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Language Constrains Poetry

Raimundo Cox-Casals

McGill Writing Centre, McGill University

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Professor Richard Cooper

Abstract

This paper delves into the relationship between prosody and poetry, focusing on the constraints imposed on the haiku by the phonological structure of Japanese and contrasting with the poetic meters that English accommodates. The hypothesis posited is that the phonology of the two languages governs the poetic meters each can support, with metrical poetry offering insight into suprasegmental structures.

Haiku, as a poetic form, has transcended its Japanese origins to become familiar in English-speaking contexts. Through a review of past research on Japanese autosegmental phonology, including syllable structure, moraic theory, and pitch accent, as well as linguistic analyses of poetry and song in both languages, the paper presents an autosegmental model most fit for representing poetic meter as an artistically driven extension of prose. This formal model proposes an additional rhythm tier to autosegmental and metrical phonology whose hierarchical position is determined by individual languages. The rhythm tier is motivated by poetic meter but is taken to be rooted in prose. Finally, the added tier explains the debated relationship between syllables and moras in Japanese.

The unviability of the haiku form in English is then used to reveal how its structure differs from Japanese, showing that attempting to replicate the haiku's metric in English proves difficult due to the difference in placement of the rhythm tier of both languages. Importantly, the study does not aim to discourage cross-language poetic adaptation but seeks to objectively contrast English and Japanese phonology through evidence from poetic composition. By employing linguistic theory, the paper contributes to a deeper understanding of the direct influence of language-specific elements on poetry as numerous linguists have speculated in the past.

Keywords: phonology, metrical poetry, haiku, prosody, syllable, mora, stress, pitch accent.

1 Introduction

The term "poetic language" denotes a form of writing or speaking deeply rooted in the natural cadence of human speech and the artistic manipulation of language. Poets will repeat word-final syllables in a technique called rhyming and arrange a common consonant sound at the beginnings of adjacent words in a method named alliteration (Dresher & Friedberg, 2006). Amid these artistic expressions, one aspect of poetry stands out for its special connection to prosody and music – meter. Meter involves the allocation of rhythmic beats, sometimes perceptually strong or weak, to prosodic units within a language. Notable examples include William Shakespeare's iambic pentameter, where stressed and unstressed syllables are set to the rhythm of a template (see §3.2), as well as the beloved Japanese poem, the haiku. Because such vastly different styles of meter were developed by different cultures in different languages, the intriguing question arises: does the language in which a poetic form originates condition the meter that a poet may apply? In this paper, I hypothesize that this is the case. The inherent structure of a language governs the poetic meters that a language can accommodate, and by extension, the meters that are possible in a specific language serve to understand the structure of such language. This has been posited in the past by Halle & Keyser (1971), Kiparsky (1975), and others. My objective is to demonstrate that the haiku, as a poetic form, serves as evidence for the phonological structure of Japanese, and conversely, highlights the contrast with English by illustrating how a haiku cannot be achieved in the latter.

In the Western world, haiku has become a familiar poetic form to elementary school teachers and students. Originating in ancient Japan and refined by the renowned poets Bashō, Buson, Issa, and Shiki,[1] these simple poems have gained popularity in the anglophone community. Adapting the original metric is necessary to compensate for the difference in prosodic structure between English and Japanese. Typically, transferring a haiku and using its metrical template to compose poems in English proves challenging and has been the subject of much debate. Attempts to compose a parallel version either fail to preserve the essence and content of the original Japanese poem or create deficiencies in English prosody, making it nearly, if not fully impossible to replicate a haiku in English. While variation and creative liberty exists in the length and metre of haikus both in English and Japanese (Henderson, 1967, p. 13-35), this essay will focus strictly on the traditional 5-7-5 form for consistency and analytical simplicity. Massive variation in phonology exists between regional varieties of Japanese, hence for reduction of investigation, Tokyo "standard" Japanese (hereafter referred to as just Japanese) will be the only dialect under examination when looking at recitations of haikus. Lastly, artistic expression is always free and can bring individuals joy in any format. Rather than critiquing the authenticity of the art form, the purpose of this paper is to use linguistic theory to inspect poetry in the two languages and identify the linguistic features that regulate it.

Though many language-internal systems like syntax and freedom in word order can also constrain poetry (Kiparsky, 1975), the intention here is to observe the role of phonology. I will review the roles of the syllable, mora, and pitch accent system, showing how these elements interact in Japanese prose and the context of haiku. A proposed variation on an

[1] This paper will follow the Japanese tradition of referring to renowned poets by their first names only. Since Japanese surnames go before the given name, Matsuo Bashō will be called Bashō.

autosegmental model will then be introduced for representing the skeleton of a haiku and its phonological components. This model will contrast with English to demonstrate how the differences between the two languages condition the types of poetry that are viable in either language.

2 Background

2.1 What is a haiku?

Haikus originated in the 17th century, during the Edo period in modern-day Japan. They are generally taught in anglophone schools as a short poem of three lines, each consisting of a different number of syllables (σ). The first line is 5σ, the second line is 7σ, and the third line is 5σ, all adding up to a total of 17σ. They must contain at least one word which refers to a season (or an element of nature in some versions). Finally, they must depict a specific point in time characterized by an emotion felt by the writer and transmitted to the reader. This is how Cheney (2002) teaches his students. Yet, the traditional Japanese poem is counted with an orthographic unit called *onji,* meaning 'sound symbol,' representing not a syllable but a sequence of segments that are phonologically assigned one mora[2] (μ). This gives us the form of the original Japanese haiku with 5μ-7μ-5μ, adding up to 17μ. Other forms of Japanese verses are also written with lines of 5μ and 7μ in different combinations, such as *tanka* (5μ-7μ-5μ-7μ-7μ) and *kata-uta* (5μ-7μ-7μ). The haiku is the selected verse type for this review because it is undoubtedly the most predominant form practiced in the West and therefore the most likely to feature adaptations in English. Below is an example of a famous haiku by Bashō (1686) with each metrical beat (♪) labelled above its corresponding rhythmic grouping of segments:

(1.)

	♪ ♪ ♪ ♪ ♪	
Line 1 (5μ, 5σ):	*fu ru i ke ya*	'An ancient pond'
	♪ ♪ ♪ ♪ ♪ ♪ ♪	
Line 2 (7μ, 7σ):	*ka wa zo to bi ko mu*	'A frog jumps in'
	♪ ♪ ♪ ♪ ♪	
Line 3 (5μ, 5σ):	*mi zu no o to*	'The splash of water'

Figure 1. Haiku split into its three lines with mora- and syllable-count labelled. Includes the original Japanese in rōmaji[3] and a translation. Each *onji* is spread onto a rhythmic template and labelled with a beat.

Unlike in a musical score where different note shapes correspond to different values of duration, the eighth note symbol '♪' is used here to represent any pulse regardless of time since human speech rate is neither constant nor consisting of absolute units. The beats of a metrical poem, also called metrical positions (MP), appear to commonly be filled by syllables in the case of (1.) which led English speakers to create the tradition of the 5σ-7σ-5σ English haiku in the 1950s. R. H. Blyth and H. Henderson, the first English haiku writers, decided that

[2] Mora is pluralized as moras here but can also appear as morae as in the original Latin.
[3] Rōmaji is a convention used to write Japanese with the Latin alphabet.

5σ-7σ-5σ was the closest equivalent to 5μ-7μ-5μ, thinking it created a similar condition for English haikus (Gilbert & Yoneoka, 2000). In the following example of a haiku by Bashō, moraic segments that alone do not make up a syllable take MPs that would otherwise not be filled in a syllable-timed poem. The word-final syllable in the word *daikon* /da$_{\mu}$i$_{\mu}$ko$_{\mu}$n$_{\mu}$/ 'radish' is split into two MPs because it contains two moras /ko/ and the moraic nasal /n/,[4] which would condense into a single MP as /kon/ in a syllable-timed poem. The same applies to the heavy diphthong in /dai/ being interpreted as one syllable. Similarly, long vowels like in *bīru* /biːɾɯ/ 'beer' are split over two MPs for being bimoraic. These initial observations should begin to spark doubt in the mora-to-syllable adaptation since the fact that 17μ ≠ 17σ results in a difference in total filled MPs between a mora-timed Japanese haiku and a syllable-timed English haiku.

(2.)

	♪	♪	♪	♪	♪			
Line 1 (5μ, 5σ):	*ki*	*ku*	*no*	*a*	*to*			'After chrysanthemums'
	♪	♪	♪	♪	♪	♪	♪	
Line 2 (7μ, 5σ):	*da*	*i*	*ko*	*n*	*no*	*ho*	*ka*	'Radishes outside'
	♪	♪	♪	♪	♪			
Line 3 (5μ, 5σ):	*sa*	*ra*	*ni*	*na*	*shi*			'Are all that is left'

Figure 2. Haiku split into its three lines and spread onto a rhythmic template. The second and fourth moras of line 2 do not constitute syllables making mora- and syllable-count differ.

For an English speaker, it feels unnatural to consider a coda or an offglide as having its own MP in a poem except for the marginal cases of syllabic nasals e.g. ['bʌ.ʔn̩] 'button' and vowels in hiatus e.g. [na.'iv] 'naive.' Aside from the difference in the total number of MPs, Japanese as a language seems to give rhythmic importance to the mora while English does exclusively with the syllable. I will discuss the complexities of the mora and the syllable and attempt to explain how they play different roles in the two languages. The discordance between these units will reveal why a haiku cannot be replicated in English with the same form as the traditional Japanese haiku and will help achieve a unified theoretical representation.

2.2 The Syllable

Human speech is inherently divided into basic units of production and perception but exactly pinning down what those units are is extremely difficult. Syllables (σ) are by far the most widespread candidates for auditory and articulatory segmenting (Abercrombie, 1967). They can be observed phonetically as wave-like cyclic recurrences of peaks in sonority (Goldsmith, 2011). Syllables also seem to be natural rhythmic pulses intuitive to ordinary speakers. Among speakers, there is agreement on how many syllables a word has – that is, how many beats are counted in a word – but not always an agreement on where syllable boundaries lie. Superficially, syllables play a rhythmic role in the prosody of many languages

[4] In the following sections, the coda nasal will be transcribed as /n/ though it varies in place of articulation.

before any structural or phonotactic one. Below is the general consensus among phonologists for the architecture of a syllable.

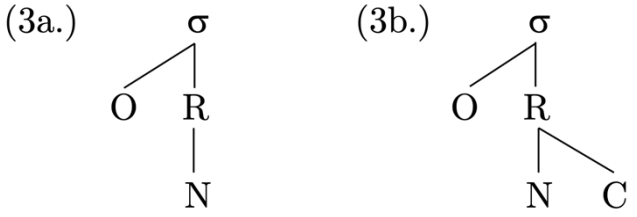


Figure 3. Structure of an onset-rhyme open syllable (3a.) and a closed syllable (3b.) where σ = syllable; O = onset; R = rhyme; N = nucleus; C = coda.

Much argumentation has been made regarding the supposed universality of the syllable as a hierarchical organizational model as shown above. Hyman (1985) claimed that syllables are not universal, instead they are a language-particular construct built on weight units. Though later in his career, he claimed that syllables were indeed universal units (Hyman, 2008). More importantly, the universality of the syllable's internal structure has been especially questioned with evidence from Japanese. Vance (2008) claims that the rhyme node does not seem to exist as a sub-constituent of a syllable in Japanese as Japanese speakers are more likely to stutter over both the initial consonant and the vowel in a CVC syllable while English speakers stutter more commonly at the initial consonant alone (Kureta, Fushimi, & Tatsumi, 2006). This suggests that in Japanese the onset and nucleus form a constituent before uniting the syllable while in English the nucleus and rhyme do the same. Japanese pre-vocalic segments are always coherent with the following vowel, whereas post-vocalic segments operate independently from the preceding vowel which is best explained by a core-coda analysis (here body-coda) rather than an onset-rhyme one (Haraguchi, 2003).

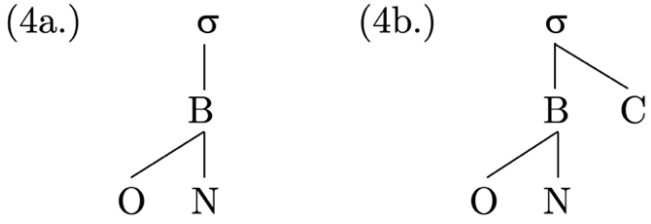


Figure 4. Body-coda analyses where σ = syllable; O = onset; B = body/core; N = nucleus; C = coda.

The number of CV syllables predominates CVC ones in Japanese, leading to a bias toward CV-based processing. At the same time, CVC syllables are no less common than CV ones in English, therefore, English speakers do not rely on CV- or VC-based processing in the same manner. Altogether, the functional units of a language could potentially vary cross-linguistically resulting in this apparent difference in syllable architecture. This same study presents counterevidence for a body-coda analysis and its implications for subsyllabic boundaries. Firstly, inserting a glide does not seem to form a CG subsyllabic constituent. Secondly, implicit priming tasks to test for syllable-internal structure show that for CVN

syllables, V and N are more likely to form a rhyme rather than C and V forming a body. Lastly, Japanese orthography has been observed to create a body-coda "illusion" in literate adults making their intuitions biased (see § 2.1). Because of this divide and structural complication, I will approach Japanese syllables using moraic theory as moras are relevant units for haikus. Mora boundaries in Japanese are more important psycholinguistically than other subsyllabic organizations and the presence or absence of different onset consonants does not affect this observation. In conclusion, syllable structure is beyond the scope of this study and instead, my goal is to look at the role of syllables and moras in the context of poetry as it is directly affected by the language's underlying structure.

2.3 The Mora

The mora is an abstract phonological unit used for measuring syllable weight (Trubetzkoy, 1939) and providing structure (Hayes, 1989). Only segments syllabified in the rhyme contribute to the weight of a syllable; onsets[5] are weightless across all languages. This paper will focus on nuclei and codas as weight contributors, rather than assuming a rhyme constituent. Whether a language distinguishes between light and heavy syllables varies.

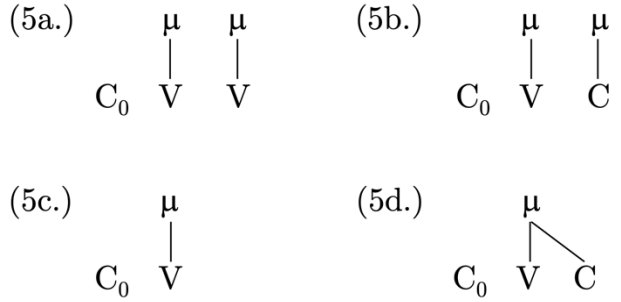


Figure 5. Typology of weight where (3a. and 3b.) are heavy (bimoraic) syllables, while (3c. and 3d.) are light (monomoraic) syllables.

Syllables are classified as light (one mora), heavy (two moras), or superheavy (three moras), though superheavy syllables are speculative. In Japanese, moraic units, named *haku* (or *onji* in written form), are perceived as rhythmic pulses conceptually isochronous to native speakers (Abercrombie, 1967). Trubetzkoy's terms for this is a prosodeme; responsible for keeping prosodic rhythm. Additionally, the concept of mora-timing is contrasted with syllable-timed languages like Spanish and stress-timed languages like English (Tateishi, 1985). While moras, syllables, and stresses are never the same duration exactly, even at a steady tempo, speakers might adjust the durations of segments to achieve average intervals between moras. However, evidence supporting absolute isochrony is lacking (Warner and Arai, 2000), hence it will not be considered as evidence for mora-timing in haiku.

Regardless of rhythmic class, the mora is both a unit of weight and a skeletal slot that forms organization within the syllable. Traditionally it is a subsyllabic constituent (Hayes, 1989; Hyman, 1985) though its exact value can be unclear. Labrune (2012) and Gilbert &

[5] Onset consonants appear here as C_0 meaning $0…n$ consonant positions since the complexity of onsets is irrelevant for weight theory.

Yoneoka (2000) identify "special," "deficient," or "weak" moras which cannot bear accent. The deficient moras of Japanese include nasal coda /N/, the first half of a geminate /Q/, and the second half of a long vowel /H/ (sometimes /R/). The second half of a V_1V_2 sequence is considered deficient if it consists of an offglide.

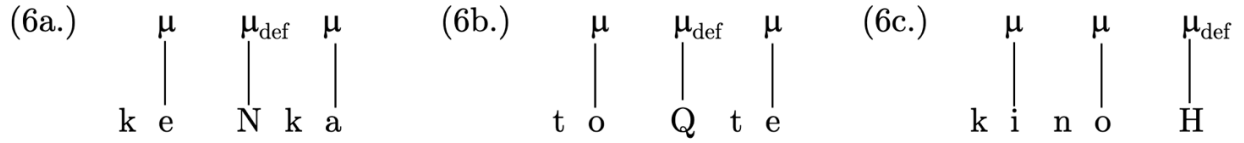


Figure 6. Example words with the three deficient moras of Japanese. Each mora is labelled above the transcription. Words: /kenka/ 'fight,' /totte/ 'handle,' /kinoo/ 'yesterday.'

Even though deficient moras cannot be accented, they are still phonetically heard as beats and are therefore counted as MPs in haiku and other poetic forms. This theory, however, struggles to reconcile moras as both beats and syllable constituents. The mora is understood to be assigned to segments giving them weight either underlyingly or by a rule (Hayes, 1989), but some linguists analyze Japanese with full moras as CV sequences and deficient moras separately (Gilbert & Yoneoka, 2000; Labrune, 2012). This approach reflects the Japanese *kana* orthography, where CV sequences are indivisible into C and V, and deficient moras are written as separate glyphs, fully counted in haikus despite their lack of syllabic standing. This paper considers the CV-mora hypothesis parallel to the body-coda syllable analysis. Labrune argues that Japanese simply has no syllables and only makes use of the mora. She proposes the following representation where moras are CV units that are deficient when one of their two slots is empty.

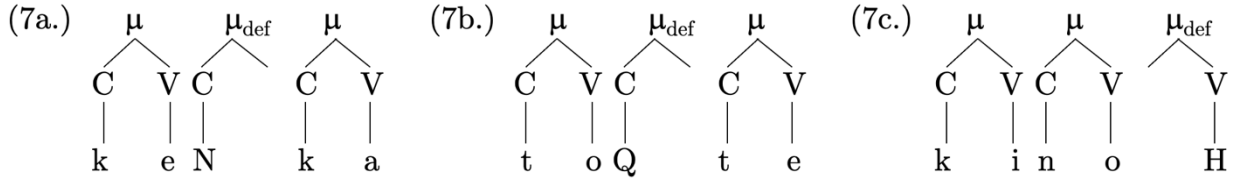


Figure 7. Example words from *Figure 6* with each CV-mora and deficient mora labelled.

Labrune's approach (originally from Kubozono, 1989) illustrates the *kana* orthography and the segmenting intuitions of Japanese adults, and accurately predicting which moras can be accented. However, this model incorrectly associates moras with onsets, suggesting that onset consonants contribute weight. Thus this paper argues that true weight units are moras alone, while onsets are constituents irrelevant to moraic value and only associate to syllable nodes directly.

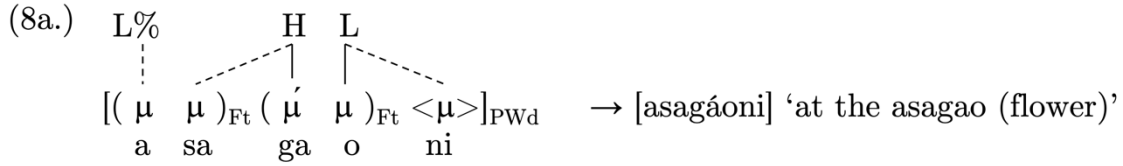
2.4 Pitch accent

Japanese uses a pitch accent system, distinct from a stress or tone systems. Unlike tone, pitch accent is not stored underlyingly as a typological primitive, and unlike stress, it is not a requirement for every prosodic (McCawley, 1978). Words in Japanese may only have

one accent or none at all (Ito & Mester, 2016). Pitch accent is cued by a drop in pitch (f_0) after the accented unit, rather than by loudness or length like a stress. Once the accent is reached, the pitch remains low for the remainder of the prosodic word (PWd). Functionally, since pitch accent is the metrical allocation of tones, the accented unit receives a high tone (H) followed by a low tone (L), both of which spread to adjacent units. If the PWd has no accent, the pitch remains high throughout. Finally, an unaccented word-initial unit has a low pitch due to a border tone (L%) at the left edge and then rises thereafter.

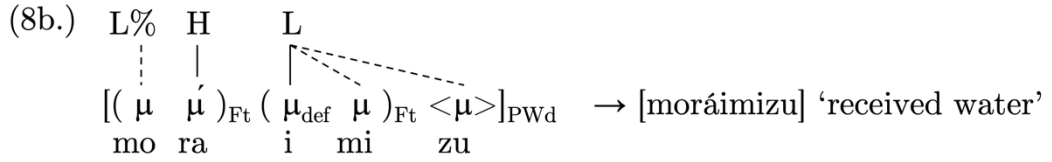
Due to the agglutinative structure of Japanese, accents can shift when affixes are added to a base (Ito & Mester, 2016). Regional dialects also exhibit immense variation in accent parameters and rules (Kubozono, 2012). To amend complications, the discussion focuses on the Tokyo dialect. Like stress accent, pitch accent is rhythmically assigned and predictable by a set of parameters and rules (McCawley, 1978). According to Metrical Phonology (Goldsmith, 1990), the mora is the basic unit for measuring phonological distance when locating accent in Japanese. In a basic form (8a.) accent is typically assigned to the antepenult mora of the PWd (McCawley, 1968). Some linguists argue that Japanese parses moraic trochees (Poser, 1990) similarly to stress languages (McCarthy & Prince, 2004). Labrune's proposal claims that if a deficient mora appears in accent position, the H tone shifts regressively and associates with the next full mora to the left (8b.).

(8a.)



→ [asagáoni] 'at the asagao (flower)'

(8b.)



→ [moráimizu] 'received water'

Figure 8. Example words with a transcription in the first column, the computation of pitch accent in the second column, and a translation of the word in the third column. Feet are labelled $(\ldots)_{Ft}$, prosodic words are labelled $[\ldots]_{PWd}$, extrametrical moras are marked with <…>, and accent is marked with an acute accent (´).

This grid model predicts the surface realizations of pitch accent but it excludes syllables. Considering moras as the units that locate accent, and syllables as higher constituents that receive the accent, allows for a reanalysis where deficient moras are treated as part of heavier syllables. For instance, (9a.) /N/ is a moraic by position making it a coda likely allowed by minimum sonority constraints. (9b.) /Q/ is part of a geminate making it a coda and onset. (9c.) /H/ is the second mora of a long vowel making it part of a complex nucleus. With this perspective, previously deficient moras are reclassified as regular, suggesting that accent shift is not due to more deficiency but due to syllable structure. Thus, like stress, pitch accent is also realized solely on syllables, motivating the existence of syllables in Japanese to bear accent (Kawahara, 2015).

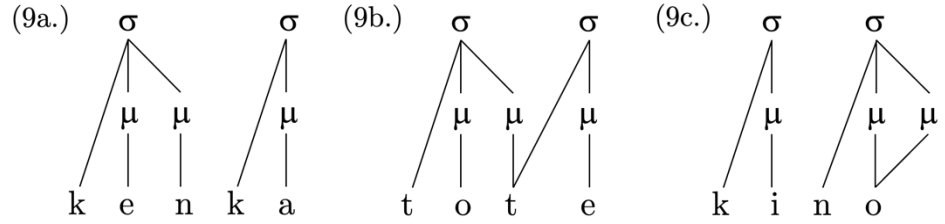


Figure 9. Example words with each deficient mora reanalyzed as syllabic constituents.

This Moraic Theory analysis does not require moras to be categorized as deficient but instead posits that syllables receive accent. Consequently, the model does not need to involve accent shifting immediately after being located on a deficient mora, simplifying the derivation of accent. In the following sections, deficient moras will continue to be argued against.

3 A model for representing Japanese haiku

3.1 Syllable-Mora Interdependence

This section reviews proposals for representing the relationship between syllables and moras in Japanese, intending to capture the structure of haiku. When all syllables are monomoraic, the syllable count of a haiku equals the mora count ($n_\sigma = n_\mu$). However, if some syllables are bimoraic, the mora count can exceed the syllable count ($n_\sigma < n_\mu$), creating a discrepancy between syllables and moras. Japanese syllables are overwhelmingly light so the notion of counting haikus with syllables appears analogous. Moras are used to construct feet while accent is realized on syllables (Vance, 2017) which means moraic foot boundaries do not always align with syllable boundaries, complicating rhythmic division. As well as pitch accent, evidence from base templates for hypocoristics, truncated language, secret jargon, compounds, portmanteaus, word games, etc. suggests that moras, rather than syllables, play a central role in Japanese (Tateishi, 1985; Trubetzkoy, 1939). However, this largely resembles footing in English for instance, where a foot is binary if it consists of two moras though the existence of syllables in English is not being questioned by experts. Both units seem to actively participate in phonological processes though the concern here is what haikus show about the syllable-mora interactive relationship.

One approach (7a-c.) combines onsets and nuclei into a CV-mora, representing the *kana* but failing to represent the weightlessness of onsets which is essential for rules in Moraic Theory. This method has been criticized for recreating the body-coda analysis and for being influenced by the writing system (Inagaki, Hatano, & Otake, 2000). As each *kana* glyph encodes a CV or deficient mora, the orthography may shift literate adults' perception preventing syllables from becoming psychologically salient (Kubozono, 1999). Studies show that learning *kana* may create a "body-coda illusion" (Kureta, Fushimi, & Tatsumi, 2006) because preliterate children have been observed to hear syllables as more psychologically salient and later shift to segmenting language with *haku* after learning *kana* (Inagaki, Hatano, & Otake, 2000). Labrune (2012) claims that full moras are always CV in shape since speech detection experiments prove the mora to be the prosodeme of Japanese (Kureta et al., 2006). This notion considers moras to be phonetically perceivable when they are more precisely abstract phonological units that are associated with segments but do not represent phonetic

entities, only phonological behaviour. A mora is not "heard" and parsed as a sequence of sounds because weight is assigned by position. It is a segment's membership to a syllable that licenses a weight value. This is supported by the evident presence of a constraint on superheavy syllables, e.g. one with a long vowel and a nasal coda or a coda and a geminate immediately after. A purely mora-based representation should presumably allow any string "moras" and not constrain their adjacency unless they were being organized by a higher constituent that imposes weight requirements. By extension, I claim that *kana* glyphs and haiku beats do not represent moras but rather groupings of sounds that when strung together each contribute to one mora. When adults count "moras" they are merely counting *haku* which are being confused for moras. In other words, it is not the case that /ka/ "is" a mora, it is a *haku* – a CV sequence represented by an independent *kana* symbol and contributes a mora when syllabified because of its nucleus /a/.

Another proposal is to reanalyze heavy syllables as bisyllabic sequences, replacing every mora with a syllable (Yoshida, 1990). For example, *kuukoo* /ku.H.ko.H/ 'airport' and *konpon* /ko.N.po.N/ 'base' would each have four syllables and the only *true* heavy syllables would be those with two adjacent deficient moras like *hontte* /ho.NQ.te/ 'really.' These syllable types are vastly constrained in Japanese likely for being too heavy (/hoNQte/ is the only example provided). However, if this nasal-geminate sequence were truly an independent bimoraic syllable, we would expect it to attract pitch accent equally, if not more, than any monomoraic syllable which is not attested. Moreover, Yoshida's model predicts that all supposed deficient moras are separate syllables but since they cannot bear accent, it forces the theory to consider them deficient syllables, projecting the deficiency problem onto the syllable tier. For a haiku, this model is problematic as it does not capture pitch accent as being realized on all syllables equally nor does it consistently divide sounds into monomoraic rhythmic units, which is crucial for a haiku analysis.

The most comprehensive model is Hayes' (1989) Moraic Theory where onsets are weightless and associate with the syllable node directly. Simplex nuclei and codas are each linked to a mora, and branching nuclei to two moras. Lastly, all moras are dominated by a syllable node (see *Figure 9*). This way, accent can be located through mora-counting and received by syllables. Kubozono (2003) states that the syllable is necessary for Japanese prosody but exists at a potentially lesser role alongside the mora. This observation stems from the rhythmic nature of the mora in Japanese, with MPs always being monomoraic in weight and the role of the mora in computing accent which is a process inherently based on rhythm. Labrune (2012) says the haiku meter is reliant on rhythm, not pitch, so moras serve as the pulses whether they can bear accent or not. As shown, moras do not bear accent, syllables do, but because all metrical poetry relies on rhythm and not pitch, the allocation of any tones onto syllables is irrelevant to the meter. This is the difference between reciting of a poem and singing – music harnesses pitch and rhythm together to build melodies. Hereon, Hayes' model will be used to analyze haikus as it best captures the relationship between the syllable and the mora, and all observations collectively.

3.2 Pitch, Rhythm, and Silence

When organizing language onto a templatic meter, such as in a song or poem, the string must be divided into rhythmic groupings that can fill the required MPs much like mapping melody to skeleton. Assuming that moras are either underlyingly associated with

segments or assigned via a rule, simply stating that the MPs of a haiku are filled by moras is inadequate. This view implies that moras are rhythmic cycles characterized by their segmental members akin to syllables rather than abstract constituents in the prosodic frame not directly perceived like syllables. To illustrate, a CVC syllable in a language that assigns moras to codas sounds no different from a CVC syllable in a language where codas are weightless. Furthermore, claiming that moras take up MPs excludes onsets, deeming them extrametrical which is unreasonable. Instead, to satisfy the template of a haiku, segments adjust their durations to align the moraic segments with the MPs. Whether timings correspond to syllable boundaries or not, all segments that are assigned a mora are arranged under equidistant MPs so that their productions are isochronous. Thus, MPs are filled by light syllables and monomoraic sequences, distributing weight evenly along the template, but moras themselves do not constitute rhythmic divisions.

Interestingly, Japanese speakers intuitively know how to apply moraic segments to a meter and how many moras are assigned to a string of segments. If this skill relies on the orthographic system, it raises questions about the invention of the script. How is it that each string of segments that gets a *kana* symbol contains exactly one mora if moras are not audible or consciously perceived? This study will not delve into the origins of the script or the haiku template but will focus on haikus having a regular recurrence of moraic segments. Evidence from text setting – the arranging of language to music – shows that syllables are the preferred units for song lyrics (Starr & Shih, 2017). Since linguistic art forms develop in relation to the phonological structures of particular languages, if the distribution of segments over musical notes consists of syllabic groups, it is evidence that syllables are salient prosodic units. Curiously, mora-based text setting seems to be a stylistic norm in Japanese that is shifting over time possibly due to exposure to Western popular music which is strictly syllabic or melismatic[6]. Since music harnesses pitch and Japanese pitch accent is borne by syllables, opting for syllables over moraic segments is preferable for singing, meanwhile, poetry is only concerned with rhythm thus, there is less need for syllable-timing as pitch accent is free from the meter.

Testing for moraic versus syllabic lyrics is challenging because the only non-syllabic moraic segments in Japanese that can be sung are the nasal coda and the long vowel since they are sonorants. Nasal codas are sometimes set to notes even in other genres and languages as a stylistic choice but do not indicate moraic text setting. Singleton vowels can be extended over long sustained notes and their duration does not correspond to phonemic length. Therefore, because long vowels are bimoraic but single segments and the nature of music allows for rhythms to be artistically extended with no correlation with phonemic vowel length, it is impossible to tell if long vowels are being partitioned at a mora boundary when sung.

The final element of a haiku is observed by Poser (1990) and Cole & Miyashita (2006). All lines in Japanese verse are structured with bimoraic feet, where each moraic segment takes a beat, which may also be a silent pulse called a *rest* or *caesura*. Beats are grouped into pairs to form four binary feet. If a line has n audible beats, the reader will take pauses for a duration exactly proportional to $8 - n$ beats, totalling a duration of 8♪. The number of moraic segments (n_{μ}) plus the number of caesuras ($n_{\emptyset}$) equals the total number of beats (n♪)

[6] A melisma is a syllable sung over multiple notes. What is important here is that though syllables can be set to one or multiple notes, a single note must be sung with no more than one syllabic element.

allocated to the MPs of the haiku. Section 2.3 will explore how these phonological elements combine to produce a haiku.

3.3 Proposal

Each line of a haiku has either 5μ or 7μ (moraic segments; cf. moras) with pauses filling the gaps between the number of audible moras and 8♪ to achieve a consistent length for each line (Kogure & Miyashita, 1999). The length of each pause takes up a metrical position and can therefore be treated as an empty mora.

(10.)

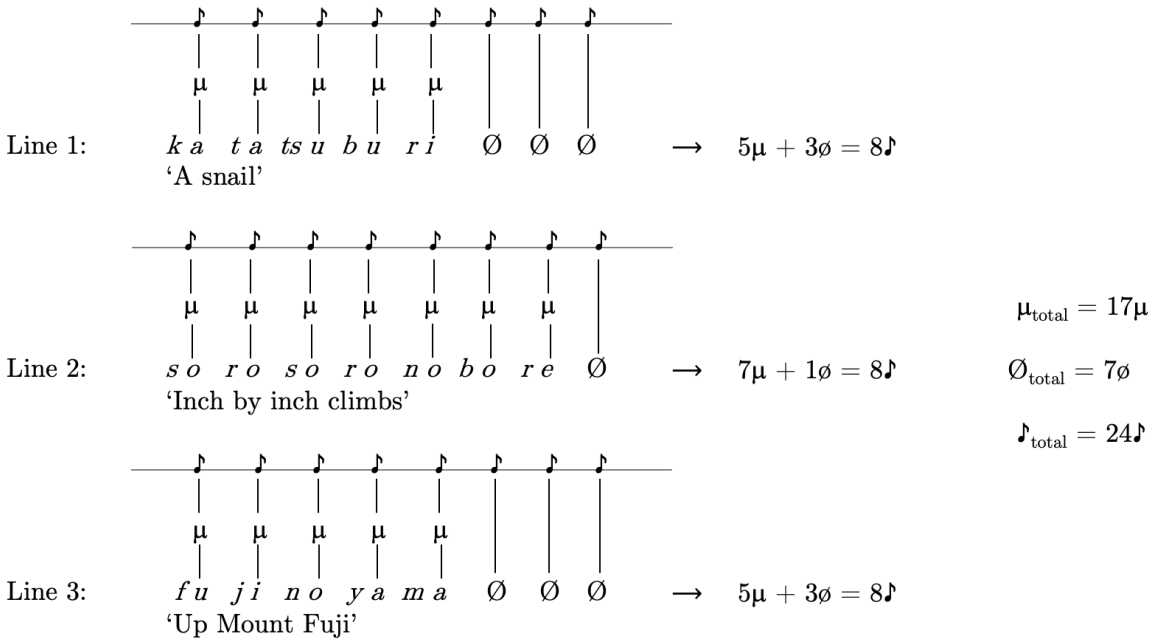


Figure 10. Haiku by Issa with a translation and transcription divided into each line and labelled with moras and caesuras linked to beats on the template. Total counts for each unit are on the right.

The skeletal configuration of a haiku can be drafted as either a moraic tetrameter, with four binary moraic feet per line (Kozasa, 1997), or as a moraic octometer, with each line containing eight moras parsed into binary feet (Poser, 1990). Regardless of whether feet are explicitly recognized, the haiku template functions like a skeleton for the melody, with each moraic segment and rest assigned an MP. According to Hyman (1985), the core tier of any metrical system is the weight tier, which consists of potential beats. In the case of Japanese, moras connect directly to the MPs on the template and syllables are like shells built around them. In (10.), the bottom tier is the melody, with moras assigned to segments. The top tier represents the haiku template, where each MP is associated with a mora or a caesura. The mora, caesura, and beat count is labelled with an arrow next to each line and the total counts for the entire haiku are to the right. Every haiku consists of 24 MPs filled with units, 17 of which are moras and 7 are pauses.

The model presented above only includes the weight tier and the rhythmic template. A more detailed diagram includes syllable constructions and pitch accent assignment.

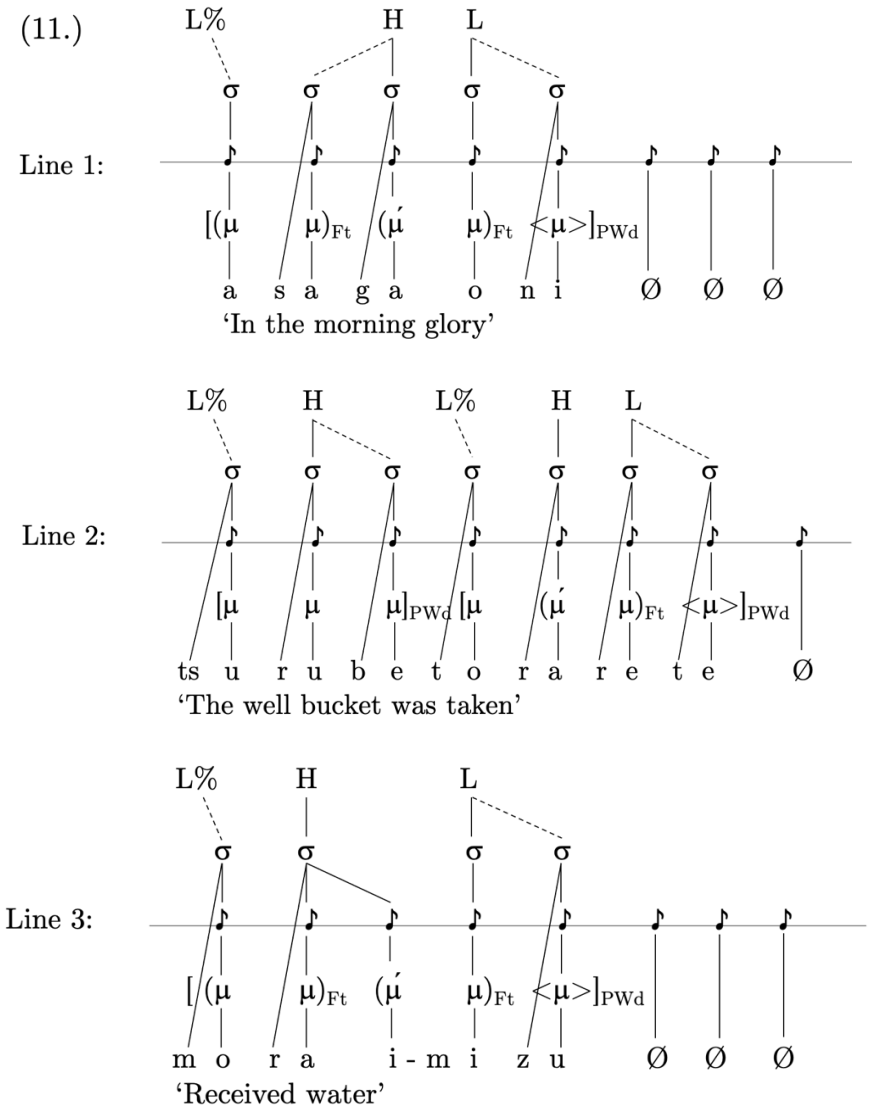


Figure 11. Haiku by Chiyo divided into its three lines with each autosegmental tier represented. From bottom to top: segment, weight, rhythmic template, syllabic, and tonal tiers.

Here, every prosodic tier is specified above the melody. From bottom to top:

1) Segment tier: speech sounds, or lack thereof, form a string.

2) Weight tier: moras are assigned to certain segments and used to build feet to locate accent. Note that the word /tsurube/ is shown as footless because it is unaccented though feet are likely parsed without any accentuation. Identifying exact foot constructions is not in the interest of this study.

3) Template tier: the poetic meter that is part of the prosodic frame in metrical poetry, singing, and other artistic uses of speech. Section 4 will discuss this in more depth.

4) Syllable tier: provides sonority organization and the targets necessary for the realization of accent.

5) Pitch tier: the tones assigned by pitch accent on the syllables.

What is crucial about this representation is that in Japanese moras and poetic pauses are directly associated with MPs which are rhythmic events, and syllables are associated with tones which consist of pitch changes. Thus, this model predicts that moras bear rhythm while syllables bear pitch, explaining the divide between timing divisions in poems and songs. The next section will explore how this model applies to English.

4 Metrical Poetry in English

4.1 Stress accent and Iambic Pentameter

Accent, whether pitch or stress, is a system of syntagmatic contrasts based on levels of prominence that divides a word into accentual chunks (Beckman, 1986). Phonetically, stress accent uses material other than just pitch to mark its location within a domain. A stress system relies on the rhythmic alternation of strong and weak beats (McCawley, 1978). English stress is cued by duration, spectral quality, and f_0 rather than with tone assignment. In English, a "stress-timed" language, interstress intervals are no more isochronous than in a supposed "syllable-timed" language like Spanish (Dauer, 1983). However, what is crucial here is that disregarding isochrony, it is preferred for stresses to take MPs in English, while moras take the same role in Japanese. As mentioned, categorizing languages by what units are isochronous in prose is doubtful but in metrical poetry, there is a preference when choosing a rhythmic unit. Though stresses tend to recur regularly universally, English stresses are lined up with the equidistant MPs of a metrical poem, much like the Japanese mora is. This is best illustrated with grid theory (Liberman, 1975; Liberman & Prince, 1977).

(12.)

$$\begin{array}{cccccccccccccccc} (\sigma & \acute{\sigma})_{\mathrm{Ft}} & (\sigma & \acute{\sigma})_{\mathrm{Ft}} & (\sigma & \acute{\sigma})_{\mathrm{Ft}} & (\sigma & \acute{\sigma})_{\mathrm{Ft}} & (\sigma & \acute{\sigma})_{\mathrm{Ft}} \\ \text{If} & \text{mu} & \text{-} & \text{sic} & \text{be} & \text{the} & \text{food} & \text{of} & \text{love,} & \text{play} & \text{on} \end{array}$$

Figure 12. Shakespearean iambic pentameter from Twelfth Night taken from Ford (2006) labelled with syllables, feet, and stresses.

The weak-strong template for an iambic pentameter is (ws.ws.ws.ws.ws) and trochaic tetrameter is (sw.sw.sw.sw) (Halle & Kesyer, 1971). Even if foot constructions in poetry do not match those generated by the language's phonology, the key is that stresses fall on alternating beats. The Correspondence Rule (Halle and Keyser, 1971; Kiparsky, 1975, 1977; Liberman and Prince, 1977; Piera, 1981; Hanson and Kiparsky, 1996) says that a poem is well-formed as long as no weak metrical position contains a syllable which is strong within a lexical word. The issue is that stresses can vary in their spacing and may fall every two or three syllables. Assigning MPs to stresses yields diversified syllable counts for the same template (Dresher & Friedberg, 2006). This, along with other obstacles to adapting the haiku template to English, will be addressed in the following section.

4.2 Applying the template

If the goal is to replicate a haiku in English with the same template as Japanese, one would align moraic segments temporally with the poem's isochronous MPs. However, this

sounds unnatural in English since heavy syllables are much more common and many codas are less sonorous therefore making it awkward to assign beats to them. If our music was mora-timed, singers would divide a word like 'cat' /kæt/ into two notes, /kæ/ and /t/. Given that vocalizing a pitched note requires the vibration of the vocal folds and a continuous airflow, it is impractical for a voiceless obstruent like /t/ to be sung. Assigning MPs to segments that are [– syllabic] or not syllable nuclei, makes the following poem sound odd.

(13.)

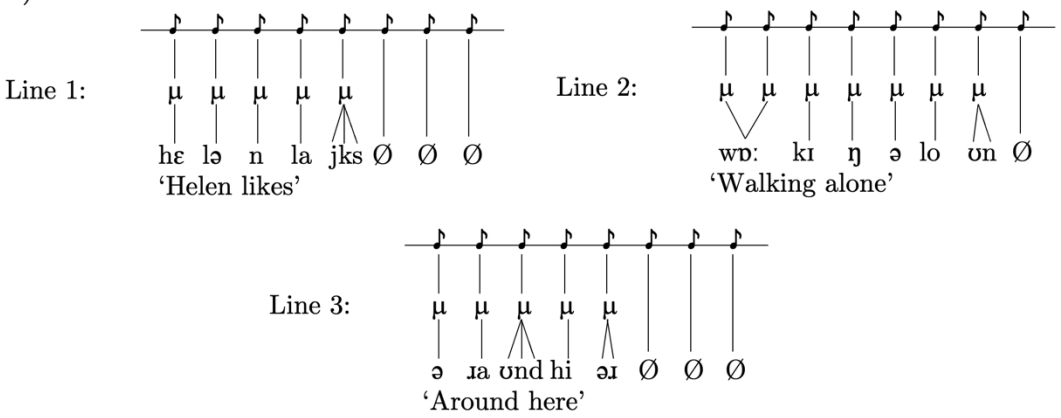


Figure 13. Hypothetical English haiku that associates moras with MPs.

If this format is read out loud, it sounds anomalous and inconsistent with English prosody. While the mora functions as a structural and temporal unit for the Japanese haiku (Gilbert & Yoneoka, 2000), the complexity of English syllables does not accommodate the same meter. Consequently, haiku is taught in Western contexts with syllables rather than moras. When recited, English speakers use a free meter without strict isochronous beats, making the 5σ-7σ-5σ configuration more of a length guideline for each line and not a true metrical template. Below is an example of what a haiku would sound like if it forced syllables into MPs.

(14.)

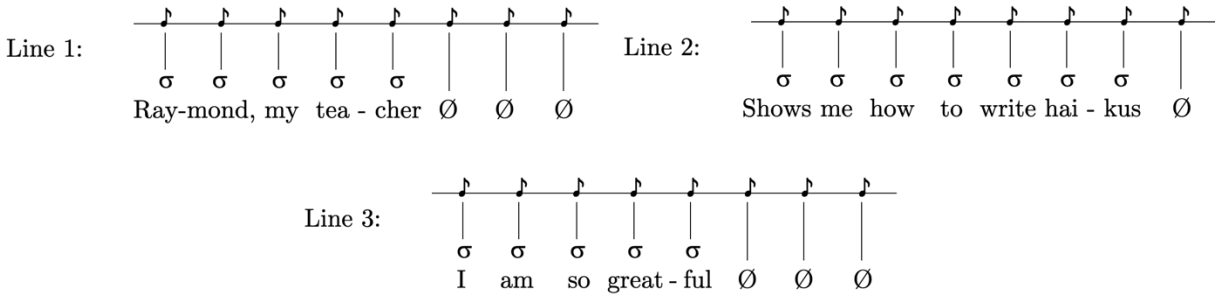


Figure 14. Hypothetical English haiku that associates syllables with MPs.

This suggestion for a template lines up syllables with MPs. Whether or not syllable-timing is a viable theory, equidistant syllables in English sound slightly more natural than mora-timing but still sound discordant to native speakers because it disrupts the perception stress.

Regularizing syllable lengths abolishes the duration cue for stress stripping the language of a prosodic element characteristic of its rhythm and cadence.

From iambic pentameter and other English meters, it is revealed that moraic and syllabic meters do not hold up well with the structure of the language like they do in Japanese. Alternatively, because of its rhythmic quality, stress plays a central role in English poetry. To represent this, the template tier shown in (11.) is positioned differently depending on the individual language. In Japanese, it fits between the weight and syllable tiers to account for mora-timing. In English, it is placed above the stress tier replacing the pitch accent tier.

(15.)

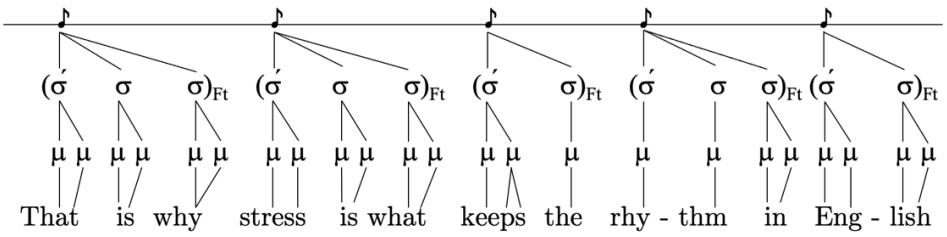


Figure 15. Hypothetical English haiku that associates stressed syllables (foot heads) with MPs.

This final application includes from bottom to top:

1) Segment tier: speech sounds
2) Weight tier: moras assigned to segments
3) Syllable tier: shows syllables, feet, and stress
4) Metrical template: Five beats for the first line of a haiku.

Note that the foot constructions here are intended to show poem-level feet like the iambic pentameter in (12.) rather than PWd-level feet. English builds trochaic feet but how syllables are parsed is not as relevant since what matters is that the head of the foot falls on the MP. This study opts to associate non-stresses to the right of each stress with the MP associated with said stress. This is because to achieve a constant beat, the medial unstressed syllables are adjusted to reach stress isochrony and thus form part of the total duration of the MP. Stress-timing sounds the most natural out of the three options presented and since English meter is already stress-timed, such as with iambic pentameter, creating a haiku with feet and stresses rather than moras or syllables best suits the language and mirrors its preexisting poetic tradition.

5 The modern English haiku

With stress-timed haikus, English-speaking poets can emulate the original meter of the Japanese haiku while adhering to the English cadence. The trouble lies in the size of semantic information that stress-timed haikus can encode. Because stresses are separated by unstressed syllables, a poem with the same number of MPs can be double or more syllables. This expansion affects the haiku's conciseness – a key characteristic of the Japanese form. Coupé et al. (2019) note that languages differ in Shannon information per syllable but are more similar in information rate per second due to the Information Density Hypothesis (Frank & Jaeger, 2008; Jaeger, 2010). Humans reduce their speech rate when producing

utterances with high information density and increase their speech rate when producing less dense utterances, making the amount of information transmitted per time more uniform. English, with its denser information encoding, is spoken at a slower rate than Japanese. Altogether, a haiku which jams additional unstressed syllables into the same template must be recited faster, leading to an even higher semantic load. A faster speech rate and information density within the same time frame leads to a haiku that transmits masses of semantic content more than its Japanese counterpart, diminishing conciseness.

When poets started writing haiku in English in the 1950s, they initially adopted the 5σ-7σ-5σ form (named "traditional haiku"), assuming it created a similar condition to Japanese language haiku. Over time, haiku poets in North America became aware that the 17 English syllables are more complex units and convey a great deal more information than 17 Japanese *haku* and thus began favouring fewer syllables. Many now write "free form haiku" with three lines following a short-long-short pattern and no grid structure. According to Imaoka (1996), to be proportional in information size, English haikus should be 14σ, or even 11σ, disregarding the template. Contemporary English-language haikus often focus on brevity, concrete imagery, and the natural world as a subject matter, rather than maintaining a 5σ-7σ-5σ form (Cheney, 2002). Alternatively, instead of keeping the syllable count or meter, poets also try to reduce their haikus to the smallest number of syllables possible without losing the meaning or effect. Even modern Japanese poets depart from the metric.

6 Conclusion

This study does not discourage English-speaking poets from exploring foreign poetic forms but aims to highlight the differences in structure between English and Japanese through the poetic meters either language accommodates. At its core, haiku seeks to capture a moment, image, or feeling drawn from close observation of nature and conveyed in common language free of overt metaphors, "poetic" language, or cleverness (Cheney, 2002). Evidence was presented supporting the presence of syllables in Japanese for bearing pitch accent while moras are the more relevant units for rhythm. Rhythmic beats called *haku* correspond to sequences of segments (usually CV) that take MPs but do not correspond to moras themselves. These sequences, represented by *kana* characters, always contain exactly one melodic element associated with a mora. Next, the meter of the Japanese was presented as a template with eight isochronous MPs per line, some of which are associated with moras, and the remaining empty positions at the right edge are associated with pauses. Lastly, the haiku template was applied to the prosodic structure of English in different hypothetical configurations, revealing that the two languages differ in which prosodic constituents they consider for metricality and thus do not accommodate the same poetic forms. The findings suggest that the most intuitive way of representing these differences is by expressing the metrical template of a poem as a separate tier, consisting of equidistant beats, whose placement relative to the other prosodic tiers varies by language. This template would be between the weight and syllable tiers for Japanese and above the stress tier for English.

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