	12	6	27	2	0.67	5	13	0	2	0.28
370	着実	/fja.ku-zi.tu/	steadiness	2	4	5	47	280	46	40	7	0.86	65	261	2	14	0.20
371	月産	/ge.Q-sa.N/	monthly production	2	4	5	61	785	18	43	18	0.98	5	798	0	21	0.01
372	模範	# /mo-ha.N/	example, model	2	3	5	11	39	0	10	1	1.00	5	34	0	1	0.13
373	円滑	* /e.N-ka.tu/	smooth	2	4	5	13	5	0	13	0	1.00	5	0	0	0	1.00
374	水着	/mi-zu-gi/	swimming wear	2	3	5	129	35	392	32	97	0.08	16	411	1	20	0.04
375	標本	/hjo.u-ho.N/	sample	2	4	5	45	1257	1001	37	8	0.56	18	2240	1	12	0.01
376	越境	/e.Q-kjo.u/	crossing the border	2	4	5	22	136	28	16	6	0.83	61	103	3	3	0.37
377	併設	/he.i-se.tu/	parallel establishment	2	4	5	20	635	0	20	0	1.00	5	630	0	10	0.01
378	開局	/ka.i-kjo.ku/	opening a station	2	4	5	52	678	384	50	2	0.64	418	644	5	19	0.39
379	枚数	/ma.i-su.u/	the number of something	2	4	5	65	149	35	55	10	0.81	17	167	1	14	0.09
380	発熱	/ha.tu-ne.tu/	occurrence of fever	2	4	5	78	251	770	37	41	0.25	5	1016	0	23	0.00
381	睡眠	# /su.i-mi.N/	sleep	2	4	5	12	11	0	12	0	1.00	5	6	0	1	0.45
382	隔離	/ka.ku-ri/	isolation	2	3	5	15	56	0	14	1	1.00	21	35	1	1	0.38
383	苦慮	/ku-ryo/	worry oneself	2	2	5	36	104	0	32	4	1.00	16	88	2	5	0.15
384	下痢	/ge-ri/	diarrhea	2	2	5	63	203	59	28	35	0.77	15	247	1	11	0.06
385	受託	/zju-ta.ku/	accepting on trust	2	3	5	29	694	219	27	2	0.76	243	670	3	7	0.27
386	戯曲	/gt-kjo.ku/	drama	2	3	5	16	171	0	15	1	1.00	12	159	1	5	0.07
387	団員	/da.N-i.N/	members	2	4	5	48	1795	0	48	0	1.00	55	1740	3	25	0.03
388	倍率	/ba.i-ri.tu/	magnification ratio	2	4	5	18	127	0	14	4	1.00	22	105	1	8	0.17
389	受諾	/zju-da.ku/	acceptance	2	3	5	23	141	219	21	2	0.39	177	183	3	4	0.49



390	絕望	/ze.tu-bo.u/	2	4	5	58	280	100	35	23	0.74	5	375	0	14	0.01
391	穩健	/o.N-ke.N/	2	4	5	7	58	0	7	0	1.00	5	53	0	2	0.09
392	適應	/te.ki-o.u/	2	4	5	40	108	22	37	3	0.83	66	64	4	4	0.51
393	補充	/ho-zju.u/	2	3	5	18	109	8	16	2	0.93	25	92	2	6	0.21
394	半額	/ha.N-ga.ku/	2	4	5	52	324	0	52	0	1.00	22	302	1	16	0.07
395	旅費	/tjo-hi/	2	2	5	39	361	0	27	12	1.00	147	214	2	8	0.41
396	語學	/go-ga.ku/	2	3	5	69	1338	63	67	2	0.96	5	1396	0	27	0.00
397	批評	/hi-ha.N/	2	3	5	25	192	8	20	5	0.96	107	93	2	3	0.54
398	足場	/a.si-ba/	2	3	5	72	604	859	37	35	0.41	5	1458	0	30	0.00
399	行列	/gjo.u-re.tu/	2	4	5	48	147	439	29	19	0.25	5	581	0	12	0.01
400	鈍化	/do.N-ka/	2	3	5	47	568	52	42	5	0.92	5	615	0	14	0.01
401	文民	/bu.N-mi.N/	2	4	5	73	1070	326	65	8	0.77	204	1192	1	28	0.15
402	軍備	/gu.N-bi/	2	3	5	46	794	0	46	0	1.00	151	643	5	8	0.19
403	利率	/ri-ri.tu/	2	3	5	28	289	0	23	5	1.00	83	206	3	8	0.29
404	到達	/to.u-ta.tu/	2	4	5	18	114	23	16	2	0.83	28	109	1	6	0.20
405	難問	/na.N-mo.N/	2	4	5	49	678	0	48	1	1.00	5	673	0	8	0.01
406	旅券	/tjo-ke.N/	2	3	5	21	355	0	17	4	1.00	123	232	1	7	0.35
407	滿屋	/ma.N-ru.i/	2	4	5	32	251	0	32	0	1.00	5	246	0	10	0.02
408	暴動	/bo.u-do.u/	2	4	5	64	1044	5	63	1	1.00	67	982	3	15	0.06
409	彈壓	/da.N-a.tu/	2	4	5	25	102	0	22	3	1.00	5	97	0	7	0.05
410	除去	/tjo-kjo/	2	2	5	19	29	95	17	2	0.23	63	61	2	3	0.51
411	棄却	/ki-kja.ku/	2	3	5	13	50	0	13	0	1.00	5	45	0	5	0.10
412	敗北	/ha.i-bo.ku/	2	4	5	14	29	107	9	5	0.21	14	122	1	4	0.10
413	暴落	/bo.u-ra.ku/	2	4	5	44	92	5	41	3	0.95	5	92	0	7	0.05
414	通訳	/tu.u-ya.ku/	2	4	5	57	804	204	49	8	0.80	25	983	3	24	0.02
415	中核	/tju.u-ka.ku/	2	4	5	73	1364	74	65	8	0.95	450	988	2	25	0.31
416	騒音	/so.u-o.N/	2	4	5	48	69	26	32	16	0.73	43	52	3	2	0.45
417	斷念	/da.N-ne.N/	2	4	5	42	215	0	40	2	1.00	5	210	0	10	0.02
418	側面	/so.ku-me.N/	2	4	5	58	281	6	53	5	0.98	44	243	2	14	0.15
419	国営	/ko.ku-e.i/	2	4	5	89	1543	445	69	18	0.78	180	1808	5	29	0.09
420	査察	/sa-sa.tu/	2	3	5	17	132	0	17	0	1.00	47	85	2	3	0.36
421	陣營	/zi.N-e.i/	2	4	5	23	266	0	23	0	1.00	11	255	1	6	0.04
422	債務	/sai-mu/	2	3	5	38	1506	0	38	0	1.00	17	1489	1	25	0.01
423	年末	/ne.N-ma.tu/	2	4	5	64	764	11	50	14	0.99	11	764	1	14	0.01
424	新柄	/si.N-ga.ra/	2	4	6	64	698	45	58	6	0.94	6	737	0	27	0.01
425	雜件	/za.Q-ke.N/	2	4	6	40	332	46	23	17	0.88	13	342	1	6	0.04
426	戲評	/gi-hjo.u/	2	3	6	23	109	8	18	5	0.93	6	111	0	6	0.05
427	綿密	/me.N-mi.tu/	2	4	6	17	107	0	17	0	1.00	46	61	2	1	0.43
428	永眠	/e.i-mi.N/	2	4	6	19	40	0	18	1	1.00	29	11	2	2	0.73
429	勞委	/ro.u-i/	2	3	6	10	225	0	10	0	1.00	6	219	0	4	0.03
430	枝肉	/e.da-ni.ku/	2	4	6	12	38	0	11	1	1.00	6	32	0	3	0.16
431	日勤	/ni.Q-ki.N/	2	4	6	56	1606	1238	32	24	0.56	29	2815	1	27	0.01
432	内勤	/na.i-ki.N/	2	4	6	85	678	9	73	12	0.99	18	669	1	20	0.03
433	評議	/hjo.u-gi/	2	3	6	40	906	0	40	0	1.00	671	235	6	10	0.74
434	銀貨	/gi.N-ka/	2	3	6	22	548	0	22	0	1.00	6	542	0	4	0.01
435	脱水	/da.Q-su.i/	2	4	6	87	213	105	62	25	0.67	42	276	1	20	0.13

(continued)

No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
436	増配	/zo.u-ha.i/	dividend increase	2	4	6	44	299	93	35	9	0.76	66	326	4	17	0.17
437	落第	/ra.ku-dai.i/	flunk	2	4	6	23	92	32	18	5	0.74	38	86	1	3	0.31
438	弱震	/zja.ku-si.N/	weak earthquake	2	4	6	23	58	27	13	10	0.68	6	79	0	3	0.07
439	木馬	/mo.ku-ba/	dummy horse	2	3	6	46	146	26	29	17	0.85	6	166	0	9	0.03
440	和室	/wa-si.tu/	Japanese-style room	2	3	6	41	205	0	40	1	1.00	14	191	1	12	0.07
441	来場	/ra.i-zjo.u/	visit	2	4	6	76	1012	630	49	27	0.62	80	1562	3	33	0.05
442	犠打	/gi-da/	sacrifice hit	2	2	6	11	136	0	11	0	1.00	6	130	0	4	0.04
443	月面	/ge.tu-me.N/	surface of the moon	2	4	6	82	305	174	59	23	0.64	6	473	0	24	0.01
444	氷河	/hjo.u-ga/	glacier	2	3	6	15	27	0	11	4	1.00	6	21	0	2	0.22
445	歳末	/sa.i-ma.tu/	year-end	2	4	6	25	45	10	19	6	0.82	28	27	4	3	0.51
446	脚色	/kja.ku-sjo.ku/	dramatization	2	4	6	77	103	7	42	35	0.94	6	104	0	8	0.05
447	共著	/kjo.u-tjo/	collective writing	2	3	6	24	439	0	22	2	1.00	163	276	1	12	0.37
448	断片	/da.N-pe.N/	segment	2	4	6	24	41	9	20	4	0.82	15	35	1	4	0.30
449	両軍	/fjo.u-gu.N/	two forces	2	4	6	46	353	0	46	0	1.00	24	329	1	13	0.07
450	無税	/mu-zc.i/	duty free	2	3	6	99	329	13	90	9	0.96	6	336	0	20	0.02
451	献立	/ko.N-da.te/	menu	2	4	6	40	6	454	0	40	0.01	6	454	0	17	0.01
452	忍耐	/ni.N-ta.i/	endurance	2	4	6	4	6	0	2	2	1.00	6	0	0	0	1.00
453	激增	/ge.ki-zo.u/	sharp increase	2	4	6	24	38	11	21	3	0.78	13	36	1	4	0.27
454	漂流	/hjo.u-rju.u/	drift	2	4	6	44	127	0	43	1	1.00	6	121	0	7	0.05
455	駅員	/e.ki-i.N/	station staff	2	4	6	46	1670	0	46	0	1.00	28	1642	1	24	0.02
456	関脇	/se.ki-wa.ke/	Sekiwake, a rank in Sumo wrestling	2	4	6	13	6	625	3	10	0.01	6	625	0	7	0.01
457	新卒	/si.N-so.tu/	recent college grad	2	4	6	53	649	45	49	4	0.94	78	616	2	22	0.11
458	弾薬	/da.N-ja.ku/	ammunition	2	4	6	38	93	0	29	9	1.00	14	79	1	6	0.15
459	良識	/fjo.u-si.ki/	common sense	2	4	6	27	157	0	27	0	1.00	69	88	2	5	0.44
460	最悪	/sa.i-a.ku/	worst	2	4	6	36	715	61	30	6	0.92	61	715	1	12	0.08
461	下期	/si.mo.ki/	second semester	2	3	6	97	427	246	36	61	0.63	30	643	2	27	0.04
462	小幡	/ko-ha.ba/	narrow range	2	3	6	75	177	189	46	29	0.48	6	360	0	15	0.02
463	片手	/ka.ta-te/	one-handed	2	3	6	95	266	425	50	45	0.38	12	679	1	22	0.02
464	密度	/mi.Q-sju.u/	density	2	4	6	47	586	7	36	11	0.99	14	579	1	7	0.02
465	改装	/ka.i-cji.ku/	renovation	2	4	6	34	516	17	33	1	0.97	163	370	5	8	0.31
466	物品	/bu.Q-pi.N/	goods	2	4	6	58	202	534	20	38	0.27	114	622	3	16	0.15
467	下着	/si.ta-gi/	underwear	2	3	6	101	24	282	22	79	0.08	6	300	0	16	0.02
468	空前	/ku.u-ze.N/	never-before-seen	2	4	6	69	663	125	50	19	0.84	6	782	0	15	0.01
469	中盤	/fju.u-ba.N/	middle game	2	4	6	85	1403	74	77	8	0.95	60	1417	2	28	0.04
470	人柄	/hi.to-ga.ra/	personality	2	4	6	85	191	817	31	54	0.19	40	968	2	23	0.04
471	重油	/zju.u-ju/	heavy oil	2	3	6	50	293	33	38	12	0.90	80	246	3	12	0.25
472	役場	/ja.ku-ba/	public office	2	3	6	63	708	849	34	29	0.45	40	1517	1	32	0.03
473	熱帯	/ne.Q-ta.i/	the tropical zone	2	4	6	39	119	24	24	15	0.83	16	127	1	8	0.11
474	経歴	/ke.i-re.ki/	career	2	4	6	28	1631	0	24	4	1.00	980	651	3	6	0.60
475	巡回	/zju.N-ka.i/	patrol	2	4	6	20	160	6	19	1	0.96	26	140	2	6	0.16
476	品種	/hi.N-sju/	breed variety	2	3	6	27	234	9	22	5	0.96	68	175	2	6	0.28

477	学年	/ga.ku-ne.N/	2	4	6	103	1600	407	87	16	0.80	519	1488	2	45	0.26
478	月額	/ge.tu-ga.ku/	2	4	6	43	256	174	24	19	0.60	89	341	2	15	0.21
479	脱退	/da.Q-ta.i/	2	4	6	34	93	26	25	9	0.78	31	88	2	9	0.26
480	断定	/da.N-te.i/	2	4	6	70	1099	34	62	8	0.97	180	953	3	28	0.16
481	庁舎	# /fjo.u-sja/	2	3	6	9	85	7	8	1	0.92	6	86	0	3	0.07
482	出力	/sju.tu-rjo.ku/	2	4	6	141	890	1230	72	69	0.42	593	1527	3	52	0.28
483	未定	/mi-te.i/	2	3	6	66	1132	34	60	6	0.97	6	1160	0	31	0.01
484	同居	/do.u-kjo/	2	3	6	93	517	179	86	7	0.74	6	690	0	33	0.01
485	分類	/bu.N-ru.i/	2	4	6	56	379	5	55	1	0.99	70	314	3	13	0.18
486	救出	/kju.u-sju.tu/	2	4	6	57	356	24	48	9	0.94	62	318	6	12	0.16
487	国外	/ko.ku-ga.i/	2	4	6	115	1584	445	97	18	0.78	136	1893	1	38	0.07
488	突入	/to.tu-nju.u/	2	4	6	45	303	35	32	13	0.90	50	288	3	13	0.15
489	直球	/fjo.Q-kju.u/	2	4	6	54	269	173	29	25	0.61	13	429	1	14	0.03
490	保全	/ho-ze.N/	2	3	6	24	759	20	22	2	0.97	269	510	8	9	0.35
491	庶民	/sjo-mi.N/	2	3	6	29	558	199	28	1	0.74	523	234	5	5	0.69
492	孤立	/ko-ri.tu/	2	3	6	39	450	6	33	6	0.99	90	366	2	15	0.20
493	残高	/za.N-da.ka/	2	4	6	32	49	287	24	8	0.15	115	221	4	3	0.34
494	在住	/za.i-zju.u/	2	4	6	25	66	0	25	0	1.00	18	48	1	4	0.27
495	釈放	/sja.ku-ho.u/	2	4	6	9	76	0	7	2	1.00	57	19	2	1	0.75
496	供述	/kjo.u-zju.tu/	2	4	6	21	33	0	17	4	1.00	6	27	0	1	0.18
497	懸念	/ke-ne.N/	2	3	6	29	179	24	22	7	0.88	15	188	1	8	0.07
498	端麗	/ta.N-re.i/	2	4	7	19	23	0	15	4	1.00	18	5	1	1	0.78
499	極上	/go.ku-zjo.u/	2	4	7	82	921	67	51	31	0.93	7	981	0	23	0.01
500	早番	/ha.ja-ba.N/	2	4	7	41	169	90	23	18	0.65	145	114	1	8	0.56
501	論語	/ro.N-go/	2	3	7	72	437	0	72	0	1.00	7	430	0	10	0.02
502	自発	/zi-ha.tu/	2	3	7	114	1587	201	100	14	0.89	53	1735	2	36	0.03
503	随想	/zu.i-so.u/	2	4	7	30	283	0	30	0	1.00	7	276	0	10	0.02
504	製粉	/se.i-fu.N/	2	4	7	26	342	0	23	3	1.00	7	335	0	12	0.02
505	人妻	/hi.to-zu.ma/	2	4	7	83	161	817	20	63	0.16	7	971	0	25	0.01
506	鶏卵	/ke.i-ra.N/	2	4	7	5	7	0	5	0	1.00	7	0	0	0	1.00
507	集配	/sju.u-ha.i/	2	4	7	36	247	79	28	8	0.76	7	319	0	15	0.02
508	調味	/fjo.u-mi/	2	3	7	56	578	163	53	3	0.78	7	734	0	16	0.01
509	来店	/ra.i-te.N/	2	4	7	36	524	31	32	4	0.94	44	511	2	12	0.08
510	雑用	/za.tu-jo.u/	2	4	7	100	634	63	79	21	0.91	23	674	1	24	0.03
511	街路	/ga.i-ro/	2	3	7	47	172	28	36	11	0.86	144	56	4	7	0.72
512	大胆	/da.i-ta.N/	2	4	7	137	608	1213	32	105	0.33	7	1814	0	44	0.00
513	手製	/te-se.i/	2	3	7	74	325	62	61	13	0.84	7	380	0	19	0.02
514	出前	/de-ma.e/	2	3	7	106	385	1594	22	84	0.19	7	1972	0	38	0.00
515	配役	/ha.i-ja.ku/	2	4	7	51	235	32	39	12	0.88	27	240	1	13	0.10
516	増刷	/zo.u-sa.tu/	2	4	7	28	319	14	26	2	0.96	169	164	5	10	0.51
517	真空	/si.N-ku.u/	2	4	7	63	211	19	29	34	0.92	7	223	0	9	0.03
518	歌曲	/ka-kjo.ku/	2	3	7	33	355	48	26	7	0.88	183	220	3	8	0.45
519	期末	/ki-ma.tu/	2	3	7	23	272	0	19	4	1.00	12	260	1	7	0.04
520	悪質	/a.ku-si.tu/	2	4	7	78	178	76	66	12	0.70	79	175	2	11	0.31
521	英訳	/e.i-ja.ku/	2	4	7	28	333	0	27	1	1.00	288	45	5	2	0.86
522	火力	/ka-rjo.ku/	2	3	7	93	808	47	75	18	0.95	38	817	1	29	0.04

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No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
523	頭痛	/zu-tu.u/	headache	2	3	7	19	18	0	11	8	1.00	7	11	0	1	0.39
524	水爆	/su.i-ba.ku/	hydrogen bomb	2	4	7	93	341	39	67	26	0.90	15	365	1	16	0.04
525	適切	/te.ki-se.tu/	rightness	2	4	7	31	155	0	30	1	1.00	75	80	4	4	0.48
526	番付	/ba.N-zu.ke/	numerical ranking	2	4	7	23	209	188	12	11	0.53	7	390	0	9	0.02
527	実例	/zi.tu-re.i/	example	2	4	7	76	329	332	41	35	0.50	142	519	6	22	0.21
528	漁民	/gjo-mi.N/	fishing people	2	3	7	42	621	199	38	4	0.76	82	738	3	10	0.10
529	弁論	/be.N-ro.N/	oration	2	4	7	51	237	0	51	0	1.00	96	141	4	9	0.41
530	名門	/me.i-mo.N/	honorable family	2	4	7	68	558	47	59	9	0.92	7	598	0	18	0.01
531	免稅	/me.N-ze.i/	duty free	2	4	7	24	237	0	24	0	1.00	37	200	3	9	0.16
532	出願	/sju.tu-ga.N/	application	2	4	7	83	176	1183	27	56	0.13	395	964	2	28	0.29
533	在学	/za.i-ga.ku/	being in school	2	4	7	71	1374	0	71	0	1.00	15	1359	1	27	0.01
534	激戦	/ge.ki-se.N/	severe fight	2	4	7	62	290	11	60	2	0.96	39	262	3	14	0.13
535	著作	/gjo-sa.ku/	literary work	2	3	7	50	324	29	45	5	0.92	28	325	1	16	0.08
536	連敗	/re.N-pa.i/	consecutive losses	2	4	7	51	452	53	44	7	0.90	7	498	0	18	0.01
537	直結	/fjo.Q-ke.tu/	direct connection	2	4	7	51	75	173	25	26	0.30	90	158	3	12	0.36
538	集約	/sju.u-ya.ku/	consolidation	2	4	7	43	394	0	42	1	1.00	60	334	3	11	0.15
539	広域	/ko.u-i.ki/	broad area	2	4	7	21	200	169	15	6	0.54	126	243	2	5	0.34
540	親族	/si.N-zo.ku/	family	2	4	7	48	205	31	40	8	0.87	104	132	4	6	0.44
541	海域	/ka.i-i.ki/	ocean area	2	4	7	43	462	0	39	4	1.00	111	351	2	11	0.24
542	荷物	/ni-mo.tu/	burden	2	3	7	83	56	247	14	69	0.18	35	268	1	19	0.12
543	同一	/do.u-i.tu/	identification	2	4	7	85	607	160	80	5	0.79	288	479	7	25	0.38
544	祖国	/so-ko.ku/	homeland	2	3	7	72	1124	416	56	16	0.73	29	1511	3	24	0.02
545	接統	/se.tu-zo.ku/	association	2	4	7	23	113	28	13	10	0.80	7	134	0	9	0.05
546	罰金	/ba.Q-ki.N/	fine	2	4	7	53	523	74	46	7	0.88	7	590	0	22	0.01
547	無罪	/mu-za.i/	innocence	2	3	7	99	255	13	90	9	0.95	7	261	0	13	0.03
548	発掘	/ha.Q-ku.tu/	excavation	2	4	7	64	724	285	36	28	0.72	64	945	1	21	0.06
549	任務	/ni.N-mu/	assignment	2	3	7	44	1495	0	44	0	1.00	549	946	7	19	0.37
550	合弁	/go.u-be.N/	joint venture	2	4	7	56	231	172	31	25	0.57	7	396	0	14	0.02
551	翻訳	/ho.N-ja.ku/	translation	2	4	7	16	25	0	15	1	1.00	25	0	3	0	1.00
552	牛肉	/gju.u-ni.ku/	beef	2	4	7	10	79	0	10	0	1.00	7	72	0	3	0.09
553	納稅	/no.u-ze.i/	tax payment	2	4	7	29	130	21	24	5	0.86	41	110	4	8	0.27
554	外部	/ga.i-bu/	outside	2	3	7	87	886	112	75	12	0.89	99	899	1	28	0.10
555	頭取	/to.u-do.ni/	president	2	4	7	23	7	37	6	17	0.16	7	37	0	4	0.16
556	発注	/ha.Q-tju.u/	order	2	4	7	70	743	285	42	28	0.72	29	999	1	22	0.03
557	武力	/bu-tjo.ku/	force	2	3	7	89	755	47	76	13	0.94	98	704	5	23	0.12
558	長女	/gjo.u-zjo/	oldest daughter	2	3	7	68	552	284	50	18	0.66	28	808	1	16	0.03
559	稅率	/ze.i-ri.tu/	tax rate	2	4	7	17	202	0	13	4	1.00	44	158	1	11	0.22
560	撤退	/te.Q-ta.i/	evacuation	2	4	7	17	49	0	17	0	1.00	18	31	1	4	0.37
561	削減	/sa.ku-ge.N/	cut down	2	4	7	10	16	0	9	1	1.00	16	0	1	0	1.00
562	遅番	/o-so-ba.N/	late shift	2	4	8	23	30	33	12	11	0.48	15	48	1	2	0.24
563	弱電	/zja.ku-de.N/	light electrical	2	4	8	40	241	27	30	10	0.90	8	260	0	7	0.03

564	絕唱	/ze Q-sjo.u/	2	4	8	36	170	5	28	8	0.97	8	167	0	8	0.05
565	行狀	/gjo.u-zjo.u/	2	4	8	58	207	439	39	19	0.32	8	638	0	14	0.01
566	脫獄	/da.tu-go.ku/	2	4	8	29	49	55	14	15	0.47	33	71	2	6	0.32
567	同窓	/do.u-so.u/	2	4	8	77	489	143	74	3	0.77	57	575	4	24	0.09
568	簿記	/bo.ki/	2	2	8	27	205	0	27	0	1.00	8	197	0	7	0.04
569	心接	/o.u-se.tu/	2	4	8	21	790	0	21	0	1.00	523	267	1	7	0.66
570	硫酸	/fju.u-sa.N/	2	4	8	12	19	30	10	2	0.39	23	26	1	2	0.47
571	殘金	/za.N-ki.N/	2	4	8	74	564	175	64	10	0.76	65	674	3	25	0.09
572	殘落	/ha.N-ra.ku/	2	4	8	62	381	0	52	10	1.00	8	373	0	19	0.02
573	心待	/ko.ko-ro-e/	2	4	8	47	8	209	1	46	0.04	8	209	0	11	0.04
574	亂鬧	/ra.N-to.u/	2	4	8	33	59	11	31	2	0.84	70	0	4	0	1.00
575	極端	/kjo.ku-ta.N/	2	4	8	49	49	26	26	23	0.65	19	56	2	8	0.25
576	便所	/be.N-zjo/	2	3	8	47	70	279	9	38	0.20	8	341	0	13	0.02
577	突進	/to.Q-si.N/	2	4	8	43	236	42	36	7	0.85	40	238	3	10	0.14
578	概算	/ga.i-sa.N/	2	4	8	36	344	108	31	5	0.76	67	385	1	10	0.15
579	漁村	/gjo-so.N/	2	3	8	22	122	0	19	3	1.00	109	13	5	1	0.89
580	油圧	/ju-a.tu/	2	3	8	21	89	0	19	2	1.00	8	81	0	5	0.09
581	民芸	/mi.N-ge.i/	2	4	8	38	394	0	38	0	1.00	66	328	2	16	0.17
582	拝見	/ha.i-ke.N/	2	4	8	62	265	0	48	14	1.00	8	257	0	5	0.03
583	動力	/do.u-fjo.ku/	2	4	8	89	874	187	75	14	0.82	154	907	3	33	0.15
584	電極	/de.N-kjo.ku/	2	4	8	43	1169	0	42	1	1.00	224	945	1	18	0.19
585	三男	/sa.N-na.N/	2	4	8	28	855	0	23	5	1.00	8	847	0	9	0.01
586	陳列	/cji.N-re.tu/	2	4	8	21	28	0	21	0	1.00	8	20	0	3	0.29
587	不便	/fu-be.N/	2	3	8	97	1106	75	90	7	0.94	8	1173	0	23	0.01
588	出題	/sju.tu-da.i/	2	4	8	88	947	1183	32	56	0.44	806	1324	2	32	0.38
589	極秘	/go.ku-hi/	2	3	8	30	15	56	8	22	0.21	8	63	0	8	0.11
590	勳章	/ku.N-sjo.u/	2	4	8	15	29	0	15	0	1.00	8	21	0	2	0.28
591	万全	/ba.N-ze.N/	2	4	8	27	253	7	22	5	0.97	105	155	1	8	0.40
592	返却	/he.N-kja.ku/	2	4	8	29	100	30	26	3	0.77	70	60	4	6	0.54
593	用具	/yo.u-gu/	2	3	8	40	272	0	40	0	1.00	98	174	5	12	0.36
594	擊墜	/ge.ki-tu.i/	2	4	8	7	8	8	5	2	0.50	16	0	1	0	1.00
595	序盤	/zjo-ba.N/	2	3	8	20	74	0	20	0	1.00	8	66	0	5	0.11
596	論評	/ro.N-pjo.u/	2	4	8	49	85	98	32	17	0.46	109	74	5	3	0.60
597	決裂	/ke.tu-re.tu/	2	4	8	21	75	275	8	13	0.21	8	342	0	11	0.02
598	分配	/bu.N-pa.i/	2	4	8	58	325	85	41	17	0.79	79	331	3	17	0.19
599	偏見	/he.N-ke.N/	2	4	8	55	265	0	43	12	1.00	8	257	0	5	0.03
600	閉會	/he.i-ka.i/	2	4	8	46	1373	0	45	1	1.00	13	1360	1	18	0.01
601	留任	/fju.u-ni.N/	2	4	8	39	264	10	38	1	0.96	8	266	0	14	0.03
602	脫皮	/da.Q-pi/	2	3	8	29	55	32	13	16	0.63	8	79	0	8	0.09
603	稅關	/ze.i-ka.N/	2	4	8	11	229	7	10	1	0.97	62	174	2	6	0.26
604	混雜	/ko.N-za.tu/	2	4	8	23	73	0	23	0	1.00	33	40	1	2	0.45
605	增收	/zo.u-sju.u/	2	4	8	39	340	14	37	2	0.96	133	221	7	11	0.38
606	元日	/ga.N-zi.tu/	2	4	8	86	487	974	36	50	0.33	90	1371	4	33	0.06
607	教材	/kjo.u-za.i/	2	4	8	49	928	31	48	1	0.97	400	559	4	17	0.42
608	納入	/no.u-nju.u/	2	4	8	42	280	21	37	5	0.93	21	280	2	12	0.07
609	喫煙	/ki.tu-e.N/	2	4	8	14	8	107	7	7	0.07	8	107	0	1	0.07

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No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
610	結集	/ke-Q-sju.u/	assemble	2	4	8	44	945	88	35	9	0.91	99	934	5	12	0.10
611	脱出	/da-Q-sju.tu/	escape	2	4	8	66	358	33	49	17	0.92	33	358	2	16	0.08
612	上陸	/zjo.u-ri.ku/	landing	2	4	8	65	381	111	48	17	0.77	25	467	1	30	0.05
613	離脱	/ri-da.tu/	takeoff	2	3	8	19	15	31	17	2	0.33	39	7	1	1	0.85
614	路上	/ro-zjo.u/	on the road	2	3	8	61	954	29	49	12	0.97	8	975	0	18	0.01
615	接近	/se-Q-ki.N/	access	2	4	8	23	238	12	15	8	0.95	93	157	3	4	0.37
616	主体	/sju-ta.i/	actor, agent	2	3	8	94	1070	0	94	0	1.00	20	1050	1	28	0.02
617	名簿	/me.i-bo/	name list	2	3	8	53	282	47	44	9	0.86	45	284	1	13	0.14
618	増税	/zo.u-ze.i/	tax increase	2	4	8	41	339	14	39	2	0.96	36	317	3	19	0.10
619	是正	/ze-se.i/	correction	2	3	8	25	219	57	22	3	0.79	157	119	3	8	0.57
620	派出	/ha-sju.tu/	sending off	2	3	9	48	359	7	41	7	0.98	9	357	0	14	0.02
621	変圧	/he.N-a.tu/	transformation	2	4	9	44	240	0	44	0	1.00	74	166	2	7	0.31
622	建具	/ta-te-gu/	joinery	2	3	9	26	124	555	17	9	0.18	23	656	1	14	0.03
623	特売	/to.ku-bai/	bargain sale	2	4	9	51	1111	121	42	9	0.90	30	1202	1	29	0.02
624	外勤	/ga.i-ki.N/	outside duty	2	4	9	67	637	112	55	12	0.85	16	733	1	17	0.02
625	堅実	/ke.N-zi.tu/	wisdom	2	4	9	30	268	17	27	3	0.94	90	195	4	8	0.32
626	和服	/wa-fu.ku/	Japanese-style clothing	2	3	9	54	204	0	42	12	1.00	75	129	6	9	0.37
627	職安	/sjo.ku-a.N/	public employment agency	2	4	9	24	269	60	19	5	0.82	9	320	0	11	0.03
628	朝方	/a.sa-ga.tu/	in the morning	2	4	9	69	259	543	18	51	0.32	9	793	0	20	0.01
629	率直	/so-Q-tjo.ku/	frankness	2	4	9	15	16	6	13	2	0.73	15	7	1	1	0.68
630	重力	/zju.u-rjo.ku/	gravity	2	4	9	111	926	80	89	22	0.92	19	987	1	36	0.02
631	欲望	/jo.ku-bo.u/	desire	2	4	9	36	272	0	31	5	1.00	9	263	0	9	0.03
632	薬剤	/ja.ku-za.i/	medication	2	4	9	18	44	25	14	4	0.64	59	10	2	1	0.86
633	品物	/si.na-mo.no/	goods	2	4	9	89	50	321	30	59	0.13	23	348	1	22	0.06
634	速球	/so-Q-kjuu/	fastball	2	4	9	32	255	19	21	11	0.93	15	259	1	7	0.05
635	税法	/ze.i-ho.u/	tax law	2	4	9	53	244	59	33	20	0.81	25	278	1	16	0.08
636	利息	/ri-so.ku/	interest	2	3	9	32	187	0	27	5	1.00	83	104	3	2	0.44
637	推測	/su.i-so.ku/	guess	2	4	9	23	214	8	22	1	0.96	54	168	3	5	0.24
638	内側	/u.cji-ga.wa/	inside	2	4	9	88	47	410	23	65	0.10	57	400	2	15	0.12
639	弊害	/he.i-ga.i/	harmful effect	2	4	9	31	210	0	31	0	1.00	96	114	4	4	0.46
640	不在	/fu-za.i/	absence	2	3	9	98	1440	0	97	1	1.00	9	1431	0	27	0.01
641	独裁	/do.ku-sai/	autocratic	2	4	9	29	356	0	28	1	1.00	39	317	1	14	0.11
642	家賃	/ja.cji.N/	house rent	2	3	9	48	35	337	7	41	0.09	9	363	0	10	0.02
643	作者	/sa.ku-sja/	author	2	3	9	79	649	455	55	24	0.59	182	922	4	21	0.16
644	宿泊	/sju.ku-ha.ku/	accommodation	2	4	9	16	81	0	11	5	1.00	9	72	0	2	0.11
645	矛盾	/mu-zju.N/	contradiction	2	3	9	0	9	0	0	0	1.00	9	0	0	0	1.00
646	在日	/za.i-ni.cji/	residing in Japan	2	4	9	90	601	841	42	48	0.42	16	1426	1	36	0.01
647	根拠	/ko.N-kjo/	reason	2	3	9	17	61	24	14	3	0.72	59	26	2	3	0.69
648	暫定	/za.N-te.i/	temporary	2	4	9	50	1064	34	44	6	0.97	193	905	2	25	0.18
649	開幕	/ka.i-ma.ku/	curtain-up	2	4	9	53	512	384	51	2	0.57	606	290	8	9	0.68
650	官僚	/ka.N-rjo.u/	government official	2	4	9	32	136	0	32	0	1.00	105	31	3	2	0.77

651	派閥	#	/ha-ba.tu/	political faction	2	3	9	10	57	0	10	0	1.00	9	48	0	3	0.16
652	購入		/ko.u-nju.u/	purchase	2	4	9	31	279	0	31	0	1.00	88	191	2	10	0.32
653	議論		/gi-ro.N/	discussion	2	3	9	50	529	0	50	0	1.00	146	383	5	13	0.28
654	鑄鉄		/ju.u-te.tu/	cast iron	2	4	10	16	176	0	13	3	1.00	58	118	2	5	0.33
655	夜学		/ja-ga.ku/	night school	2	3	10	87	1399	8	72	15	0.99	55	1352	1	28	0.04
656	手芸		/sju-ge.i/	fancywork	2	3	10	71	195	302	26	45	0.39	44	453	1	22	0.09
657	別冊		/be.Q-sa.tu/	supplementary volume	2	4	10	23	63	18	15	8	0.78	10	71	0	3	0.12
658	平凡		/he.i-bo.N/	mediocrity	2	4	10	38	444	9	35	3	0.98	121	332	2	11	0.27
659	邸宅	#	/te.i-ta.ku/	residence	2	4	10	7	359	0	7	0	1.00	326	33	2	2	0.91
660	筆記		/hi.Q-ki/	write-down	2	3	10	50	210	0	39	11	1.00	35	175	1	7	0.17
661	主翼		/sju-jo.ku/	main wing	2	3	10	47	728	0	47	0	1.00	10	718	0	17	0.01
662	紅茶		/ko.u-tja/	tea	2	3	10	17	16	113	14	3	0.12	10	119	0	3	0.08
663	新株		/si.N-ka.bu/	new stock	2	4	10	53	659	45	49	4	0.94	10	694	0	25	0.01
664	標識		/hjo.u-si.ki/	mark, sign	2	4	10	23	173	0	23	0	1.00	10	163	0	7	0.06
665	脱線		/da.Q-se.N/	sidetrack	2	4	10	65	309	26	56	9	0.92	10	325	0	21	0.03
666	給油		/kju.u-ju/	fueling	2	3	10	23	363	0	20	3	1.00	79	284	2	6	0.22
667	実演		/zi.tu-e.N/	demonstration	2	4	10	72	640	332	37	35	0.66	182	668	5	23	0.21
668	世相		/se-so.u/	social situation	2	3	10	40	590	424	32	8	0.58	47	967	2	13	0.05
669	墓参		/bo-sa.N/	visiting a grave	2	3	10	19	354	0	14	5	1.00	10	344	0	2	0.03
670	豚肉	#	/bu.ta-ni.ku/	pork	2	4	10	10	42	0	9	1	1.00	17	25	1	2	0.40
671	射撃		/sja-ge.ki/	shooting	2	3	10	27	204	0	23	4	1.00	123	81	2	8	0.60
672	鉄骨		/te.Q-ko.tu/	iron frame	2	4	10	37	154	49	30	7	0.76	136	67	3	3	0.67
673	消印		/ke.si-i.N/	postmark	2	4	10	30	40	207	9	21	0.16	10	237	0	10	0.04
674	打席		/da-se.ki/	at-bat	2	3	10	37	307	81	34	3	0.79	135	253	3	11	0.35
675	压迫		/a.Q-pa.ku/	oppression	2	4	10	16	60	19	12	4	0.76	79	0	5	0	1.00
676	襲撃		/sju.u-ge.ki/	attack	2	4	10	23	204	6	22	1	0.97	148	62	5	6	0.70
677	民衆		/mi.N-sju.u/	common people	2	4	10	28	322	0	27	1	1.00	124	198	4	10	0.39
678	職務		/sjo.ku-mu/	duties	2	3	10	50	1620	5	47	3	1.00	1141	484	9	20	0.70
679	談話		/da.N-wa/	talking	2	3	10	38	509	0	33	5	1.00	126	383	1	4	0.25
680	分担		/ta.N-ta.N/	assigning tasks	2	4	10	41	325	5	40	1	0.98	79	251	3	10	0.24
681	短縮		/ta.N-sju.ku/	shortening	2	4	10	26	123	21	25	1	0.85	31	113	1	5	0.22
682	借金		/sja.Q-ki.N/	debt	2	4	10	63	543	114	46	17	0.83	39	618	3	24	0.06
683	保存		/ho-zo.N/	preservation	2	3	10	35	553	34	27	8	0.94	119	468	6	11	0.20
684	採択		/sa.i-ta.ku/	adoption	2	4	10	15	138	0	15	0	1.00	122	16	3	2	0.88
685	風雲		/fu.u-u.N/	whirlwind	2	4	11	64	82	26	48	16	0.76	11	97	0	11	0.10
686	記名		/ki-me.i/	registration	2	3	11	65	616	8	56	9	0.99	64	560	3	12	0.10
687	手帳		/te-ga.ni/	casiness	2	3	11	58	321	62	44	14	0.84	30	353	1	16	0.08
688	特約		/to.ku-ja.ku/	special agreement	2	4	11	64	862	94	57	7	0.90	19	937	1	28	0.02
689	特設		/to.ku-se.tu/	purpose-built	2	4	11	51	1240	94	44	7	0.93	11	1323	0	29	0.01
690	必着		/hi.Q-ja.ku/	not later than	2	4	11	53	59	297	32	21	0.17	73	283	2	7	0.21
691	毛布		/mo.u-fu/	blanket	2	3	11	34	22	66	15	19	0.25	11	77	0	3	0.13
692	卓球		/ta.Q-kju.u/	ping-pong	2	4	11	24	246	0	19	5	1.00	11	235	0	5	0.04
693	北欧		/ho.ku-o.u/	North Europe	2	4	11	16	109	19	12	4	0.85	67	61	4	4	0.52
694	発明		/ha.tu-me.i/	invention	2	4	11	93	546	831	47	46	0.40	75	1302	2	33	0.05
695	学力		/ga.ku-fjo.ku/	academic ability	2	4	11	121	1448	410	98	23	0.78	293	1565	6	45	0.16
696	調節		/tjo.u-se.tu/	adjustment	2	4	11	36	478	163	33	3	0.75	79	562	1	12	0.12

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No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
697	入団	/nju-u-da:N/	joining a team	2	4	11	60	585	127	55	5	0.82	145	567	5	17	0.20
698	祝日	/sju.ku-zhi:tu/	public holiday	2	4	11	83	473	941	39	44	0.33	53	1361	4	31	0.04
699	県立	/ke.N-ri:tu/	prefectural government-run	2	4	11	38	440	6	34	4	0.99	51	395	1	16	0.11
700	港湾	# /ko.u-wa:N/	port	2	4	11	3	41	0	3	0	1.00	11	30	0	1	0.27
701	完了	/ka.N-rjo:u/	completion	2	4	11	17	442	0	17	0	1.00	86	356	2	3	0.19
702	座席	/za-se:ki/	seat	2	3	11	31	289	0	31	0	1.00	11	278	0	9	0.04
703	移住	/i-zju:u/	immigration	2	3	11	19	73	20	16	3	0.78	75	18	5	2	0.81
704	殺到	/sa.Q-to:u/	rush	2	4	11	14	26	36	4	10	0.42	11	51	0	3	0.18
705	任命	/ni.N-me:i/	appointment	2	4	11	43	239	5	41	2	0.98	21	223	1	9	0.09
706	評判	/hjo.u-ba:N/	credit	2	4	11	20	155	128	15	5	0.55	47	236	1	6	0.17
707	財務	/za.i-mu/	financial affairs	2	3	11	46	1622	0	46	0	1.00	100	1522	2	27	0.06
708	留学	/lju.u-ga:ku/	overseas education	2	4	11	57	1346	10	56	1	0.99	16	1340	1	26	0.01
709	活版	/ka.Q-pa:N/	printed matter	2	4	12	27	115	142	7	20	0.45	74	183	2	7	0.29
710	執事	/si:tu:zi/	butler	2	3	12	82	1191	182	66	16	0.87	12	1361	0	30	0.01
711	乳業	/nju.u-gjo:u/	dairy industry	2	4	12	69	2106	0	58	11	1.00	12	2094	0	24	0.01
712	便秘	/be.N-pi/	constipation	2	3	12	17	57	8	10	7	0.88	12	53	0	4	0.18
713	帝都	/te.i-to/	empire capital	2	3	12	12	103	0	12	0	1.00	103	0	2	0	1.00
714	直通	/tjo.ku-tu:u/	direct	2	4	12	53	771	29	34	19	0.96	96	704	4	11	0.12
715	炊事	/su.i-zi/	cooking	2	3	12	74	1179	143	64	10	0.89	81	1241	2	26	0.06
716	活性化	/ka.Q-se:i/	activation	2	4	12	56	259	275	42	14	0.49	47	487	2	12	0.09
717	新春	/si.N-sju:N/	new spring	2	4	12	63	678	46	54	6	0.94	43	718	3	26	0.06
718	同封	/do.u-fu:u/	enclosure	2	4	12	79	489	148	74	5	0.77	12	625	0	29	0.02
719	借款	/sja.Q-ka:N/	giving credit	2	4	12	14	30	40	4	10	0.43	31	39	2	3	0.44
720	式場	/si.ki-zjo:u/	ceremonial hall	2	4	12	57	849	599	31	26	0.59	56	1392	1	27	0.04
721	風俗	/fu.u-zo:ku/	public morals	2	4	12	57	82	16	51	6	0.84	12	86	0	10	0.12
722	風速	/fu.u-so:ku/	wind speed	2	4	12	60	140	16	52	8	0.90	21	135	1	13	0.13
723	冷却	/re.i-kja:ku/	cooling	2	4	12	30	132	0	26	4	1.00	92	40	3	5	0.70
724	水域	/su.i-iki/	water area	2	4	12	98	439	39	72	26	0.92	12	466	0	19	0.03
725	背広	/se-bi:ro/	suits	2	3	12	16	18	49	4	12	0.27	12	55	0	3	0.18
726	恋愛	/re.N-a:i/	love	2	4	12	22	12	29	19	3	0.29	41	0	1	0	1.00
727	団結	/da.N-ke:tu/	union	2	4	12	22	235	0	21	1	1.00	100	135	1	8	0.43
728	反撃	/ha.N-ge:ki/	counterattack	2	4	12	57	523	0	49	8	1.00	288	235	7	17	0.55
729	暗殺	/a.N-sa:tu/	assassination	2	4	12	44	52	17	43	1	0.75	12	57	0	3	0.17
730	老後	/ro.u-go/	post-retirement years	2	3	12	44	975	0	43	1	1.00	31	944	1	9	0.03
731	土俵	/do-hjo:u/	sumo ring	2	3	12	37	119	191	30	7	0.38	12	298	0	6	0.04
732	出現	/sju.tu-ge:N/	emersion	2	4	12	77	278	1183	21	56	0.19	625	836	4	28	0.43
733	出産	/sju.Q-sa:N/	birthing	2	4	12	107	1036	921	70	37	0.53	206	1751	1	42	0.11
734	主役	/sju-ja:ku/	central player	2	3	12	68	677	24	58	10	0.97	86	615	3	14	0.12
735	海軍	/ka.i-gu:N/	navy	2	4	12	50	520	0	46	4	1.00	68	452	4	10	0.13
736	選出	/se.N-sju:tu/	elect	2	4	12	59	742	91	49	10	0.89	354	479	5	12	0.42
737	拠点	/kjo-te:N/	lodgment	2	3	12	49	198	0	48	1	1.00	35	163	1	10	0.18



738	抑制	/jo.ku-se.i/	2	4	12	25	187	0	25	0	1.00	73	114	3	5	0.39
739	部会	/bu-ka.i/	2	3	12	57	1652	0	56	1	1.00	128	1524	2	24	0.08
740	予測	/jo-so.u/	2	3	12	26	652	0	26	0	1.00	136	516	4	9	0.21
741	達成	/ta.Q-se.i/	2	4	12	32	499	0	31	1	1.00	107	392	2	13	0.21
742	売却	/hai-i-ka.ku/	2	4	12	26	106	86	24	2	0.55	119	73	3	5	0.62
743	死去	/si-kjo/	2	2	12	41	203	42	40	1	0.83	186	59	6	3	0.76
744	優雅	/ju-u-ga/	2	3	13	22	844	0	21	1	1.00	13	831	0	6	0.02
745	博物	/ha.ku-bu.tu/	2	4	13	84	221	130	41	43	0.63	13	338	0	22	0.04
746	舶来	/ha.ku-ra.i/	2	4	13	31	278	122	29	2	0.70	13	387	0	8	0.03
747	婚礼	/ko.N-re.i/	2	4	13	24	34	0	23	1	1.00	29	5	1	1	0.85
748	減配	/ge.N-pa.i/	2	4	13	33	125	120	16	17	0.51	53	192	1	11	0.22
749	先着	/se.N-tja.ku/	2	4	13	86	293	36	67	19	0.89	29	282	1	16	0.09
750	測量	/so.ku-rjo.u/	2	4	13	36	82	0	35	1	1.00	36	46	2	2	0.44
751	果物	/ku.de-mo.ne/	2	4	13	85	63	265	29	55	0.19	36	292	3	20	0.11
752	外科	/ge-ka/	2	2	13	76	161	471	24	52	0.25	26	606	1	20	0.04
753	操縦	/so.u-zju.u/	2	4	13	6	41	0	5	1	1.00	28	13	1	1	0.68
754	続出	/zo.ku-sju.tu/	2	4	13	54	317	115	41	13	0.73	19	413	1	14	0.04
755	商売	/sjo.u-ba.i/	2	4	13	36	1135	27	32	4	0.98	480	682	6	11	0.41
756	摘発	/te.ki-ha.tu/	2	4	13	38	302	116	25	13	0.72	13	405	0	8	0.03
757	変動	/he.N-do.u/	2	4	13	73	1149	0	73	0	1.00	156	993	5	14	0.14
758	場面	/ba-me.N/	2	3	13	63	641	7	57	6	0.99	395	253	3	15	0.61
759	学則	/ga.ku-so.ku/	2	4	14	61	799	363	50	11	0.69	36	1126	1	27	0.03
760	悪徳	/a.ku-to-ku/	2	4	14	73	50	76	62	11	0.40	79	47	2	4	0.63
761	続落	/zo.ku-ra.ku/	2	4	14	35	75	108	27	8	0.41	14	169	0	9	0.08
762	快適	/ka.i-te.ki/	2	4	14	21	73	0	20	1	1.00	56	17	1	1	0.77
763	自筆	/ji-hi.tu/	2	3	14	109	1292	104	94	15	0.93	19	1377	1	30	0.01
764	健全	/ke.N-zc.N/	2	4	14	12	327	0	11	1	1.00	216	111	2	3	0.66
765	熱心	/ne.Q-si.N/	2	4	14	92	300	38	68	24	0.89	38	300	2	11	0.11
766	印鑑	/i.N-ka.N/	2	4	14	13	125	0	13	0	1.00	14	111	0	2	0.11
767	花束	/ha.na-ta.ba/	2	4	14	26	44	36	13	13	0.55	14	66	0	4	0.18
768	名物	/me.i-bu.tu/	2	4	14	128	465	153	78	50	0.75	65	553	3	31	0.11
769	運搬	/u.N-pa.N/	2	4	14	19	663	53	17	2	0.93	465	251	5	6	0.65
770	立体	/ri.Q-ta.i/	2	4	14	74	438	186	65	9	0.70	22	602	1	21	0.04
771	海水	/ka.i-su.i/	2	4	14	99	511	79	79	20	0.87	97	493	4	20	0.16
772	出品	/sju.Q-pi.N/	2	4	14	103	446	1439	49	54	0.24	697	1188	4	37	0.37
773	発電	/ha.tu-de.N/	2	4	14	83	452	770	42	41	0.37	22	1200	1	24	0.02
774	議題	/gi-da.i/	2	3	14	29	1104	0	29	0	1.00	762	342	5	8	0.69
775	燃料	/ne.N-rjo.u/	2	4	14	21	352	0	20	1	1.00	32	320	1	12	0.09
776	名譽	/me.i-jo/	2	3	14	52	282	47	43	9	0.86	14	315	0	14	0.04
777	喪主	/mo-sju/	2	2	14	27	97	33	15	12	0.75	14	116	0	5	0.11
778	純毛	/zju.N-mo.u/	2	4	15	25	35	0	23	2	1.00	15	20	0	3	0.43
779	地目	/eji-mo.ku/	2	3	15	117	936	468	66	51	0.67	15	1399	0	39	0.01
780	配本	/ha.i-ho.N/	2	4	15	60	1429	1009	50	10	0.59	23	2415	1	21	0.01
781	殺菌	/sa.Q-ki.N/	2	4	15	17	26	36	7	10	0.42	33	29	1	2	0.53
782	浴室	/jo.ku-si.tu/	2	4	15	19	140	0	19	0	1.00	28	112	1	5	0.20
783	食肉	/sjo.ku-mi.ku/	2	4	15	31	346	21	28	3	0.94	55	312	3	9	0.15

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No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
784	雜貨	/za.Q-ka/	general merchandise	2	3	15	44	104	23	27	17	0.82	50	77	1	4	0.39
785	適當	/te.ki-to.u/	propriety	2	4	15	46	347	133	45	1	0.72	37	443	3	14	0.08
786	喜劇	/ki-ge.ki/	comedy	2	3	15	17	89	33	15	2	0.73	83	39	3	3	0.68
787	筋肉	# /ki.N-ni.ku/	muscle	2	4	15	11	32	0	9	2	1.00	15	17	0	2	0.47
788	學術	/ga.ku-zju.tu/	academic field	2	4	15	63	1245	363	52	11	0.77	268	1340	10	20	0.17
789	告訴	/ko.ku-so/	accusation	2	3	15	14	88	0	14	0	1.00	51	37	2	3	0.58
790	社説	/sja-se.tu/	editorial article	2	3	15	42	1231	49	40	2	0.96	176	1104	1	10	0.14
791	追跡	/tu.i-se.ki/	chase	2	4	15	45	127	52	39	6	0.71	127	52	4	3	0.71
792	穀物	/ko.ku-mo.tu/	cereal	2	4	15	80	56	247	13	67	0.18	15	288	0	20	0.05
793	残業	/za.N-gjo.u/	overtime work	2	4	15	80	2128	101	71	9	0.95	116	2113	3	26	0.05
794	哲學	/te.tu-ga.ku/	philosophy	2	4	15	54	1338	0	54	0	1.00	15	1323	0	25	0.01
795	失業	/si.tu-gjo.u/	unemployment	2	4	15	83	2172	67	59	24	0.97	126	2113	2	25	0.06
796	買収	/ba.i-sju.u/	corruption	2	4	15	17	123	134	15	2	0.48	149	108	2	5	0.58
797	介入	/ka.i-nju.u/	interposition	2	4	15	31	273	0	31	0	1.00	30	243	1	10	0.11
798	逆転	/ga.ku-ic.N/	adverse change	2	4	15	31	346	0	24	7	1.00	15	331	0	5	0.04
799	若手	/wa.ka-te/	junior	2	3	15	98	413	557	52	46	0.43	171	799	4	24	0.18
800	導入	/do.u-nju.u/	introduction	2	4	15	32	273	0	30	2	1.00	21	252	1	10	0.08
801	雜役	/za.tu-e.ki/	fatigue duty	2	4	16	57	31	82	19	38	0.27	23	90	1	5	0.20
802	学芸	/ga.ku-ge.i/	arts and sciences	2	4	16	66	860	363	55	11	0.70	71	1152	3	29	0.06
803	清潔	/se.i-ke.tu/	cleanliness	2	4	16	29	76	70	23	6	0.52	16	130	0	6	0.11
804	紡績	/bo.u-se.ki/	spinning	2	4	16	7	148	0	6	1	1.00	16	132	0	4	0.11
805	婚約	/ko.N-ja.ku/	engagement	2	4	16	30	240	0	30	0	1.00	29	211	1	7	0.12
806	木曜	/mo.ku-jo.u/	Thursday	2	4	16	28	326	21	16	12	0.94	150	197	2	9	0.43
807	順調	/zju.N-jo.u/	working order	2	4	16	42	221	0	42	0	1.00	36	185	1	13	0.16
808	圧倒	/a.Q-to.u/	crush	2	4	16	18	37	33	15	3	0.53	26	44	1	3	0.37
809	空中	/ku.u-fju.u/	air	2	4	16	84	399	70	69	15	0.85	53	416	1	26	0.11
810	特許	/to.Q-kjo/	patent	2	3	16	44	196	646	9	35	0.23	156	686	1	22	0.19
811	悲劇	/hi-ge.ki/	tragedy	2	3	16	25	100	0	25	0	1.00	27	73	2	4	0.27
812	陸軍	/ri.ku-gu.N/	army	2	4	16	26	187	0	24	2	1.00	125	62	3	2	0.67
813	打線	/da-se.N/	battling order	2	3	16	60	405	81	57	3	0.83	141	345	4	20	0.29
814	秩序	/cji.tu-zjo/	cosmos, regularity	2	3	16	2	16	0	2	0	1.00	16	0	0	0	1.00
815	下旬	/ge-zju.N/	end	2	3	16	64	96	199	28	36	0.33	40	255	2	11	0.14
816	配慮	/ha.i-fjo/	care, attention	2	3	16	38	267	8	36	2	0.97	55	220	1	12	0.20
817	減税	/ge.N-ze.i/	tax cut	2	4	16	30	165	40	29	1	0.80	63	142	2	11	0.31
818	学割	/ga.ku-wa.ri/	discount for students	2	4	17	53	767	419	41	12	0.65	17	1169	0	28	0.01
819	序曲	/zjo-kjo.ku/	overture	2	3	17	23	179	0	22	1	1.00	17	162	0	7	0.09
820	庶務	/sjo-mu/	general affairs	2	2	17	38	1483	0	38	0	1.00	674	809	2	23	0.45
821	脱走	/da.Q-so.u/	getaway	2	4	17	38	62	26	29	9	0.70	39	49	3	5	0.44
822	額面	/ga.ku-me.N/	face	2	4	17	58	281	0	54	4	1.00	17	264	0	15	0.06
823	明確	/me.i-ka.ku/	unambiguity	2	4	17	34	225	104	23	11	0.68	60	269	2	9	0.18
824	稅務	/ze.i-mu/	tax service	2	3	17	41	1554	0	41	0	1.00	52	1502	3	26	0.03

825	着陸	/ʃja.ku-ri.ku/	2	4	17	30	109	46	23	7	0.70	44	111	2	7	0.28
826	出動	/ʃju.Q-ki.N/	2	4	17	112	1147	1183	56	56	0.49	480	1850	4	39	0.21
827	駐在	/ʃju.u-za.i/	2	4	17	23	386	0	23	0	1.00	29	357	1	7	0.08
828	国王	/ko.ku-o.u/	2	4	17	82	1306	445	61	21	0.75	35	1716	1	28	0.02
829	休日	/kjuu-zi.tu/	2	4	17	88	510	941	46	42	0.35	61	1390	4	33	0.04
830	妥協	/da-kjo.u/	2	3	17	4	39	0	4	0	1.00	24	15	1	2	0.62
831	保有	/ho-ju.u/	2	3	17	35	579	20	32	3	0.97	83	516	5	12	0.14
832	比率	/hi-ri.tu/	2	3	17	19	157	31	13	6	0.84	77	111	3	8	0.41
833	役割	/ʃja.ku-wa.ri/	2	4	17	12	115	56	10	2	0.67	17	154	0	6	0.10
834	魅惑	/mi-wa.ku/	2	3	18	9	81	0	9	0	1.00	55	26	1	2	0.68
835	親分	/o.ja-bu.N/	2	4	18	83	449	99	55	28	0.82	18	530	0	21	0.03
836	併殺	/he.i-satu/	2	4	18	26	59	0	25	1	1.00	18	41	0	3	0.31
837	勤勞	/ki.N-ro.u/	2	4	18	18	332	14	17	1	0.96	304	42	2	2	0.88
838	平年	/he.i-ne.N/	2	4	18	91	1299	53	83	8	0.96	148	1204	4	31	0.11
839	巨大	/kjo-da.i/	2	3	18	35	375	0	35	0	1.00	274	101	5	4	0.73
840	女王	/zjo.u-ou/	2	4	18	37	679	129	27	10	0.84	164	644	2	7	0.20
841	創立	/so.u-ri.tu/	2	4	18	46	496	6	41	5	0.99	72	430	4	17	0.14
842	院長	/i.N-tjo.u/	2	4	18	60	831	0	54	6	1.00	387	444	5	16	0.47
843	脱稅	/da.tu-ze.i/	2	4	18	38	130	55	23	15	0.70	18	167	0	16	0.10
844	認可	/ni.N-ka/	2	3	18	8	89	85	7	1	0.51	145	29	3	2	0.83
845	弁護	/be.N-go/	2	3	18	24	173	0	24	0	1.00	98	75	4	4	0.57
846	前半	/ze.N-ha.N/	2	4	18	63	402	55	48	15	0.88	42	415	1	19	0.09
847	会合	/ka.i-go.u/	2	4	18	67	1735	531	50	17	0.77	427	1839	3	24	0.19
848	就任	/sjuu-ni.N/	2	4	18	43	317	0	42	1	1.00	80	237	3	12	0.25
849	中級	/juu-kuju.u/	2	4	19	86	1550	74	78	8	0.95	74	1550	3	27	0.05
850	寶石	/ho.u-se.ki/	2	4	19	26	25	0	15	11	1.00	19	6	0	1	0.76
851	入居	/njuu-kjo/	2	3	19	64	415	163	56	8	0.72	56	522	1	20	0.10
852	追放	/tu.i-ho.u/	2	4	19	31	173	52	27	4	0.77	19	206	0	9	0.08
853	質疑	/si.tu-gi/	2	3	19	11	119	0	9	2	1.00	97	22	1	1	0.82
854	連載	/re.N-sa.i/	2	4	19	45	453	24	44	1	0.95	107	370	2	15	0.22
855	世話	/se-wa/	2	2	19	52	1064	0	47	5	1.00	19	1045	0	13	0.02
856	近所	/ki.N-zjo/	2	3	19	71	201	456	34	37	0.31	210	447	3	19	0.32
857	論文	/ro.N-bu.N/	2	4	19	79	156	49	70	9	0.76	37	168	2	10	0.18
858	說得	/se.Q-to.ku/	2	4	19	25	169	7	24	1	0.96	98	78	2	4	0.56
859	受注	/zju-tju.u/	2	3	19	27	148	219	25	2	0.40	153	214	1	7	0.42
860	献金	/ke.N-ki.N/	2	4	19	56	567	36	49	7	0.94	27	576	1	22	0.04
861	財源	/za.i-ge.N/	2	4	19	18	166	0	17	1	1.00	134	32	4	2	0.81
862	獲得	/ka.ku-to.ku/	2	4	19	19	89	8	17	2	0.92	19	78	0	4	0.20
863	明朗	/mei-ro.u/	2	4	20	32	202	104	21	11	0.66	37	269	1	9	0.12
864	楽天	/ra.ku-te.N/	2	4	20	36	20	153	21	15	0.12	27	146	1	3	0.16
865	熟練	/zju.ku-re.N/	2	4	20	22	68	0	21	1	1.00	62	6	1	1	0.91
866	肥料	/hi-fjo.u/	2	3	20	23	352	0	22	1	1.00	27	325	1	12	0.08
867	失点	/si.Q-te.N/	2	4	20	75	285	93	66	9	0.75	93	285	1	16	0.25
868	空軍	/ku.u-gu.N/	2	4	20	48	312	0	42	6	1.00	48	264	2	8	0.15
869	通達	/tu.u-ta.tu/	2	4	20	59	878	204	51	8	0.81	200	882	3	27	0.18
870	権力	/ke.N-rjo.ku/	2	4	20	83	791	47	69	14	0.94	177	661	7	22	0.21

(continued)

No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
871	特定	/to.ku-te.i/	attribution	2	4	20	87	1690	128	74	13	0.93	446	1372	8	41	0.25
872	独自	/do.ku-zi/	inimitableness	2	3	20	22	222	0	21	1	1.00	37	185	2	7	0.17
873	有能	/ju.u-no.u/	competent ability	2	4	21	57	511	7	52	5	0.99	79	439	5	18	0.15
874	物色	/bu.Q-sjo.ku/	hunt out	2	4	21	95	230	23	50	45	0.91	21	232	0	14	0.08
875	右翼	/u-jo.ku/	right wing	2	3	21	17	53	25	11	6	0.68	21	57	0	5	0.27
876	貯蓄	# /jo-cji.ku/	savings	2	3	21	8	42	0	7	1	1.00	42	0	2	0	1.00
877	財界	/za.i-ka.i/	business community	2	4	21	29	718	0	27	2	1.00	61	657	2	9	0.08
878	突破	/to.Q-pa/	breakthrough	2	3	21	27	29	42	14	13	0.41	35	36	2	3	0.49
879	著者	/jo-sja/	author	2	2	21	62	402	77	45	17	0.84	42	437	3	14	0.09
880	加入	/ka-nju.u/	join	2	3	21	47	357	0	47	0	1.00	56	301	1	13	0.16
881	支出	/si-sju.tu/	expense	2	3	21	60	623	7	52	8	0.99	21	609	0	21	0.03
882	戦略	/se.N-rja.ku/	strategy	2	4	21	61	414	18	60	1	0.96	250	182	5	8	0.58
883	座談	/za-da.N/	conversation	2	3	22	37	870	0	37	0	1.00	177	693	3	8	0.20
884	窯業	/jo.u-gjo.u/	pottery	2	4	22	58	2116	0	53	5	1.00	22	2094	0	24	0.01
885	三陸	/sa.N-ri.ku/	Sanriku, northern pacific coast in Japan	2	4	22	26	942	0	26	0	1.00	22	920	0	11	0.02
886	係員	/ka.ka.r-i.N/	attendant	2	5	22	46	1618	7	41	5	1.00	751	874	5	21	0.46
887	実業	/zi.tu-gjo.u/	business	2	4	22	111	2337	332	70	41	0.88	156	2513	2	42	0.06
888	連勝	/re.N-sjo.u/	consecutive wins	2	4	22	55	572	24	54	1	0.96	93	503	3	17	0.16
889	体力	/tai-rjo.ku/	physical strength	2	4	22	93	985	47	80	13	0.95	28	1004	1	33	0.03
890	人類	/zi.N-ru.i/	mankind	2	4	22	88	602	478	57	31	0.56	297	783	4	24	0.28
891	農村	/no.u-so.N/	farming village	2	4	22	32	329	0	32	0	1.00	274	55	7	4	0.83
892	打撃	/de-ge.ki/	bating	2	3	22	35	307	81	32	3	0.79	221	167	7	11	0.57
893	有力	/ju.u-rjo.ku/	important, influential	2	4	22	107	909	54	90	17	0.94	268	695	8	31	0.28
894	調印	/jo.u-i.N/	signing	2	4	22	34	421	163	28	6	0.72	22	562	0	11	0.04
895	専務	/se.N-mu/	executive managing director	2	3	22	51	1711	0	51	0	1.00	46	1665	1	31	0.03
896	欧米	/o.u-be.i/	Europe and the U.S.	2	4	22	18	146	0	10	8	1.00	60	86	2	4	0.41
897	合意	/go.u-i/	agreement	2	3	22	93	417	172	68	25	0.71	73	516	2	19	0.12
898	借地	/sja.ku-cji/	leased land	2	3	23	90	865	74	68	22	0.92	48	891	3	30	0.05
899	技能	/gt-no.u/	skill	2	3	23	31	662	0	31	0	1.00	366	296	4	9	0.55
900	通学	/tu-u-ga.ku/	commute	2	4	23	96	2106	197	90	6	0.91	201	2102	2	47	0.09
901	本質	/ho.N-si.tu/	essence	2	4	23	101	820	0	97	4	1.00	102	718	5	32	0.12
902	単純	/ta.N-zju.N/	simplicity	2	4	23	21	116	0	21	0	1.00	35	81	1	4	0.30
903	演劇	/e.N-ge.ki/	drama	2	4	23	22	321	0	21	1	1.00	246	75	7	3	0.77
904	窓口	/ma.do-gu.cji/	contact, window	2	4	23	34	111	46	19	15	0.71	23	134	0	8	0.15
905	到着	/to.u-tja.ku/	arrival	2	4	23	43	47	18	28	15	0.72	28	37	1	5	0.43
906	往復	/o.u-fu.ku/	round trip	2	4	24	13	113	0	12	1	1.00	24	89	0	1	0.21
907	答弁	/to.u-be.N/	answer, account	2	4	24	21	78	69	20	1	0.53	147	0	2	0	1.00
908	年内	/ne.N-na.i/	by the end of the year	2	4	24	78	1277	22	64	14	0.98	29	1270	1	26	0.02
909	実質	/zi.Q-si.tu/	substantiality	2	4	24	76	452	265	52	24	0.63	161	556	6	23	0.22
910	撮影	/sa.tu-e.i/	filming, shooting	2	4	24	13	24	7	8	5	0.77	24	7	0	1	0.77
911	認識	/ni.N-si.ki/	acknowledgment	2	4	24	18	172	85	17	1	0.67	160	97	3	5	0.62

912	設立	/se-tu-ri-tu/	2	4	24	42	587	175	33	9	0.77	96	666	3	18	0.13
913	初任	/sjo-mi.N/	2	3	25	77	354	75	57	20	0.83	25	404	0	23	0.06
914	薬局	/ja-Q.kjo.ku/	2	4	25	22	161	34	11	11	0.83	56	139	2	5	0.29
915	藥品	/ja.ku-hi.N/	2	4	25	45	535	45	29	16	0.92	59	521	2	12	0.10
916	血圧	/ke-tu-atu/	2	4	25	33	101	0	19	14	1.00	45	56	1	4	0.45
917	在庫	/za-i-ko/	2	3	25	28	234	0	28	0	1.00	25	209	0	10	0.11
918	石炭	/se-ki-ta.N/	2	4	25	33	89	19	20	13	0.82	89	19	1	2	0.82
919	財産	/za-i-sa.N/	2	4	25	48	747	0	41	7	1.00	73	674	3	16	0.10
920	人物	/zi.N-bu.tu/	2	4	25	148	665	584	76	72	0.53	306	943	5	39	0.24
921	压力	/a-tu-fjo.ku/	2	4	25	82	726	73	61	21	0.91	40	759	2	26	0.05
922	今晚	/ko.N-ba.N/	2	4	26	28	526	0	24	4	1.00	41	485	1	11	0.08
923	下水	/ge-su.i/	2	3	26	126	331	138	75	51	0.71	62	407	1	24	0.13
924	集金	/sju-u-ki.N/	2	4	26	68	671	74	60	8	0.90	80	665	1	28	0.11
925	住宅	/sja-ta.ku/	2	3	26	18	1360	0	18	0	1.00	296	1064	1	10	0.22
926	洋服	/jo-u-fu.ku/	2	4	26	51	243	0	41	10	1.00	158	85	6	8	0.65
927	冷凍	/re-i-to.u/	2	4	26	18	100	0	14	4	1.00	92	8	3	1	0.92
928	主題	/sju-da.i/	2	3	26	61	1429	0	61	0	1.00	73	1356	2	17	0.05
929	全般	/ze.N-pa.N/	2	4	26	50	861	36	46	4	0.96	385	512	4	14	0.43
930	育成	/i.ku-se.i/	2	4	26	32	483	5	30	2	0.99	94	394	4	13	0.19
931	運賃	/u.N-cej.N/	2	4	26	25	672	53	23	2	0.93	26	699	0	12	0.04
932	合計	/go.u-ke.i/	2	4	26	58	408	172	33	25	0.70	44	536	2	16	0.08
933	若者	/wa-ka-mo.mo/	2	4	26	76	162	572	18	58	0.22	171	563	4	16	0.23
934	打点	/da-te.N/	2	3	27	64	350	81	61	3	0.81	168	263	4	17	0.39
935	正面	/sjo-u-me.N/	2	4	27	98	392	168	60	38	0.70	27	533	0	30	0.05
936	活発	/ka-Q-pa.tu/	2	4	28	47	135	438	16	31	0.24	35	538	1	13	0.06
937	直営	/jo.ku-e.i/	2	4	28	53	405	29	35	18	0.93	177	257	2	14	0.41
938	巡查	/zju.N-sa/	2	3	28	19	480	6	18	1	0.99	105	381	2	7	0.22
939	所在	/sjo-za.i/	2	3	28	42	453	0	42	0	1.00	28	425	0	11	0.06
940	品目	/hi.N-mo.ku/	2	4	28	76	258	176	38	38	0.59	61	373	3	12	0.14
941	貨物	/ka-mo.tu/	2	3	28	79	56	247	12	67	0.18	35	268	1	19	0.12
942	補助	/ho-zjo/	2	2	28	26	187	8	22	4	0.96	127	68	3	6	0.65
943	農民	/no.u-mi.N/	2	4	28	52	821	199	51	1	0.80	212	808	6	12	0.21
944	法律	/ho.u-ri.tu/	2	4	28	46	179	0	42	4	1.00	116	63	6	4	0.65
945	与党	/jo-to.u/	2	3	28	10	125	0	10	0	1.00	103	22	2	1	0.82
946	朗読	/ro.u-do.ku/	2	4	29	26	29	0	26	0	1.00	29	0	0	0	1.00
947	討論	/to.u-ro.N/	2	4	29	46	259	0	43	3	1.00	160	99	7	4	0.62
948	教諭	/kjo.u-u/	2	3	29	41	834	31	40	1	0.96	636	229	7	8	0.74
949	黒人	/ko.ku-ji.N/	2	4	29	147	773	270	81	66	0.74	64	979	1	35	0.06
950	読者	/do.ku-sjo/	2	3	29	65	412	147	43	22	0.74	82	477	2	17	0.15
951	決意	/ke-tu-i/	2	3	29	72	285	275	59	13	0.51	215	345	3	17	0.38
952	父親	/cji-cji-o.ja/	2	4	29	17	81	54	7	10	0.60	75	60	3	2	0.56
953	複雑	/fu.ku-za.tu/	2	4	30	16	38	0	16	0	1.00	38	0	1	0	1.00
954	理論	/ri-ro.N/	2	3	30	55	548	0	55	0	1.00	30	518	0	19	0.05
955	増大	/zo.u-da.i/	2	4	30	51	430	14	49	2	0.97	234	210	9	11	0.53
956	漁業	/gjo-gjo.u/	2	3	30	72	2151	0	63	9	1.00	212	1939	5	22	0.10
957	軍縮	/gu.N-sju.ku/	2	4	30	40	169	0	40	0	1.00	30	139	0	6	0.18

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No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
958	掲載	# /ke.i-sa.i/	posting	2	4	30	8	58	0	8	0	1.00	39	19	1	1	0.67
959	記入	/ki-nju.u/	fill-in	2	3	31	40	708	0	40	0	1.00	184	524	3	15	0.26
960	造船	/zo.u-se.N/	shipbuilding	2	4	31	37	134	0	31	6	1.00	31	103	0	7	0.23
961	予約	/jo-jaku/	booking, reservation	2	3	31	45	792	0	45	0	1.00	193	599	1	17	0.24
962	国防	/ko.ku-bo.u/	national defense	2	4	31	79	1368	445	61	18	0.75	31	1782	0	30	0.02
963	脚本	/kja.ku-ho.N/	script, playbook	2	4	32	41	1227	1001	29	12	0.55	32	2196	0	12	0.01
964	電力	/de.N-jo.ku/	electricity	2	4	32	105	1778	47	93	12	0.97	333	1492	2	40	0.18
965	評論	/hjo.u-ro.N/	criticism	2	4	33	51	258	0	51	0	1.00	134	124	5	8	0.52
966	修理	/sjuu-ri/	repair	2	3	33	53	828	8	50	3	0.99	79	757	1	20	0.09
967	診断	/si.N-da.N/	diagnosis	2	4	33	28	161	0	27	1	1.00	102	59	2	5	0.63
968	義務	/gr-mu/	duty	2	2	33	56	1483	0	56	0	1.00	63	1420	1	24	0.04
969	入院	/nju.u-i.N/	hospitalization	2	4	33	55	708	127	52	3	0.85	163	672	1	23	0.20
970	緊急	/ki.N-kju.u/	emergency	2	4	33	18	174	0	18	0	1.00	114	60	5	2	0.66
971	住民	/zju.u-mi.N/	inhabitant	2	4	33	34	884	241	32	2	0.79	570	555	6	7	0.51
972	能率	/no.u-ri.tu/	efficiency	2	4	34	18	176	0	14	4	1.00	49	127	1	7	0.28
973	運送	/u.N-so.u/	transportation	2	4	34	34	1091	53	32	2	0.95	390	754	7	9	0.34
974	期日	/ki-zi.tu/	due date	2	3	34	74	671	924	35	39	0.42	132	1463	2	34	0.08
975	文芸	/bu.N-ge.i/	creative writing	2	4	34	61	633	127	54	7	0.83	165	595	4	21	0.22
976	品質	/hi.N-si.tu/	quality	2	4	34	34	178	9	32	2	0.95	49	138	1	10	0.26
977	職場	/jo.ku-ba/	workplace	2	3	34	67	718	854	36	31	0.46	87	1485	2	31	0.06
978	労務	/ro.u-mu/	labor service	2	3	35	45	1661	0	45	0	1.00	583	1078	4	23	0.35
979	安値	/ja.su-ne/	low price	2	3	35	32	139	329	7	25	0.30	88	380	1	7	0.19
980	不明	/fu-me.i/	unclear	2	3	35	112	1450	0	108	4	1.00	41	1409	1	34	0.03
981	予防	/jo-bo.u/	prevention	2	3	35	26	672	0	26	0	1.00	35	637	0	13	0.05
982	頭金	/a.ta.ma-ki.N/	down payment	2	5	36	64	603	48	49	15	0.93	156	495	3	22	0.24
983	配達	/ha.i-ta.tu/	delivery	2	4	36	40	278	31	36	4	0.90	58	251	2	15	0.19
984	預金	/jo-ki.N/	deposit with banks	2	3	36	52	523	74	44	8	0.88	45	552	1	21	0.08
985	部品	/bu-hi.N/	part	2	3	36	49	759	28	36	13	0.96	121	666	1	17	0.15
986	株価	/ka.bu-ka/	stock price	2	3	36	22	794	0	22	0	1.00	421	373	1	11	0.53
987	所得	/sjo-to.ku/	income	2	3	36	43	191	8	42	1	0.96	36	163	0	10	0.18
988	表明	/hjo.u-me.i/	manifestation	2	4	36	49	508	6	40	9	0.99	105	409	2	19	0.20
989	暖房	/da.N-bo.u/	heating	2	4	37	11	97	0	9	2	1.00	37	60	0	4	0.38
990	青春	/se.i-sju.N/	adolescence	2	4	37	32	152	41	17	15	0.79	101	92	1	9	0.52
991	漁船	/gjo-se.N/	fishing boat	2	3	37	39	158	0	30	9	1.00	67	91	1	7	0.42
992	主任	/sju-mi.N/	chief	2	3	37	76	886	0	74	2	1.00	47	839	2	24	0.05
993	銘柄	/me.i-ga.ra/	brand	2	4	37	18	43	0	17	1	1.00	37	6	0	1	0.86
994	魅力	/mi-jo.ku/	attraction	2	3	37	74	744	47	62	12	0.94	55	736	1	26	0.07
995	税金	/ze.i-ki.N/	tax	2	4	37	56	624	30	50	6	0.95	108	546	3	24	0.17
996	全員	/ze.N-i.N/	everyone	2	4	37	84	2223	36	83	1	0.98	164	2095	3	38	0.07
997	失敗	/si.Q-pa.i/	failure	2	4	38	38	74	122	22	16	0.38	140	56	2	5	0.71
998	結論	/ke.tu-ro.N/	conclusion	2	4	38	65	211	411	43	22	0.34	236	386	2	18	0.38

999	決議	/ke.tu-gi/	2	3	38	46	863	275	33	13	0.76	444	694	5	19	0.39
1000	判決	/ha.N-ke.tu/	2	4	38	23	393	0	23	0	1.00	127	266	4	9	0.32
1001	出身	/sju.Q-si.N/	2	4	39	102	542	928	65	37	0.37	39	1431	0	33	0.03
1002	対立	/ta.i-ri.tu/	2	4	39	63	788	6	57	6	0.99	127	667	4	23	0.16
1003	都立	/to-ri.tu/	2	3	40	42	691	21	35	7	0.97	51	661	1	21	0.07
1004	大陸	/ta.i-ri.ku/	2	4	40	137	793	1087	78	59	0.42	46	1834	1	46	0.02
1005	売店	/ba.i-te.N/	2	4	41	27	395	86	22	5	0.82	226	255	4	6	0.47
1006	路線	/ro-se.N/	2	3	41	48	272	0	48	0	1.00	51	221	1	14	0.19
1007	改革	/ka.i-ka.ku/	2	4	41	33	304	17	32	1	0.95	273	48	6	6	0.85
1008	最適	/sa.i-te.ki/	2	4	42	23	729	61	21	2	0.92	304	486	4	10	0.38
1009	練習	/re.N-sju.tu/	2	4	42	22	153	0	20	2	1.00	79	74	3	5	0.52
1010	競馬	/ke.i-ba/	2	3	43	35	67	103	21	14	0.39	100	70	1	5	0.59
1011	主人	/sju-zi.N/	2	3	43	171	1400	227	117	54	0.86	43	1584	0	48	0.03
1012	職業	/sjo.ku-gjo.u/	2	4	43	71	2204	5	62	9	1.00	231	1978	6	22	0.10
1013	目的	/mo.ku-te.ki/	2	4	43	32	129	16	21	11	0.89	107	38	1	5	0.74
1014	国語	/ko.ku-go/	2	3	44	116	1603	445	98	18	0.78	60	1988	2	32	0.03
1015	演説	/e.N-ze.tu/	2	4	44	43	255	224	11	32	0.53	49	430	1	9	0.10
1016	決算	/ke.Q-sa.N/	2	4	45	43	574	183	33	10	0.76	55	702	2	20	0.07
1017	将軍	/sjo.u-gu.N/	2	4	46	24	294	0	24	0	1.00	53	241	1	7	0.18
1018	人民	/zi.N-mi.N/	2	4	46	98	988	677	66	32	0.59	776	889	8	25	0.47
1019	平日	/he.i-zi.tu/	2	4	47	106	863	933	64	42	0.48	276	1520	1	44	0.15
1020	出発	/sju.Q-pa.tu/	2	4	47	105	501	1223	50	55	0.29	263	1461	2	35	0.15
1021	提出	/te.i-sju.tu/	2	4	47	56	476	7	48	8	0.99	118	365	2	15	0.24
1022	中卒	/ju.u-so.tu/	2	4	48	79	1406	74	71	8	0.95	48	1432	0	28	0.03
1023	爆撃	/ba.ku-ge.ki/	2	4	48	30	292	0	30	0	1.00	248	44	7	5	0.85
1024	雑誌	/za.Q-si/	2	3	48	35	77	23	18	17	0.77	48	52	0	4	0.48
1025	契約	/ke.i-ja.ku/	2	4	49	29	232	0	27	2	1.00	72	160	2	6	0.31
1026	歩合	/bu-a.i/	2	3	50	51	501	346	11	40	0.59	60	787	1	19	0.07
1027	電停	/de.N-te.i/	2	4	51	35	1149	0	35	0	1.00	51	1098	0	18	0.04
1028	本店	/ho.N-te.N/	2	4	51	92	1010	0	87	5	1.00	306	704	3	32	0.30
1029	民間	/mi.N-ka.N/	2	4	51	55	1100	258	35	20	0.81	80	1278	3	26	0.06
1030	確認	/ka.ku-mi.N/	2	4	51	24	249	10	21	3	0.96	83	176	1	7	0.32
1031	母親	/ha.ha-o-ja/	2	4	52	25	110	42	8	17	0.72	89	63	3	3	0.59
1032	判断	/ha.N-da.N/	2	4	52	34	213	0	34	0	1.00	136	77	3	7	0.64
1033	国内	/ko.ku-na.i/	2	4	53	104	1807	456	81	23	0.80	98	2165	2	42	0.04
1034	本格	/ho.N-ka.ku/	2	4	54	99	1095	0	97	2	1.00	66	1029	2	33	0.06
1035	民主	/mi.N-sju/	2	3	54	43	302	28	33	10	0.92	64	266	1	14	0.19
1036	単位	/ta.N-i/	2	3	54	50	199	0	49	1	1.00	54	145	0	12	0.27
1037	料金	/jo.u-ki.N/	2	4	54	54	625	74	47	7	0.89	167	532	3	21	0.24
1038	格安	/ka.ku-ja.su/	2	4	55	15	68	107	7	8	0.39	55	120	0	5	0.31
1039	演出	/e.N-sju.tu/	2	4	56	56	510	7	48	8	0.99	79	438	1	16	0.15
1040	本塁	/ho.N-ru.i/	2	4	57	85	837	0	83	2	1.00	90	747	1	33	0.11
1041	合併	/ga.Q-pe.i/	2	4	57	38	123	249	11	27	0.33	95	277	1	11	0.26
1042	連続	/re.N-zo.ku/	2	4	58	49	469	24	48	1	0.95	158	335	6	15	0.32
1043	材料	/za.i-fjo.u/	2	4	60	20	352	0	20	0	1.00	78	274	1	12	0.22
1044	組織	/so-si.ki/	2	3	60	10	60	160	2	8	0.27	198	22	2	3	0.90

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No.	Item	Pronunciation	English translation	Len	Morae	Freq.	N	O-P relationship				O-S relationship					
								PF_F	PE_F	PF_N	PE_N	O-P Index	SF_F	SE_F	SF_N	SE_N	O-S Index
1045	大幅	/o-ha-ba/	wide range	2	4	61	141	389	1432	38	103	0.21	114	1707	4	40	0.06
1046	旅館	/jo-ka.N/	Japanese-style inn	2	3	62	19	407	0	15	4	1.00	62	345	0	8	0.15
1047	国鉄	/ko-ku-te.tu/	national railway	2	4	62	83	1381	445	65	18	0.76	261	1565	1	32	0.14
1048	積極	/se-Q-kjo.ku/	active, positive	2	4	65	19	93	26	9	10	0.78	65	54	0	5	0.55
1049	宿舍	/sju.ku-sja/	lodgment	2	3	65	22	95	7	16	6	0.93	65	37	0	4	0.64
1050	攻撃	/ko.u-ge.ki/	attack	2	4	65	25	230	13	24	1	0.95	207	36	8	5	0.85
1051	月収	/ge.Q-sju.u/	monthly income	2	4	67	37	230	18	26	11	0.93	150	98	2	10	0.60
1052	二塁	/ni-nu.i/	second base	2	3	68	21	1412	0	17	4	1.00	101	1311	1	7	0.07
1053	実力	/zi.tu-rjo.ku/	raw power	2	4	68	126	923	379	79	47	0.71	162	1140	3	44	0.12
1054	書類	/do.ku-ro.tu/	communication materials	2	3	68	47	270	78	44	3	0.78	89	259	2	12	0.26
1055	独立	/bo.u-e.i/	independence	2	4	69	55	588	6	49	6	0.99	81	513	2	23	0.14
1056	防衛	/fu.ta.N/	defense	2	4	70	31	205	43	29	2	0.83	212	36	5	4	0.85
1057	負担	#	burden	2	3	71	7	105	42	5	2	0.71	93	54	1	3	0.63
1058	助手	/zjo-sju/	assistant	2	2	72	91	371	340	37	54	0.52	84	627	1	24	0.12
1059	警察	/ke.i-sa.tu/	police department	2	4	72	28	317	0	28	0	1.00	196	121	3	7	0.62
1060	体育	/tai.i-ku/	gymnastics	2	4	73	32	634	0	31	1	1.00	127	507	1	10	0.20
1061	具体	/gu.ta.i/	concrete	2	3	73	59	416	0	59	0	1.00	73	343	0	16	0.18
1062	輸入	/ju-nju.u/	import	2	3	73	32	449	0	32	0	1.00	73	376	0	13	0.16
1063	入門	/nju.u-mo.N/	initiation, introduction	2	4	74	60	571	127	57	3	0.82	195	503	2	16	0.28
1064	注目	/ju.u-mo.ku/	attention	2	4	74	76	328	174	39	37	0.65	145	357	2	14	0.29
1065	芸術	/ge.i-zju.tu/	art	2	4	76	24	600	0	24	0	1.00	219	381	2	5	0.37
1066	知事	/cji-zi/	governor	2	2	76	89	1235	299	78	11	0.81	186	1348	1	32	0.12
1067	即決	/so.Q-ke.tu/	immediate decision	2	4	78	28	334	33	19	9	0.91	98	269	2	12	0.27
1068	革命	/ka.ku-me.i/	revolution	2	4	80	39	235	5	34	5	0.98	90	150	1	8	0.38
1069	日給	/ni-Q-kjuu/	daily wage	2	4	84	58	1653	1238	34	24	0.57	121	2770	3	24	0.04
1070	作曲	/sa.Q-kjo.ku/	composition	2	4	84	37	234	500	16	21	0.32	211	523	6	10	0.29
1071	入学	/nju.u-ga.ku/	admission, being accepted into school	2	4	84	95	1616	127	92	3	0.93	295	1448	9	30	0.17
1072	學歷	/ga.ku-re.ki/	academic record	2	4	85	58	983	363	47	11	0.73	848	498	4	23	0.63
1073	印刷	#	print	2	4	87	11	125	0	11	0	1.00	87	38	0	2	0.70
1074	名画	/me.i-ga/	famous painting	2	3	88	69	749	410	54	15	0.65	126	1033	2	20	0.11
1075	輸出	/ju-sju.tu/	export	2	3	88	47	472	7	40	7	0.99	176	303	1	12	0.37
1076	運輸	/ju-so.u/	transportation	2	3	92	22	670	53	20	2	0.93	193	530	4	8	0.27
1077	免許	/me.N-kjo/	license	2	3	102	14	138	0	11	3	1.00	123	15	2	2	0.89
1078	電子	/de.N-si/	electron	2	3	102	99	1946	102	73	26	0.95	515	1533	4	32	0.25
1079	喫茶	/ki-Q-sa/	coffee shop	2	3	107	13	107	18	1	12	0.86	107	18	0	2	0.86
1080	責任	/se.ki-ni.N/	responsibility	2	4	107	36	253	0	35	1	1.00	107	146	0	12	0.42
1081	特派	/to.ku-ha/	sending for a special purpose	2	3	108	53	666	110	40	13	0.86	108	668	0	26	0.14
1082	理事	/ri-zi/	commissioner	2	2	110	86	1442	143	78	8	0.91	138	1447	1	36	0.09
1083	物価	/bu.Q-ka/	price of commodity	2	3	111	42	452	22	27	15	0.95	216	258	2	15	0.46
1084	食品	/sjo.ku-hi.N/	food	2	4	112	55	705	49	39	16	0.94	296	458	4	16	0.39
1085	歓迎	/ka.N-ge.i/	welcome	2	4	120	5	120	0	5	0	1.00	120	0	0	0	1.00



1086	海外	/ka.i-ga.i/	2	4	130	77	533	0	73	4	1.00	141	392	2	19	0.26
1087	急募	/kju.u-bo/	2	3	132	31	340	46	29	2	0.88	307	79	3	6	0.80
1088	業務	/gjo.u-mu/	2	3	133	41	1715	0	40	1	1.00	452	1263	6	22	0.26
1089	金融	/ki.N-ju.u/	2	4	133	44	340	5	32	12	0.99	196	149	3	6	0.57
1090	作品	/sa.ku-hi.N/	2	4	134	55	653	406	36	19	0.62	435	624	5	17	0.41
1091	店員	/te.N-i.N/	2	4	137	47	1687	0	44	3	1.00	159	1528	1	25	0.09
1092	決定	/ke.Q-te.i/	2	4	143	66	1196	109	55	11	0.92	313	992	11	27	0.24
1093	本社	/ho.N-sja/	2	3	147	97	1559	13	94	3	0.99	986	586	5	34	0.63
1094	発売	/ha.tu-ba.i/	2	4	148	75	605	757	33	42	0.44	498	864	2	28	0.37
1095	通知	/tu.u-gji/	2	3	154	73	805	204	65	8	0.80	411	598	6	22	0.41
1096	予定	/jo-te.i/	2	3	162	68	1498	34	62	6	0.98	193	1339	1	37	0.13
1097	通勤	/tu.u-ki.N/	2	4	172	56	893	197	50	6	0.82	244	846	4	27	0.22
1098	昨年	/sa.ku-me.N/	2	4	209	58	889	44	52	6	0.95	276	657	3	20	0.30
1099	履歴	/ri-re.ki/	2	3	244	11	335	0	11	0	1.00	335	0	2	0	1.00
1100	全国	/ze.N-ko.ku/	2	4	262	110	1511	452	94	16	0.77	338	1625	2	41	0.17
1101	販売	/ha.N-ba.i/	2	4	269	14	474	27	12	2	0.95	489	12	6	2	0.98
1102	勤務	/ki.N-mu/	2	3	272	44	1495	14	43	1	0.99	513	996	7	19	0.34
1103	発表	/ha.Q-pjo.u/	2	4	286	74	724	695	35	39	0.51	359	1060	2	23	0.25
1104	技術	/gi-zju.tu/	2	3	318	23	567	0	23	0	1.00	434	133	4	4	0.77
1105	面談	/me.N-daa.N/	2	4	370	48	1358	7	45	3	0.99	1265	100	6	7	0.93
1106	株式	/ka.bu-si.ki/	2	4	385	32	628	0	32	0	1.00	441	187	2	6	0.70
1107	建設	/ke.N-se.tu/	2	4	388	23	752	29	18	5	0.96	554	227	5	8	0.71
1108	交通	/ko.u-tu.u/	2	4	415	38	905	0	39	1	1.00	415	490	0	14	0.46
1109	営業	/e.i-gjo.u/	2	4	428	64	2094	6	56	8	1.00	568	1532	3	21	0.27
1110	面接	/me.N-se.tu/	2	4	515	29	1038	7	26	3	0.99	900	145	2	7	0.86
1111	優遇	/ju.u-gu.u/	2	4	657	27	1087	0	26	1	1.00	929	158	3	4	0.85
1112	風土	/fu.u-do/	2	3	11	63	113	16	53	10	0.88	52	77	4	9	0.40
1113	実務	/zi.tu-mu/	2	3	13	90	1792	332	55	35	0.84	472	1589	7	38	0.23
1114	物質	/bu.Q-si.tu/	2	4	8	46	310	22	29	17	0.93	8	324	0	15	0.02

Asterisks (\*) indicate that the word had no orthographic neighbor listed in the National Language Research Institute (1970) frequency norms. These words were thus considered as words with unique spelling patterns. When the numbers of phonological friends and enemies are added, they should equal the orthographic neighborhood size. When the numbers of semantic friends and enemies are added, however, the result is sometimes smaller than the orthographic neighborhood size, because neighbors were omitted if they were not listed in the National Language Research Institute (1970) norms, for the computation of O-S consistency indices. *Number signs* (#) indicate the 38 katakana and 38 kanji words that were selected for the ANOVAs due to the fact that their word frequencies and orthographic neighborhood sizes were equated as much as possible

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