

PITCH CONTOUR OF JAPANESE TRADITIONAL VERSE

by

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Pitch Contour of Japanese Traditional Verse

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In this thesis I conduct experiments to investigate how pitch pattern is realized in Japanese Traditional Verses. My observation consists of four parts: (i) investigation of lexical pitch and accentual combinations of Contemporary *haiku* in prose and in verse (ii) investigation of lexical pitch and accentual combinations of Basho's traditional *haiku* (iii) observation of Nonsense *haiku* and (iv) pitch range measurements of Contemporary *haiku* in prose and in verse. As a result, the following characteristics are found: Japanese speakers (i) tend to recite Contemporary *haiku* that include familiar lexemes with expected pitch patterns, compared with Basho's Traditional *haiku* that include more lexemes unfamiliar to the subjects (ii) have two major pitch template choices, which I term "Plateau" and "Default", when reciting Nonsense verses, and the occurrences of these pitch patterns are supported by Japanese phonological notions such as *default-accent*, *downstep* or *declining*, and (iii) tend to read *haiku* in verse with a wider pitch range than that in prose. This thesis shows that a generalization of poetic recitation performance among human languages is as valuable as a study of poetic forms from texts. The findings from the observations suggest that diversity among speakers' recitations of Japanese verses is also phonologically explainable, and sheds light on the studies of prosody and metrical theory in general linguistics.

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## TABLE OF CONTENTS

ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	v
Section 1: Introduction	1
Section 2: Theoretical Background on Phonology	4
2.1 Japanese Mora	4
2.2 Mora Characteristics	6
2.2.1 Letter and Mora Correspondences	6
2.2.2 Mora-Counting	8
2.2.3 Isochronous Feature of Mora and Mora-timing	9
2.3 Pitch	10
2.3.1 Accent in Japanese	11
2.3.2 Japanese Pitch Pattern in a Single Phrase	12
2.3.3 Accentual Combination in a Compound Phrase	15
Section 3: Previous Studies on Japanese Verses	19
3.1 Mora-timed Rhythm	19
3.2 Foot in Japanese	22
3.3 Importance of Pause and Relevance of 8-8-8 Meters for <i>Haiku</i>	23
3.4 Cola	25
Section 4: Methodology	27
4.1 Design	27
4.2 Subjects	28
4.3 Script Description	39
4.3.1 <i>Haiku</i> Numbering and Line Identification	32
4.4 Tasks	34
4.5 Data Manipulation and Organization	35
Section 5: Results and Analysis	37
5.1 Contemporary <i>Haiku</i> in Prose and in Verse	37
5.1.1 Contemporary <i>Haiku</i> in Prose: Lexical Pitch	38
5.1.2 Contemporary <i>Haiku</i> in Verse: Lexical Pitch	40
5.1.3 Contemporary <i>Haiku</i> in Prose: Accentual Combination	41
5.1.4 Contemporary <i>Haiku</i> in Verse: Accentual Combination	43
5.2 Basho's Traditional <i>Haiku</i>	45
5.2.1 Basho's Traditional <i>Haiku</i> : Lexical Pitch (LP) Observation	45
5.2.2 Accentual Combination	49

5.3 Nonsense <i>Haiku</i> .....	53
5.3.1 Plateau Type.....	54
5.3.2 Default type.....	57
5.3.3 Japanese Phonological Reflections.....	59
5.3.4 Individual Pitch Pattern Observation.....	60
5.4 $F_0$ Measurement.....	65
5.4.1 Contemporary <i>Haiku</i> in Prose and in Verse.....	65
5.4.2 The Relationship Between Song and Prose.....	68
§6 Conclusion.....	70
6.1 Summary.....	70
6.2 Implications.....	71
6.3 Issues for Further Research.....	74
REFERENCES.....	77
APPENDICES.....	81

## §1. Introduction

This thesis investigates pitch patterns of Japanese Traditional verse, *haiku*. *Haiku* is a type of poem consisting of a 5-7-5 poetic structure which usually includes a season-related word or phrase. However, for the purposes of this thesis, any verse consisting of the *haiku* poetic structure, regardless of the presence or absence of seasonal reference, is treated as *haiku* and the term *haiku* is used to refer to this broader meaning throughout this thesis. I conduct an experiment by observing the seven moras of the second component in *haiku* structured verses and analyze the data collected from these recitations. *Haiku* are chosen for the experiment because they are considered the shortest verse. If shared pitch patterns are found in these, the shortest verses, it is reasonable to assume that the shared pitch features are seen even in longer verses as well. The proposals put forth in my thesis are (i) native Japanese speakers share tendencies in terms of pitch patterns when reciting *haiku*, and (ii) lexical pitch plays a significant role in creating melody in *haiku*, and (iii) there is a reason *haiku* is considered to be part of *uta* or ‘songs’ in Japanese. The investigation examines four aspects of *haiku*.

First, I investigate how lexical pitch and accentual combinations are found in Contemporary *haiku* in prose and Contemporary *haiku* in verse. This section shows that most of the regular pitch patterns are expected to occur and are thus predictable.

Second, I conduct the same procedure and test if lexical pitch and accentual combinations behave the same in Basho’s Traditional *haiku*. The results show that subjects recite them with unexpected pitch patterns significantly more so than with Contemporary *haiku*. Three possible explanations for this are: (i) subjects’

reinterpretation of the phrase (ii) the influence of *focus*, and (iii) subjects' unfamiliarity with the lexemes.

Third, I explore how pitch patterns are determined when there is no lexical pitch with Nonsense *haiku* sets consisting of /ta/ and /ra/. The data shows that subjects select mainly two pitch pattern templates, which I term "Plateau" and "Default" pitch contour types. The frequent occurrence of pitch patterns are supported by documented phonological research into Japanese phenomena such as *default-accent* and *declining* pitch. This section also suggests that Japanese phonology is reflected in the performance, even with Nonsense *haiku*, since subjects select only these two pitch pattern templates in nonsense sound combinations where neither lexical pitch patterns nor accentual combinations are assigned.

Finally, I measure the pitch range of Contemporary *haiku* in prose and in verse. I conclude that the pitch range of Contemporary *haiku* presented in verse has a wider pitch range than that of Contemporary *haiku* presented in prose. This wider pitch range, which contains more notes of the musical scale, indicates that the verse form is more musical.

These findings are significant because previous studies on Japanese verse have explored their rhythm, but not pitch patterns. As part of their studies on rhythm, Bekku (1977:25) and other researchers mention that moras are used in creating rhythmic verse in Japanese (Kindaichi, 1957; Ungar, 1978; Takaha, 1982; Takada, 1983, Cole & Miyashita, 2006; Kozasa, 1997). Some researchers have proposed the importance of counting pauses as mora (Bekku, 1977; Kogure & Miyashita, 1999). Moreover, the realization of *bimoraic feet* or *headless feet* in Japanese has also been proposed. These findings



regarding rhythm are much less documented and studied when compared with the studies on stress-languages, including many western languages, like English. This is because researchers have mainly focused on the prosodic structure in stress-languages such as English (Hayes, 1984), Finnish (Hanson and Kipersky, 1996) or Seneca (Melinger, 2010). Whereas stress-accent is used in creating rhythm for verses from the languages above, substitution of the stress is required in creating rhythm for non stress-accent languages, such as mora-counting in the Japanese language.

Verses are originally derived from songs (Bekku, 1977). Verses are called *uta* and they are to be sung in Japanese just as other regular songs with melody and lyrics. Songs require elements such as lyrics, rhythm, and melody and verses can also share these three elements. Phrases can take place of lyrics and mora-counting meets the equivalent of rhythm. Although relatively more studies on rhythm have been found, none of the researchers have explored pitch pattern in verses, even though pitch is considered to be one of the important elements in the Japanese language. This thesis fills in the gap in the previous work on how pitch pattern plays a role in creating melody in *haiku*.

This thesis is organized as follows: In §2 I present the relevant theoretical background on phonology. In §3 I present the previous studies on Japanese traditional verses. In §4, I describe the methodology for my experiment. In §5 I discuss the results and analysis and in §6 conclusions, implications and areas for further research are offered.

## §2 Theoretical Background on Phonology

In this section, I present the general theoretical background on Japanese phonology that is necessary to understand the discussion for my analysis in §5. In particular, explanations for two of the core elements of this thesis, mora and pitch, are offered.

### 2.1 Japanese Mora ( $\mu$ )

Theoretically, moras ( $\mu$ ) are regarded as subconstituents of syllables ( $\sigma$ ) in Japanese (Kubozono, 1989; Katada 1990; Inaba, 1998; Hayes, 1989; Kitahara, 2001; Beckman, 1982). There are two different internal syllable structures regarding moras (Kubozono, 1989; Katada 1990; Inaba, 1998). One is a light syllable as shown in (1a), and the other is a heavy syllable as shown in (1b). A light syllable consists of a single mora while a heavy syllable consists of two moras (Hayes, 1989. Katada, 1990; Kubozono, 1989; Vance, 2008).

#### (1) a. Short Syllable

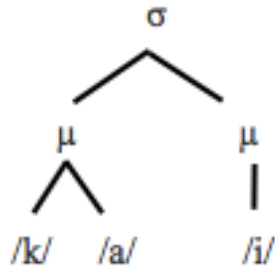


#### b. Long Syllable



For example, the internal syllabic structure of the word /kai/ or ‘shell’ can be schematized as in tree (2). The word /kai/ counts as one constituent in terms of syllables, but two constituents in terms of moras. Thus, the number of syllables and moras is not always the same.

## (2) Example of Mora & Syllable Structure: /kai/ ‘shell’



Although the notion of moras and syllables seems straightforward from the perspective of prosodic structure as seen above, precise definitions of both moras and syllables are controversial. Inaba (1998:106) mentions that “moras are traditionally considered to be abstract units” and Vance (2008:115) states that “syllables seem to be basic units of speech production and perception, but there’s no satisfactory articulatory definition of a syllable”. Even though concise definitions of syllables and moras are still somewhat unsatisfactory, it is often the case that one term applies better than the other depending on a language’s salient features. Indeed, Trubetzkoy (1969) states that natural languages can be classified either as “syllable languages” or “mora languages”.

The Japanese language is classified as a mora language because mora play a crucial role in Japanese phonology (Katada, 1990; Inaba, 1998; Kobozono, 1989). Vance (2008) claims that it is considered to be intuitive for English speaking children to count syllables and for Japanese speaking children to count moras. Therefore, syllables are used for composing *haiku* in English and moras are used for composing *haiku* in Japanese.

## 2.2 Mora Characteristics

I present two significant characteristics of moras in Japanese. First, one Japanese *kana*<sup>1</sup> or ‘letter’ generally corresponds to a single mora. Second, each mora is considered to be isochronous and the feature is used for counting units and creating rhythm in Japanese.

### 2.2.1 Letter and Mora Correspondences

It is commonly thought (Vance, 2008; Beckman, 1982) that native Japanese speakers can count moras intuitively due to the presence of the Japanese *kana* system. Shibatani (1990:158) states that “(a) mora in Japanese is a unit that can be represented by one letter of *kana*”. Cole & Miyashita (2006) also mention that “(n)ative Japanese speakers are taught to count ‘letters’ or ‘symbols’ when they compose *haiku* in elementary school”. The concept of mora is even used in Japanese games, many of which require an understanding of mora. For example, *shiritori*, or literally ‘end taking’, is one of the popular games involving moras that both the young and old in Japan are familiar with. The first player starts with the word *shiritori* and the next player continues by producing a word that starts with the last mora of the word given by the previous game player, in this case, *ri* (from *shiritori*). Play continues in this manner, with each subsequent player providing a new word that uses the last mora of the previous word as the first mora of the new word. Table (3) shows an example of a *shiritori* game.

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1 *Kana* are roughly equivalent to English letters. There are two types of *kana* writing systems in Japanese: *Hiragana* and *Katakana*. *Hiragana* are used exclusively in this thesis.

### (3) *Shiritori* Example

	a	b	c	d	e	f	g
i	しりと	りっふ	ふうる	るびい	いす	すし	しけん <sup>②</sup>
ii	‘end taking’	‘lipbalm’	‘pool’	‘ruby’	‘chair’	‘sushi’	‘exam’
iii	<i>shi ri to ri</i>	<i>ri p pu</i>	<i>pu u ru</i>	<i>ru bi i</i>	<i>i su</i>	<i>su shi</i>	<i>shi ke n</i>
iv	μ μ μ μ	μ μ μ	μ μ μ	μ μ μ	μ μ	μ μ	μ μ μ

Each example word is given four lines of description: (i) Japanese *kana*, (ii) an English translation, (iii) pronunciation shown in *roma-ji*<sup>2</sup> with space given to show mora segmentation, and (iv) mora-counting. In (i) and (iii) in Table (3), notice that the last mora of the previous word is taken as the first mora of the subsequent word. This sequence is shown with the bolded type. There are three smaller *kana* (っ, う, い) compared with the rest of the *kana* in row (i). The first one っ occurs in the second *kana* of the word in column (b) りっふ ‘lip balm’. This っ shows gemination, and approximately one mora’s worth of pause should be applied before pronouncing the next segment of sounds. Therefore, this geminate is represented as a sequence of two consonants, in this case ‘pp’ for the pronunciation of *rippu*. Other smaller *kana* such as う in column (c) ふうる ‘pool’ and い in column (d) るびい ‘ruby’ indicate long vowels. With the International Phonetic Alphabet (IPA), they can be transcribed as /pu:ru/ and /rubi:/, respectively. The syllabifications of /pu:ru/ and /bi:/ are considered to be one syllable but crucially, they are two moras. This is why the whole syllable /bi:/ is not

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<sup>2</sup> *Roma-ji* (lit., Roman Letters) is the transcription of Japanese into Roman letters corresponding with the English alphabet (Tohsaku, 1999). Varieties of *roma-ji* transcription methods exist, but in this thesis the Hepburn system is used to show Japanese sound correspondences.

copied for the next word in column (e), but only the final mora, /i/, which we see repeated as the first mora of the word *isu*. This shows that the game is played based on a system of mora recognition. The sad face (☹) is given to indicate the end of the game, due to the word *shiken*<sup>3</sup>. This word ends with ‘*n*’ (glottal nasal /N/), which is one of the violations of the game since /N/ can not appear word initially and thus no word in Japanese can start with this segment.

### 2.2.2 Mora-Counting

There is another game called *shiritori-samurai* that involves mora-counting as opposed to just recognition. The first person has to say any noun of three moras in length, such as *i chi go* ‘strawberry’ or *ri n go* ‘apple’ and the next person has to continue by saying another three mora noun that begins with the final mora of the previous noun, such as *go ri ra* ‘gorilla’. Consequently, all players must know what constitutes a mora and how to count them in order to play this game. Table (4) shows how the *shiritori samurai* game works.

#### (4) *Shiritori-Samurai* Example

	a	b	c	d	e	f
i	いちご	ごりら	らっぱ	ぱんこ	こおり	りす ☹
ii	‘strawberries’	‘gorilla’	‘trumpet’	‘bread crumbs’	‘ice’	‘squirrel’
iii	<i>i chi go</i>	<i>go ri ra</i>	<i>ra p pa</i>	<i>pa n ko</i>	<i>ko o ri</i>	<i>ri su</i>
iv	μ μ μ	μ μ μ	μ μ μ	μ μ μ	μ μ μ	μ μ

---

3 The transcription of *shiken* into IPA is /ʃiken/. The next word is supposed to start with the glottal nasal /N/, although this never happens in spoken Japanese, unlike the palatal nasal /n/, which can appear word initially (e.g., *nasu* /nasu/ ‘eggplant’).

The rules are the same as with the previous *shiritori* game, except all the words must consist of exactly three moras. The same game ending violation on words that end with the glottal nasal /N/ applies in this version, as well as a violation on any non-three mora word. In (4) the game ends with *ri su* ‘squirrel’ since it consists of only two moras, and again, the sad face (☹) is shown to indicate the violation and end of the game.

Additionally, in this game *shiritori-samurai*, as the name might suggest, all players sit cross-legged on the floor just like *samurai* used to sit. Moreover, this game is accompanied by rhythmic-hand-clapping with the mora count in unison. Before going on to the next person, all the players beat the floor twice to create the rhythm. This game reflects how intuitive it is for native Japanese speakers to count moras.

### **2.2.3 Isochronous Feature of Mora and Mora-timing**

Native Japanese people tend to believe that each mora has the same duration of utterance (Vance, 2008; Kobozono, 1989). Although this isochronous feature, in production, has proven inaccurate (Warner and Arai, 2001; Beckman, 1982; ), the concept is still used as a fundamental element in creating rhythm in Japanese verses. Although the type of meter varies, isochronous features are used in different languages in creating rhythm. For example, syllables are used in French and stress assignment is used in English. Therefore, they are called “syllable-timed rhythm” and “stress-timed rhythm”, respectively (Pike, 1945; Vance, 2008). As for Japanese, the timing can be measured by neither syllable nor stress. Shibatani (1990) states that “(a) mora functions as a rhythmic

unit in the composition of Japanese poems, e.g. *waka*<sup>4</sup> and *haiku*.” This is why the Japanese language is classified as a “mora-timed rhythm” language (Vance, 2008).

## 2.3 Pitch

This section presents another important element in this thesis, namely pitch. Fundamental Frequency ( $F_0$ ) is perceived as pitch and it is often represented as either high (H) or low (L) (Crystal, 1980). Pitch is the perceptual correlate of the rate of vocal fold vibrations (Hayes, 2009). Hertz (Hz) are used to show Frequency including  $F_0$ , which is perceived as pitch, high pitch with higher  $F_0$ . Hayes (2009) explains pitch as a “purely physical phenomenon” and states that all spoken languages are accompanied by pitch, but how it is reflected in each language differs phonologically. For instance, some stressed languages like English, Serbo-Croatian and Lithuanian attract stress on high-pitch syllables, while other languages like Estonian attract stress on low-pitch syllables (Hayes, 1995; Asu and Nolan, 2007). Pitch in Japanese is a distinctive feature in that it is used to distinguish meanings. For example, in Tokyo Japanese, /ame/ with a LH pitch pattern means ‘candy’, but with a HL pitch pattern means ‘rain’. Lexical pitch varies depending on the dialect in Japanese. In Kansai dialect Japanese<sup>5</sup>, /ame/ with a LH pitch pattern means ‘rain’ and with HL pitch pattern means ‘candy’ (Shibatani, 1990), the exact opposite of what is observed in Tokyo Japanese. Thus, different lexical pitch assignments distinguish meaning. For the purposes of this thesis, I limit the discussion to Tokyo Japanese exclusively and disregard dialectal diversity altogether. Next, I introduce

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5 *Waka* literally means “Japanese songs”, and its poetic structure is 5-7-5-7-7.

6 The *Kansai* area is located in the south-western part of mainland Japan.



accent as a feature of the Japanese language and pitch patterns that are seen in single and compound phrases in Japanese, accompanied by phonological rules and tendencies involving pitch in these phrasal environments.

### 2.3.1 Accent in Japanese

There are various accentuation types in different languages such as stress-accent languages, tone languages and pitch-accent languages, and Japanese is classified as a pitch-accent language (Kobozono, 1989; Tsujimura, 1996; Vance, 2008, Shibatani, 1990). The characteristics and usage of the term “accent” vary depending on the language. The term “accent” is commonly associated with stress-accents as seen in many European languages such as English, German, Italian and Russian (Kindaichi, 1957). In this sense, it is often difficult to define what the accent encodes exactly (Fox, 2000). Pitch-accents are seen in many Asian languages such as Thai, Burmese and Japanese (Kindaichi, 1957). In Japanese, accent is always assigned to a high pitch mora when it is followed by a low pitch mora. For example, the word *hashi* represents several different meanings depending on the placement of the accent, if one exists at all. This is shown in (5) below.

#### (5) Japanese Homonyms:

(a)	<i>ha</i> <sup>↓</sup> <i>shi</i> - <i>ga</i>	HL-L	‘chopstick(s)’
(b)	<i>ha</i> <i>shi</i> - <i>ga</i>	LH-H	‘edge(s)’
(c)	<i>ha</i> <i>shi</i> <sup>↓</sup> - <i>ga</i>	LH-L	‘bridge(s)’

The down-pointing arrow (↓) indicates the assignment of accent. The mora immediately preceding the down-pointing arrow is considered to be the accented mora. In (5a), *ha* is high pitch and *shi* is low pitch, so *ha* is accented. The pitch pattern for *hashi* in both (5b) and (5c) is low-high, so their pitch patterns appear identical. Accent assignment is


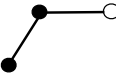
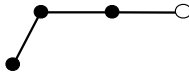
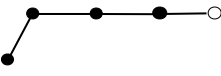

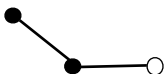
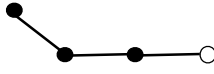
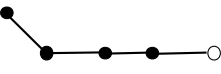
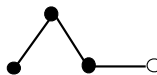

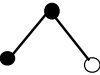
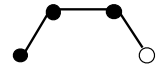
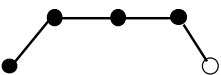
difficult to perceive without sequential mora, including the subsequent mora after the accented one. Therefore, the Japanese subject particle *-ga* is often used to elucidate the data for these tests. Notice both (5b) ‘edge’ and (5c) ‘bridge’ have exactly the same pitch sequence in isolation; however, each has a different pitch pattern when the subject marker *-ga* is included. The pitch pattern of *hashi-ga* in (5b) is low-high-high, which means there is no accent assignment. The pitch pattern of *hashi-ga* in (5c) however, is low-high-low, which means that *shi* is an accented mora and therefore there is an accent assignment for this noun, unlike in (5b). Vance (2008:7) explains the Japanese accent system as follows: “pitch-accent patterns are properties of words, and a word’s inherent pitch pattern has to be integrated into the intonation pattern of any phrase that contains that word.” In other words, each lexeme is assigned a pitch pattern, and this is called “lexical pitch”. The location of accent is unpredictable, and so lexical pitch is assigned by the speakers of a given dialect (Tsujimura, 1996; Kindaichi, 1974). In the following section, more detailed examples of various accent patterns in single phrases are provided along with the subject-marking particle *-ga*.

### 2.3.2 Japanese Pitch Pattern in a Single Phrase

There are four possible accent patterns in a single phrase in Japanese: (a) no accent, (b) accent on the first mora, (c) accent on the second or subsequent mora, not including the final mora, and (d) accent on the final mora. Table (6) shows these pitch patterns with example phrases consisting of between one and four moras. The top row of each example represents the pitch pattern schematically. The mora of the actual word in a phrase are represented with black dots (●), and the subject marker *-ga* is represented

with a white dot (○). The Japanese reading of each phrase is offered in the second row with an English translation in the third row.

#### (6) Lexical Pitch Pattern for a Single Phrase<sup>6</sup>

	1 mora	2 moras	3 moras	4 moras
<b>(a)</b> No Accent				
	<i>hi - ga</i>	<i>ha shi - ga</i>	<i>sa ku ra - ga</i>	<i>to mo da chi - ga</i>
	sun-SUB	edge-SUB	cherry blossom-SUB	friend-SUB
<b>(b)</b> Accent on the 1st mora				
	<i>hi↓ - ga</i>	<i>ha↓ shi - ga</i>	<i>i↓ no chi - ga</i>	<i>ko↓ o mo ri - ga</i>
	fire-SUB	chopsticks-SUB	life-SUB	bat-SUB
<b>(c)</b> Accent on the second from the end				
			<i>ko ko↓ ro - ga</i>	<i>mi zu u↓ mi - ga</i>
			picture book-SUB	lake-SUB
<b>(d)</b> Accent on the final mora				
		<i>ha shi↓ - ga</i>	<i>o to ko↓ - ga</i>	<i>i mo o to↓ - ga</i>
		bridge-SUB	treasure-SUB	sister-SUB

(Modified from Kindaichi, 1974)

I offer three phonological rules that account for Japanese pitch patterns. I define these as: (i) “Variable Level Pitch Start”, which states that all the phrases start with either a HL pitch pattern or a LH pitch pattern, but never the same pitch level, such as LL or

<sup>6</sup> The abbreviation SUB in the table stands for subject-marker, i.e., subject-marking particle *ga*.

HH, (ii) “Terminal Fall”, which means that once pitch-accent falls, it never rises again within the same phrase, and (iii) “Inevitable Pitch Rise”, which accounts for the Inevitable Rise of the second mora, except for when the first mora is accented. These are the shared rules for a single phrase in Japanese phonology.

*Sakura-ga* in (6a) is a phrase which has no accent. When there is no accent, the pitch-pattern remains LH and stays H even when including the subject-marking particle *ga*. This is illustrated in the LHH-H pitch-accent combination for *sakura-ga*. *Inochi-ga* in (6b) is a phrase which is accented on the first mora. Its pitch-accent combination is HLL-L. *Kokoro-ga* in (6c) is a phrase that is accented on the second mora, and its pitch pattern is LHL-H. In this pattern, the very first and last mora of a word must be low, so this type of accent can only appear in a phrase that consists of three or more moras. *Imoto-ga* in (6d) is a phrase that is accented on the final mora, and its pitch combination is LHHH-L. The final mora of the word must have high pitch in order to receive the accent. However, without taking into account the subject-marking particle *ga* this pitch pattern appears to be identical to the no-accent pattern. Therefore, this is another case where inclusion of particles is essential to fully understanding the pitch-accent system.

Another significant occurrence that is likely to occur in a Japanese single phrase is called *default-accent* (McCawley, 1968; Vance, 2008). *Default-accent* is a phenomenon where the antepenultimate mora is likely to be accented. However, if the antepenultimate mora is either a long vowel or a geminate, then the preantepenultimate mora, or fourth mora from the end, is likely to be accented instead (McCawley, 1968; Vance, 2008). This phenomenon often occurs in recently borrowed Western loanwords and meaningless

phrases as shown in Table (7). (7a) is a column of *kana mora*<sup>7</sup>, and this is considered a nonsense phrase. The arrow (↓) indicates the presence of an accent and that the pitch is dropping, so the accent is assigned to the antepenultimate mora *mu*. The word *pajama* (7b) originally came from india, but was introduced from English into Japanese as a loanword. The *pa* in *pajama* is accented because it is also the penultimate mora. In (7c), *konpurekkusu* ‘complex’, *k* is the third mora from the end, but it is not accented because it is a geminate, so instead, the antepenultimate mora *re*, is accented.

### (7) Default-accent Patterns

loanwords/meaningless words	Default-accent pitch pattern	gloss
③ ② ① (a) <i>ma mi mu↓ me mo</i>		no meaning; a column of kana mora
③ ② ① (b) <i>pa↓ ja ma</i>		‘pajamas’
④ ③ ② ① (c) <i>ko n pu re↓ k ku su</i>		‘complex’

(Modified from Vance, 2008)

This phenomenon can be observed frequently in situations where Nonsense *haiku* are used, as in §5.3.

### 2.3.3 Accentual Combinations in a Compound Phrase

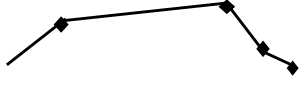
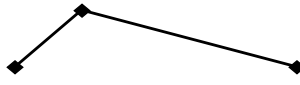


While the previous section refers to the Japanese pitch-accent system in a single phrase, this section discusses the pitch patterns found in compound phrases that consist of

<sup>7</sup> *Kana* in Japanese is an equivalent to alphabet letters in English.

two syntactic units. This is exactly the same structure with the second component of *haiku* that I observe in the experiment in this thesis.

The key for identifying and understanding pitch-accent for compound phrases is to investigate whether there is an accent on each phrase or not. There are four different possibilities (i) Unaccented phrase + Accented phrase (UA), (ii) UU, (iii) AA, and (iv) AU (Vance, 2008). These accentual combinations are crucial to understanding the observations in §5. The (↓) indicates the placement of assigned accent; if present, the unit is accented, if absent, the unit is unaccented. (8a) shows only one arrow in the second phrase, so it is a UA pattern. The pitch contour keeps rising until the accent in the second phrase. (8b) indicates a UU pattern, which means that neither of the phrases are assigned an accent. A pitch peak is seen in this UU pitch contour, which illustrates the Inevitable Pitch Rise, mentioned in §2.3.2. The Inevitable Pitch Rise is seen in (8a) and (8b) since neither of them is assigned any accent in the first phrase. (8c) indicates an AA pattern, which means both of the phrases are assigned accent. Two pitch peaks are seen in this pitch contour, and the second peak is shorter than the first one. (8d) indicates an AU pattern, which means that only the first phrase is assigned an accent, and no accent assignment occurs in the second phrase. Two pitch peaks are also seen in this pitch contour, and the second peak is lower than the first peak. Compared to the AA pitch contour, the second peak is much lower in the AU pitch contour. Again, this formation of a compound phrase is exactly the same as that of Line B in *haiku* that I conduct in the experiment of this thesis. The notion of accentual combinations of UU, UA, AA and AU plays an important role in the analysis in §5.

### (8) Lexical Pitch Patterns for a Compound Phrase

	Accent in the first phrase	Accent in the second phrase	AC	Pitch contour
(a)	Unaccented phrase <i>a su-no</i> L H H	Accented phrase <i>te<sup>↓</sup> n ki- wa</i> H L L L	UA	
(b)	Unaccented phrase <i>ki no o -no</i> L H H - H	Unaccented phrase <i>shi go to</i> L H H	UU	
(c)	Accented phrase <i>ha<sup>↓</sup> ru - ga</i> H L - L	Accented phrase <i>ku<sup>↓</sup> ru no - wa</i> H L L - L	AA	
(d)	Accented phrase <i>su ki<sup>↓</sup> na</i> L H L	Unaccented phrase <i>ya sa i-wa</i> L H H - H	AU	

(Modified from Vance: 2008:181)

Whenever there is an accent assignment in the first phrase, the pitch contour forms two peaks as shown in row (8c) and (8d). The second peak tends to be lower than the first peak in the first phrase. This phenomenon is called *downstep* (Vance, 2008; Hayashi, 2004). Compared to the second peak of AA and AU, the second peak of AA is higher than that of AU. This determines whether the second phrase is accented or not.

In sum, the relevant theoretical phonological background of the Japanese language is offered and discussed in this section. Japanese is classified as a mora language as opposed to a syllabic one. In addition, Japanese is classified as a pitch-accent language as opposed to either a stress-accent or tone-accent one. Several phonological rules and tendencies account for the Japanese pitch-accent assignments in

both single and compound phrases. All of these phenomena and tendencies are important components in understanding *haiku* pitch patterns.



### §3 Previous Studies on Japanese Verses

In this section, I present several different types of Japanese traditional verses and the previous studies that have been done on them. The focus of linguistics studies on Japanese verses has been on the poetic structures and the rhythm that mora-counting units produce. Even though pitch is an important feature in the Japanese language, the role of pitch in Japanese traditional verses has not been discussed. This thesis attempts to fill in the gap in this area of research by exploring pitch patterns in Japanese verses. Before introducing my experiment, I review significant studies regarding rhythm in Japanese traditional verses, which cover the following sub-topics: (i) mora-timed rhythm (ii) *bimoraic* or *headless feet* (iii) the importance of rhythmic pauses, and (iv) cola.

#### 3.1 Mora-timed Rhythm

*Shichigo-cho*<sup>8</sup> is the basic type of poetic structure consisting of seven and five moras literally translated as seven-five meter. Japanese speakers seem to favor *shichigo-cho* because they appear the most often in Japanese traditional verses. *Shichigo-cho* can be seen even in daily life as a form of *hyoogo* (Bekku, 1977). *Hyoogo* are 'public announcements' in poem, and they consist of a 5-7-5 poetic structure. They are implemented as a way to call for peoples' awareness on social issues, such as bullying, discrimination or even safe driving. *Hyoogo* can be seen on billboards, signs, at schools, or in newspapers where they serve as reminders about societal expectations. (1) shows

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<sup>8</sup> Originally *goshichi-cho* (five-seven meter) was popular at the origin of traditional verse; however, *shichigo-cho* (7-5 meter) gained prominence through Chinese verses's influence (Bekku, 1977). The term *shichigo-cho* is often used to describe other traditional Japanese verses based on seven-five mora whether the first line actually consists of five mora or not.

an example *hyoogo* regarding driver safety. Below the *hyoogo*, *roma-ji* is given for pronunciation, and individual mora (μ) are indicated throughout<sup>9</sup>.

### (1) Driver Safety *Hyoogo* Example

*Hyoogo*:                      待つゆとり                      ゆずる心に                      事故はなし<sup>10</sup>

Pronunciation:              ma tsu yu to ri                      yu zu ru ko ko ro ni      ji ko wa na shi

Mora:                              μ μ μ μ μ                      μ μ μ μ μ μ μ      μ μ μ μ μ

(Bekku, 1977)

‘If you are willing to wait and yield to other people, you won’t have an accident.’

Many of these *hyoogo* use five mora for the first line, seven mora for the second line and five mora for the third line. Isochronous timing, as introduced in §2, accounts for the fact that each mora has an approximately uniform time duration, which supports the creation of a rhythmic tempo<sup>11</sup>. As you may notice, this 5-7-5 poetic structure of *hyoogo* is exactly the same as *haiku*. *Haiku* was originally called *hokku* (literally ‘initial line’), and it was only the first three lines of a larger *renga* (Miner, 1979)<sup>12</sup>. Table (2) below shows a historical timeline of the emergence of some Japanese traditional verses as listed by Miner (1979).

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9 *Hyoogo* in its Japanese form is from Bekku as stated; translation is the author's.

10 [ma tsu [yu to ri]]              [[[yu zu ru [ ko ko ro]]-ni]]              [[ji ko]-wa [na shi]]  
wait tolerance              yield heart-Dat              accident-Top null

11 As mentioned in §2.1, in Japanese a heavy syllable has two moras and a light syllable has one mora. The duration of a heavy syllable consisting of two moras is much shorter than the sequence of two light syllables. Therefore, when a phrase contains heavy syllables, more moras can be used without violating the *shichi-cho* structure. This is referred to *ji-amari*, where a *shichi-cho* has one or two extra moras (Bekku, 1977; Takaha, 1976).

12 *Renga* means ‘linked poetry’ that consists of the repetitions of the 5-7-5-7-7 mora structure, and there is no set number of these repetitions (Bekku, 1997). Some say *haiku* were derived from *renga* (Bekku, 1977; Miner, 1979), and others say *haiku* were derived from *tanka* (Pauper, 1955 & 1956; Bownas & Thwaite, 1964). Both *Tanka* and *waka* consist of five lines of 5-7-5-7-7 poetic structure (Giroux, 1974).

## (2) Historical Timeline of the Appearance of Japanese Traditional Verses

Era	Type of Traditional Verses	Mora Structure
6 <sup>th</sup> c. - 13 <sup>th</sup> c.	<i>waka</i> 'court poetry'	5-7-5-7-7
	<i>chooka</i> 'long poetry'	5-7-5-7-7
	<i>tanka</i> 'short poetry'	5-7-5-7-7
13 <sup>th</sup> c. - 16 <sup>th</sup> c.	<i>renga</i> 'linked poetry'	5-7-5-7-7... 5-7-5-7-7
16 <sup>th</sup> c. - 19 <sup>th</sup> c.	<i>haikai</i> 'playful count poetry'	5-7-5
19 <sup>th</sup> c. -20 <sup>th</sup> c.	<i>haiku</i>	5-7-5

The earliest known Japanese poetry book is called *man-yoo-shu*, 'ten thousand leaf collection'. This book contains *tanka* or 'short song(s)' and *chooka* or 'long song (s)' (Waley, 1976), and *shichigo-cho* was also used in these verses. For example, *tanka*, has thirty-one moras with a 5-7-5-7-7 poetic form. This style of poetic verse comprised of thirty-one moras is considered to be one of the classical Japanese verses (Waley, 1976). There are many other Japanese traditional verses based on the *shichigo-cho* poetic form as shown below, and they are all classified as *uta* or 'songs'.

### (3) Types of Japanese Verses

- a. *haiku* 5-7-5
- b. *katauta* 5-7-7
- c. *waka/tanka* 5-7-5-7-7
- d. *sendooka* 5-7-7-5-7-7
- e. *bussoku sekika* 5-7-5-7-7-7
- f. *nagauta* 5-7-5-7...5-7
- g. *renga* 5-7-5-7-7... 5-7-5-7-7

Bekku (1977) mentions that *shichigo-cho* was not necessarily a widely used meter in the early history of Japanese poetry; however, *shichigo-cho* gained increasing popularity over the years. Many Japanese scholars in the field acknowledge *shichigo-cho* as an important

element in creating rhythmic beats for Japanese traditional verses and the style has remained popular until today (Bekku, 1977; Kubota, 1927).

### 3.2 Foot in Japanese

In stress-languages such as English, the foot originally referred to a grouping of stressed syllables used to create rhythm for verses. A foot consists of an alternation between strong and weak syllables, like trochaic or iambic rhythm (Hayes, 1995). Many researchers have tried to identify an equivalent of foot in stressless languages such as Japanese, since the widely adopted notion of foot is usually only found in the context of stress-languages. Researchers such as Bekku (1997), have argued that Japanese has the equivalent of a foot; where a foot consists of two moras; this Japanese foot is also termed ‘moraic tetrameter’ by Kozasa (1997) and bimoraic foot by Poser (1990). Poser (1990) observes how Japanese nicknames tend to form a bimoraic foot consisting of two moras, and states that “(b)imoraic foot whose properties are similar to those of stress feet in other languages plays a significant role in Japanese Morphophonology”.

This bimoraic concept is a crucial element even for regular songs accompanied by melody (Bekku, 1977). For example, one type of children’s song, *ocharakahoi* is constructed with this bimoraic foot. This song is accompanied by an *ocharakahoi* song with hand-clapping to the rhythm, as shown in (4). (X) indicates a participant clapping their own hands, and (O) indicates clapping with another player, as shown in picture (5). Picture (5) shows only one portion of the game.

#### (4) *Ocharakahoi* Game

lyrics:            *o cha ra ka o cha ra ka o cha ra ka ho i*

clapping:        (X     O    ) (X     O    ) (X     O    ) <rock, paper, scissors>

(5)                *o cha*                      *ra ka*<sup>13</sup>



*Ocha* has two moras and forms one foot, as does *raka*. Thus, the bimoraic foot is used in establishing the rhythm of the song. In the next section, I discuss how pauses are utilized in creating bimoraic feet in Japanese verses. As mentioned earlier, many traditional Japanese verses are constructed using *shichigo-cho*; however, *shichigo-cho* doesn't have an even number of syllables. I show how the odd numbered meter in *shichigo-cho* can be evened out through an analysis of rhythmic pauses.

### 3.3 Importance of Pause and Relevance of 8-8-8 Meters for *Haiku*

Even though the rhythm of *haiku* is most widely known as 5-7-5, some linguists have argued that *haiku* actually have three lines of 8 moras, which form 4 feet, by claiming that the 5-7-5 observed rhythm is just a counting of the *uttered* moras (Bekku, 1997; Cole & Miyashita, 2006; Gilbert & Yoneoka, 2000). Where uttered moras are missing, in order to complete the eight moras, pauses are inserted. Below is an example of *tanka* from Cole & Miyashita (2004), who conducted research and demonstrated that

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<sup>13</sup> This image is part of a picture taken from the website 'Kageoka Koen de Break Time!' <http://www.yen9.info/guide03/12.html>

the actual poetic structure of *tanka* can be shown to be that of an 8-8-8 structure<sup>14</sup>. The illustration in (6) shows five lines of a *tanka*. In line 1, for example, there are five uttered moras, *ya wa ra ka ni*, and three silent moras following *ni*. Asterisks (\*) represent silent moras.

#### (6) Segmentation of *Tanka*<sup>15</sup>

Foot #	1 <sup>st</sup> Foot		2 <sup>nd</sup> Foot		3 <sup>rd</sup> Foot		4 <sup>th</sup> Foot	
Mora #	1 <sup>st</sup> μ	2 <sup>nd</sup> μ	3 <sup>rd</sup> μ	4 <sup>th</sup> μ	5 <sup>th</sup> μ	6 <sup>th</sup> μ	7 <sup>th</sup> μ	8 <sup>th</sup> μ
Line 1	( <i>ya</i>	<i>wa</i> )	( <i>ra</i>	<i>ka</i> )	( <i>ni</i>	*)	(*	*)
Line 2	( <i>tsu</i>	<i>mo</i> )	( <i>re</i>	<i>ru</i> )	( <i>yu</i>	<i>ki</i> )	( <i>ni</i>	*)
Line 3	( <i>ho</i>	<i>te</i> )	( <i>ru</i>	<i>ho</i> )	( <i>o</i>	*)	(*	*)
Line 4	( <i>u</i>	<i>zu</i> )	( <i>mu</i>	<i>ru</i> )	( <i>go</i>	<i>to</i> )	( <i>ki</i>	*)
Line 5	( <i>ko</i>	<i>i</i> )	( <i>shi</i>	<i>te</i> )	( <i>mi</i>	<i>ta</i> )	( <i>shi</i>	*)

(Cole & Miyashita, 2006)

As Table (6) shows, the actual uttered moras can be counted as 5-7-5-7-7. However, when the silent moras at the end of each line are included, then all five lines of the *tanka* consist of eight moras. The eight moras are divided into 4 feet, and each foot is bimoraic.

The locations at which pauses appear are not random. In discussing the location of pauses within the poetic structure, it is necessary to look into the syntactic constituencies in the verse phrases (Bekku, 1997). In the next sub-section, I discuss the notion of “cola”, which can explain the correlation between the syntactic constituents and the location of pauses.

14 In Cole & Miyashita’s study, *tanka* with the 5-7-5-7-7 poetic structure are used rather than the *haiku* form of 5-7-5, because the focus of their study was to examine the pauses between each line. *Haiku* has only three lines, allowing only two instances of measurable pauses between lines. *Tanka* however, have five lines, providing four instances of measurable pauses between the beginning and ending lines.

15 The verse below is composed by the Japanese poet, Ishikawa Takuboku cited in Cole & Miyashita (2006).

### 3.4 Cola

Within the prosodic hierarchy, the colon (pl. cola) is above the mora and the foot. Hammond (1987) states that “cola are metrical constituents built on the output of footing.” Syntactic boundaries must not cross over the cola. Kogure & Miyashita (1999) conducted an experiment to examine the location of silent mora in *haiku* within the *haiku*’s middle phrase, or second line, which consists of seven moras. Each of the seven moras of the middle phrase are usually constructed of two syntactic constituents, as each lexeme is relatively short in Japanese. Kogure & Miyashita (1999) state that when the seven moras in *haiku* can be divided into word boundaries comprised of 3-4 moras consecutively, a pause should occur at the beginning as shown in (7a). When the seven moras in *haiku* can be divided into word boundaries comprised of 4-3 moras consecutively, a pause should occur at the end of the line as shown in (7b), so that the colon doesn’t divide the word boundary. The parentheses indicate the bimoraic feet. The black and white circles indicate syntactic constituents. An asterisk (\*) indicates a pause.

#### (7) Word Boundary and Location of Pause

##### a. 3-4 word boundary

1 Colon				1 Colon			
1 Foot		2 Foot		3 Foot		4 Foot	
1 μ	2 μ	3 μ	4 μ	5 μ	6 μ	7 μ	8 μ
(*)	(●)	(●)	(●)	(○)	(○)	(○)	(○)

##### b. 4-3 word boundary

1 Colon				1 Colon			
1 Foot		2 Foot		3 Foot		4 Foot	
1 μ	2 μ	3 μ	4 μ	5 μ	6 μ	7 μ	8 μ
(●)	(●)	(●)	(●)	(○)	(○)	(○)	(*)

There are significant studies on Japanese verses that have yielded such discoveries as the notion of feet in Japanese or the realization of cola. However, the focus of these studies has been to consider the area of rhythm. Even though researchers have explored melodic features such as pitch in general Japanese linguistic studies, they have not

explored or investigated how these findings could be applied to verses in Japanese. Just as rhythm in *haiku* is worth exploring, pitch patterns must also be investigated.

My purpose in conducting my research is to find out what the role of pitch in *haiku* is and to test the following three hypotheses: First, Japanese has lexical pitch; each Japanese word has an inherently assigned pitch pattern, which I hypothesize, is retained in *haiku*. Second, lexical pitch creates melody in Japanese verses. Third, that there are specific and justifiable reasons why *haiku* is considered to be part of *uta* or ‘song(s)’ in Japanese.



## §4 Methodology

In this section I provide the design of the experiment, information on the subjects, the script contents that the subjects were given to recite, and a few examples of actual scripts and tasks. In §4.5 I present and discuss how the data was recorded and manipulated.

### 4.1 Design

The study is organized as follows. I present subjects with four different types of *haiku* including *haiku* with meaningful phrases that are inherently assigned Lexical Pitch (LP) and Accentual Combinations (AC) as well as *haiku* without meaningful phrases to observe the effects of performance when there is no inherently assigned pitch, in other words, a surface pitch pattern. The study is grouped into four experiments: (1) The first section was designed to investigate the occurrence of LP and AC in the recitation of Contemporary *haiku* in prose and in verse. The Contemporary *haiku* that comprised the data of part 1 were composed specifically for the purpose of this experiment. The term ‘Contemporary *haiku* in prose’ refers to scripts that are not presented in a poetic structure while the term ‘*haiku* in verse’ is used for scripts that are presented in a poetic structure. (2) The second section was designed to investigate the occurrence of LP and AC in the recitation of traditional *haiku* composed by the famous poet, Matsuo Basho. (3) The third section was designed to investigate the pitch patterns found in Nonsense *haiku* where no LP is assigned. (4) The fourth section was designed to detect the pitch ranges found in

both Contemporary *haiku* in prose and Contemporary *haiku* in verse. For parts (1) and (4), the same data were utilized in the experiment.

## 4.2 Subjects

The final body of subjects was comprised of eight female native Tokyo Japanese speakers<sup>16</sup>. All of them were international students from Japan and were currently taking classes at The University of Montana. The subjects were between 18 to 24 years old and at the time of this study, they had all been in America for less than three years, so the influence of English on their Japanese could not have been too significant. The original body of subjects consisted of twenty participants, but twelve out of twenty were eliminated for the following reasons. First, seven subjects were eliminated due to their Japanese dialect: both intonation and LP can vary between the Tokyo Japanese and the *Kansai* dialect mentioned in section in 2.3, as well as other locales. For this reason, I controlled for the subjects' dialects. Second, five male subjects were eliminated due to the variation between pitch ranges of male and female voices; controlling for pitch range made the observations less complex. Choosing one gender was necessary for ensuring accurate measurements of the data due to the manipulation skill involved, and female subjects were selected because they represented the majority of subjects from the original body of participants. Consequently, eight female students who spoke Tokyo Japanese were used in the experiment. These eight female subjects are identified by the names Subject (a) though Subject (h).

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16 Subjects who are from Tokyo prefecture would have been ideal; however, subjects who weren't from Tokyo, but were evaluated to speak similar to Tokyo Japanese were also considered to be Tokyo Japanese speakers for the purposes of this thesis.

The body of subjects was also controlled for their status as non-professional poetry orators. Professionals who are skilled in reciting traditional verses and/or broadcasters can be observed on TV, and Vance (2008: 122) observes “(s)killed recitation of poetry probably comes closest to the isochronous ideal - certainly closer than spontaneous speech, with all its hesitations and dysfluencies”. However, non-professionals were chosen for this experiment because recitation from professionals can hold excessive artistic melody, and the focus of this experiment is the recitation by native Japanese speakers as part of phonology. Subjects who volunteered are representative of Japanese speakers who are not involved in poetry performing arts, and the results can be more easily generalized to a larger population of speakers than if the subjects were skilled performers.

#### **4.3 Script Description**

*Haiku* is typically defined as verse with two requirements: (i) a 5-7-5 mora poetic structure consisting of 17 total moras, and (ii) *ki-go* ‘seasonal word’; this requirement is such that a seasonal word, for example, the name of a season, flower or weather condition, that has a strong association with one of the four seasons, constitutes a part of the poem (Unger, 1978; Takaha, 1982). After consideration of these points, it became apparent that some of the scripts used for this experiment did not meet both of the requirements of being a *haiku*; they did not all contain *ki-go*. However, all of the verses met the first of these criteria, in that they consisted of 5-7-5 mora. Therefore, any verse consisting of 5-7-5 mora, regardless of the presence or absence of *ki-go* or whether

the structure is prose-like or verse-like, is treated as *haiku* and the term *haiku* shall be used to refer to this broader meaning.

There are four different types of scripts, termed: (I) Contemporary *haiku* in prose, (II) Contemporary *haiku* in verse, (III) Nonsense *haiku*, and (IV) Basho's Traditional *haiku* (Appendix B). I refer to type (I) as Contemporary *haiku* in prose because I composed these *haiku* specifically for the purposes of this experiment using colloquial wording that could easily appear in daily life. Although the *haiku* structure of 5-7-5 moras, with 17 total, remained intact, all other hints that the script was in fact a *haiku* were taken out; that is, the *haiku* appeared as normal prose, not as poetry. First, the scripts were given in one continuous line, without a spacing between words as is customary in Japanese prose writing. Second, the symbol *maru* (。), the equivalent of a period in English punctuation, was given in the script, since *maru* appears at the end of regular sentences in Japanese prose, as seen at the end of the example sentences in (1).

**(1) An Example Script from Contemporary *haiku* in Prose<sup>17</sup>**

- a) Japanese: モンタナの春がくるのはまだ先だ。  
Pronunciation: *mo n ta na no ha ru ga ku ru no wa ma da sa ki da.*  
Given translation: 'Spring won't come to Montana yet.'
- b) Japanese: その赤はかなりどぎつい色ですね。  
Pronunciation: *so no a ka wa ka na ri do gi tsu i i ro de su ne.*  
Given translation: 'The red is quite flashy.'

The script of the *haiku* in type (II), Contemporary *haiku* in verse is exactly the same as the script in the Contemporary *haiku* in prose. The differences between the two

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<sup>17</sup> All of the Contemporary *haiku* reprinted here and elsewhere in this thesis were created by and translated into English by the author.

types (I) and (II) is the use of spacing and the use of *maru*. In type (II), Contemporary *haiku* in verse, spacing is used between the lines as a visual reminder of the 5-7-5 poetic structure, but the sentence final *maru* is notably absent. An example script from Contemporary *haiku* in verse is shown in (2).

## (2) An Example Script from Contemporary *Haiku* in Verse

c) Japanese:	モンタナの	春が来るのは	まだ先だ
Pronunciation:	<i>mo n ta na no</i>	<i>ha ru ga ku ru no wa</i>	<i>ma da sa ki da</i>
Given translation:	‘Spring won’t come to Montana yet’		
d) Japanese:	その赤は	かなりどぎつい	色ですね
Pronunciation:	<i>so no a ka wa</i>	<i>ka na ri do gi tsu i</i>	<i>i ro de su ne</i>
Given translation:	‘The red is quite flashy’		

The Contemporary *haiku*, were specifically created for the purpose of investigating LP patterns and AC. Additionally, both type (I) and (II) were created in order to compare the differences between *haiku* in prose and in verse.

Type (III) is referred to as Nonsense *haiku* because they are composed of meaningless sequences of sounds, either the sound *ta* or combinations of the two sounds *ta* and *ra*<sup>18</sup>, but they are structured according to the 5-7-5 mora structure of *haiku* poetic verses. Use of the Nonsense *haiku* in this study allowed for investigation of surface pitch pattern, where there is no inherent LP assignment. An example script from a Nonsense *haiku* in verse is shown in (3). Note that while they are nonsense, the use of spacing

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18 Some Japanese words consist of only one mora. For example, *ta* can be realized as 田 ‘field’, 多 ‘many’ or 他 ‘other’ in Japanese. However, it is unlikely that many native Japanese speakers would make associations with these or other words when confronted with iterations of the same sound *ta*.

allows the Nonsense *haiku* to appear structurally the same as regular *haiku* to the subjects.

### (3) An Example Script from Nonsense *haiku*

e) Japanese:	た た た た た	た た た た た た た	た た た た た
Pronunciation:	ta ta ta ta ta	ta ta ta ta ta ta ta	ta ta ta ta ta
f) Japanese:	た ら ら ら ら	た ら ら ら ら ら ら	た ら ら ら ら
Pronunciation:	ta ra ra ra ra	ta ra ra ra ra ra ra	ta ra ra ra ra

Type (IV), referred to as Basho's Traditional *haiku*, were composed by the famous Japanese poet, Matsuo Basho (1644-1694)<sup>19</sup>. The examples used were taken from *Matsuo Zenshu* (1897). Due to Basho's status as a poet, many people, including the subjects taking part in this experiment, were familiar with his *haiku* or at least his name. Out of the seven Basho's Traditional *haiku* used in the scripts, a few poems in particular are especially famous. An example script from Basho's *haiku* is shown in (4).

### (4) An Example Script from Basho's Traditional *haiku*<sup>20</sup>

Japanese:	閑さや	岩にしみいる	蟬の声
Pronunciation:	shi zu ka sa ya	i wa ni shi mi i ru	se mi no ko e
Translation:	'How still it is here -- Stinging into the stones, the locusts' trill.'		

#### 4.3.1 Haiku Numbering and Line Identification

For the purposes of presenting the scripts to the subjects, each script is numbered according to the numbering system seen in (5). The single digit set of numbers, ranging

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19 Since the original *haiku* emergence was around the 6<sup>th</sup> c., Basho's *haiku* of the 17<sup>th</sup> c. should not be considered classical *haiku*. However, poetry from this era (the Edo period) is already referred to as "traditional" *haiku*, from the present-day point of view. Basho's influence on the *haiku* form is paramount: "he was ardently loved by his followers, and by later poets, and his Zen philosophy has thus been perpetuated in later *haiku*. It is, indeed, a key to completest appreciation of most *haiku*" (Beilenson, 1956: 4).

20 Translated by Donald Keene (Kurosawa, 2010: 84)

from Nos. 1-7 in (5a), refer to Contemporary *haiku* in prose. The set of two digits numbers ranging from Nos. 11-17 in (5b), refer to Contemporary *haiku* in verse. The set of two digit numbers ranging from Nos. 21-27 in (5c), refer to Nonsense *haiku*, while, the set of two digit numbers ranging from Nos. 31-37 in (5d), refer to Basho's Traditional *haiku*.

### (5) Numbering Systems

- (a) Nos. 1-7: Contemporary *haiku* in prose
- (b) Nos. 11-17: Contemporary *haiku* in verse
- (c) Nos. 21-27: Nonsense *haiku*
- (d) Nos. 31-37: Basho's Traditional *haiku*

The three lines of each *haiku* are identified individually as Line A, B and C. The first five constitute Line A, the next seven moras constitute Line B, and the final five moras constitute Line C, as shown in (6) below. Only Line Bs were analyzed in this thesis since many previous studies regarding *haiku* have also limited their investigations to only Line Bs. In addition, Line Bs consist of more moras than either Lines A or C, so more complex phonological and syntactical processes should be possible and observable. For example, No.11-B indicates *ha ru ga ku ru no wa* and No. 21-B indicates *ta ta ta ta ta ta ta ta*.

### (6) Line A, B and C

Script	Line A	Line B	Line C
No. 11	<i>mo n ta na no</i>	<i>ha ru ga ku ru no wa</i>	<i>ma da sa ki da</i>
No. 21	<i>ta ta ta ta ta</i>	<i>ta ta ta ta ta ta ta</i>	<i>ta ta ta ta ta</i>

#### 4.4 Tasks

There were two main tasks in the experiment. First, subjects were asked to fill out a demographic survey to identify their sex, age, place of birth, home city and dialect (see Appendix A). Second, subjects were given a total of 28 *haiku* divided into four sets of 7 *haiku* each, according to the four different types described previously: (I) Contemporary *haiku in prose*, (II) Contemporary *haiku in verse*, (III) Nonsense *haiku*, and (IV) Basho's Traditional *haiku*. Each set, consisting of one of the different types of *haiku* were given on a separate sheet of paper (see Appendix B). The first sheet contains seven Contemporary *haiku in prose* (this *haiku* set was shown without any spacing so that the *haiku* structure wouldn't be readily apparent to the subject). Subjects were given a few moments to read through them first, then they were asked to read them aloud using their normal discourse style, one by one. After completely reading all the seven Contemporary *haiku in prose* on the first sheet, subjects were given another sheet on which were written seven Contemporary *haiku in verse*. As mentioned earlier, the wording was exactly the same between this set of *haiku* and the preceding set; this time however, the manner that the script was written in visually reflected the *haiku* format. Furthermore, subjects were informed of the 5-7-5 poetic structure of the sentences. After completely reading all seven of the Contemporary *haiku in verse*, subjects were given another sheet on which were written seven Nonsense *haiku*. The same procedure was repeated; they were given a few moments to read the *haiku* and then asked to recite them aloud. After completing the set of seven Nonsense *haiku*, subjects were given the last sheet on which were written seven of Basho's Traditional *haiku*, and the same procedure

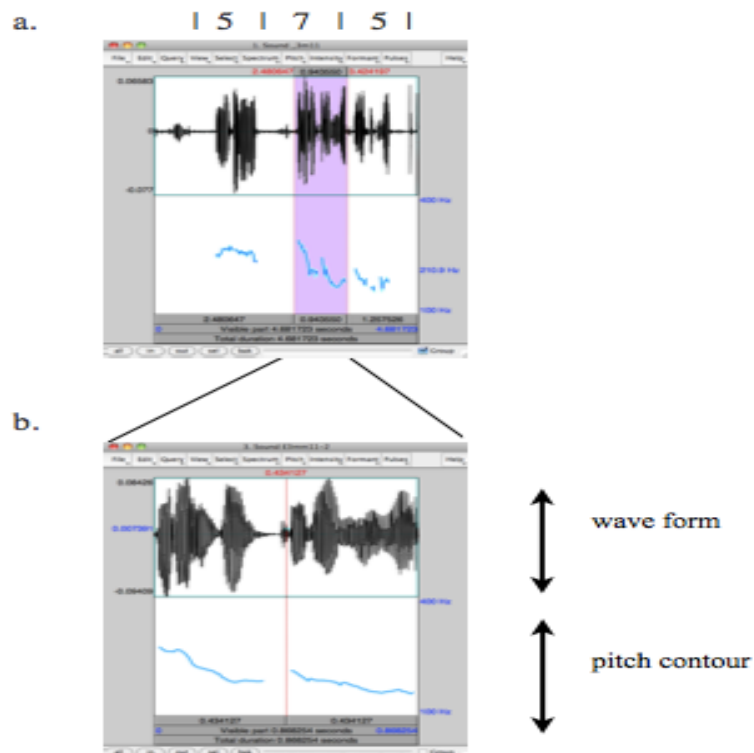


used for the preceding three types was repeated. The entire interview session was recorded both with Praat<sup>21</sup> and with an external audio voice recorder (Zoom Handy Recorder H2).

#### 4.5 Data Manipulation and Organization

In this section I discuss the way in which the recitation of the scripts was recorded, manipulated and organized. As mentioned earlier, only the recitation of Line B in each set was observed for analysis. In Praat, Line B was isolated and separated from the rest of the *haiku* and then magnified as shown below in (7): (a) shows the wave form and pitch contour of an entire *haiku*, while (b) shows just that of a Line B.

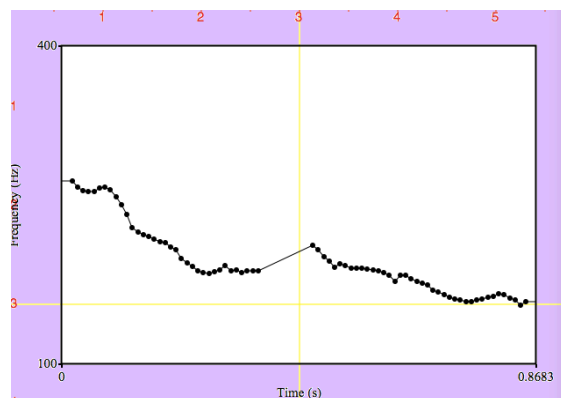
##### (7) Selection of Line B



<sup>21</sup> Praat is a free scientific software program for the analysis of speech in phonetics. It has been designed and continuously developed by Paul Boersma and David Weenik of the University of Amsterdam.

No subjects' frequency in recitation was less than 100Hz and none were greater than 400Hz, so the display range for Praat was set between 100-400Hz in order to magnify the images. The pitch was extracted from the recorded data, and then displayed separately. Again, the maximum frequency was set to a window of between 100-400Hz because this size window allowed the pitch contour to be displayed at a maximum size within that frame. The pitch contour was then copied to a clipboard and pasted into another document and utilized for analysis as in (8). Each pitch contour was named using the following protocol <Script No. X by (Subject x)> as shown in (8).

#### (8) Pitch Contour Shape



<No.11 by (a)>

This same procedure was used with all of the scripts; however, different observations and measurement methods were implemented depending on the types of *haiku* being observed. The results of analysis for each *haiku* type are discussed individually in subsections of §5.

## §5 Results & Analysis

The analyses are organized as follows: First, I observe Lexical Pitch (LP) patterns and Accentual Combinations (AC) for Contemporary *haiku* in prose and in verse. The data show that subjects recited the phrases with expected LP patterns and AC. Second, I observe LP patterns and AC for Basho's Traditional *haiku*. Compared with the recitation of Contemporary *haiku*, subjects recited Basho's Traditional *haiku* with expected LP patterns and AC at a significantly lower percentage. This is attributed to subjects' unfamiliarity with some of the lexemes used in these older *haiku* and to the *focus* that subjects put on Basho's Traditional *haiku*. The subjects' unfamiliarity with some lexemes leads to the next investigation with Nonsense *haiku*. Third, the outcome indicates that Japanese phonology such as Inevitable Pitch Rise (§2.3.2) is reflected in subjects' performances. Moreover, subjects tend to have a preferred pitch pattern even in reciting Nonsense *haiku* lacking any inherent LP. Fourth, comparing the pitch range between Contemporary *haiku* in prose and Contemporary *haiku* in verse, the results show that subjects recited Contemporary *haiku* in verse with a wider pitch range, which contains more notes of the musical scale, or melody than that in prose.

### 5.1 Contemporary *Haiku* in Prose and in Verse

The first observation was to examine each LP pattern and AC of Contemporary *haiku* in both prose and verse.

### 5.1.1 Contemporary *Haiku* in Prose: Lexical Pitch Observation

Japanese lexemes have idiosyncratically assigned LP patterns as I explained in §2.3. For this observation, only Line Bs of *haiku* were selected, as mentioned in §4.3.1. In order to make sure these assigned LP patterns truly exist in Contemporary *haiku*, I began examining LP in Contemporary *haiku* in prose form from the subjects' recitations. Table (1) shows the results of LP observations for Contemporary *haiku* in prose (Nos. 1-7).

#### (1) LP Pattern Observation - Contemporary *Haiku* in Prose

Script	Phrases	a	b	c	d	e	f	g	h
No. 1	<i>ha ru ga</i> (HLL)	√	√	√	√	√	√	√	√
	<i>ku ru no wa</i> (HLLL)	√	√ ↑	√	√	√	√	√ ↑	√
No. 2	<i>su ki na</i> (LHL)	√	√	√	√	√	√	√	√
	<i>ya sa i wa</i> (LHHH)	√	√ ↑	√	√	√	√	√	√
No. 3	<i>ka na ri</i> (HLL)	√	√	√	√	√	√	√	√
	<i>do gi tsu i</i> (LHHH)	√	√	√	√	√	√	√	√
No. 4	<i>ha ya ne</i> (LHL)	√	√	LHH	√	√	√	√	√
	<i>ha ya o ki</i> (LHHL)	√	√	HHLL	√	√	√	√	√
No. 5	<i>a su no</i> (LHH)	√	√	√	√	√	√	√	√
	<i>te n ki wa</i> (HLLL)	√	√	√	√	√	√	√	√
No. 6	<i>ki no o no</i> (LHHH)	√	√	√	√	√	√	√	√
	<i>te su to</i> (HLL)	√	√	√	√	√	√	√	√
No. 7	<i>ko no ko wa</i> (LHHL)	√	√	√	√	√	√	√	√
	<i>i tsu ka</i> (HLL)	√	√	√	√	√	√	√	√

The LP patterns are indicated by pitch with the symbols L (low) and H (high). The script number, phrasal content and expected LP patterns (in parentheses) are offered in the

table. Each script is divided into two rows and represents the syntactic constituents in a compound phrase; the upper row contains the first constituents and the lower row contains the second constituents, for each *haiku*. For example, No. 1 *haruga - kurunowa* consists of the upper row *haruga* and the lower row *kurunowa*. The eight subjects (a-h) are listed along the top of the table. When a subjects' LP pattern of recitation matches the expected LP pattern, the check symbol (✓) is given. For example, the expected LP pattern for *haruga* of script No. 1 is HLL. Since subject (a) recited the phrase with a HLL LP pattern as expected, the check mark (✓) appears in the field for subject (a), No. 1. The upward-pointing arrow (↑) indicates that the pitch of the final mora was increasing. I term this phenomenon, Final Pitch Rise. An underlined H next to (↑) shows that the pitch was raised higher than the rest of the Hs. I discuss the phenomenon of (↑) more later in §5.3.4

Table (1) shows that the subjects' LP patterns for all of the recitations matched the expected LP patterns except for subject (c) with regards to the entirety of script No. 4. One possible reason subject (c) recited No. 4 *hayane - hayaoki* (lit. 'early to bed, early to rise') with a LHHHLL pitch pattern may be due to the subjects' reinterpretation of the phrase. Subject (c) may have considered the phrase to be an idiom. As stated earlier in §2.3.2, having two pitch peaks in a single phrase is a violation of Japanese phonology (Terminal Fall). Assuming that subject (c) reinterpreted the phrase as an idiom, the phrase can then be analyzed as a single noun phrase instead of a compound phrase, which exhibits AC and allows for two peaks. That is the justification for why the other subjects recited *hayane* with the LHL LP pattern and *hayaoki* with the LHHL LP pattern, which

each have an instance of high pitch for a total of two high pitch peaks for that phrase, while subject (c) recited the same phrase, *hayane - hayaoki* with the LHHHLL<sup>22</sup> pitch pattern, with only one high pitch peak throughout the entire phrase. Therefore, it is reasonable to assume that she reinterpreted the phrase as an idiom. Since only this one phrase was recited with an unexpected pitch pattern, I conclude that the LP patterns for Contemporary *haiku* in prose are retained and shared by native Japanese speakers in general.

### 5.1.2 Contemporary *Haiku* in Verse: Lexical Pitch Observation

Next, I observed LP patterns for Contemporary *haiku* in verse (Nos. 11-17) as shown in Table (2). The exclamation mark (!) indicates that the pitch of the penultimate mora is increasing. I define this phenomenon as Semi Final Pitch Rise and discuss it later in §5.3.4 along with Final Pitch Rise.

Interestingly, the results of the LP pattern observations for Contemporary *haiku* in verse (Nos. 11-17) were almost the same as for Contemporary *haiku* in prose (Nos. 1-7), even including the exceptions by subject (c) for the entirety of No. 4. The explanation for subject (b)'s unexpected pitch patterns for Contemporary *haiku* in verse, No. 14 is omitted because it is assumed to follow the same justification as offered for Contemporary *haiku* in prose in §5.1.1. The fact that almost all of the Contemporary *haiku* in both prose and verse were recited with expected pitch patterns supports the argument that subjects succeed in assigning expected LP patterns. Since subjects recited the phrases with the expected LP whether the scripts were written in prose or verse, I

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22 This LP pattern shows *default-accent* as well. I explain this in more detail in section 5.3.

claim that LP is a fundamental pitch pattern that cannot be violated. This makes sense since in Japanese, LP has semantic associations.

## (2) LP Pattern Observation - Contemporary *Haiku* in Verse




Script	Phrases	a	b	c	d	e	f	g	h
No. 11	<i>ha ru ga</i> (HLL)	√	√	√	√	√	√	√	√
	<i>ku ru no wa</i> (HLLL)	√	√ ↑	√	√	√	√	√	√
No. 12	<i>su ki na</i> (LHL)	√	√	√	√	√	√	√	√
	<i>ya sa i wa</i> (LHHH)	√	√ ↑	√	√	√ ↑	√	√	√
No. 13	<i>ka na ri</i> (HLL)	√	√	√	√	√	√	√	√
	<i>do gi tsu i</i> (LHHH)	√	√ !	√	√	√	√	√	√
No. 14	<i>ha ya ne</i> (LHL)	√	√	LHH	√	√	√	√	√
	<i>ha ya o ki</i> (LHHL)	√	√	HHLL	√	√	√	√	√
No. 15	<i>a su no</i> (LHH)	√	√	√	√	√	√	√	√
	<i>te n ki wa</i> (HLLL)	√	√	√	√	√	√	√	√
No. 16	<i>ki no o no</i> (LHHH)	√	√	√	√	√	√	√	√
	<i>te su to</i> (HLL)	√	√	√	√	√	√	√	√
No. 17	<i>ko no ko wa</i> (LHHL)	√	√	√	√	√	√	√	√
	<i>i tsu ka</i> (HLL)	√	√	√	√	√	√	√	√

### 5.1.3 Contemporary *Haiku* in Prose: Accentual Combination Observation

The previous section discussed LP patterns; this section is concerned with their Accentual Combinations (AC). As explained in §2.3.3, AC is found in compound phrases where there are two potential accentual phrases. LP is automatically assigned when a phrase is chosen, then AC are determined based on LP assignment. Since each Japanese phrase is rather short, compound phrases are likely to appear in Line Bs that contain seven moras. In fact, all Line Bs of the script I used for the experiment consist of

two phrases, so examining AC is crucial to explaining pitch pattern tendencies. Table (3), repeated from §2.4, shows the three types of AC: AA, AU and UA that occur in script Nos. 1-7.

### (3) Accentual Combinations

Expected AC	AA	AU	UA
Pitch Contour Shapes			

Since these expected AC and their corresponding pitch contour shapes are used as a basis for my analyses, I first examine Contemporary *haiku* in prose to see whether or not the AC of the performances match these expected AC. The results are shown in Table (4).

### (4) AC Observation - Contemporary *Haiku* in Prose

AC, Script Number & Phrases		a	b	c	d	e	f	g	h
AA	No. 1 <i>ha</i> ↓ <i>ru ga</i> - <i>ku</i> ↓ <i>ru no wa</i>	√	√ ↑	√	√	√	√	√ ↑	√
	No. 4 <i>ha ya</i> ↓ <i>ne</i> - <i>ha ya o</i> ↓ <i>ki</i>	√	√	11/2	√	√	√	√	√
	No. 7 <i>ko no</i> ↓ <i>ko wa</i> - <i>i</i> ↓ <i>tsu ka</i>	√	√	√	√	√	√	√	√
AU	No. 2 <i>su ki</i> ↓ <i>na</i> - <i>ya sa i wa</i>	√	√ ↑	√	√	√	√	√	√
	No. 3 <i>ka</i> ↓ <i>na ri</i> - <i>do gi tsu i</i>	√	√	√	√	√	√	√	√
UA	No. 5 <i>a su no</i> - <i>te</i> ↓ <i>n ki wa</i>	√	√	√	√	√	√	√	√
	No. 6 <i>ki no o no</i> - <i>te</i> ↓ <i>su to</i>	√	√	√	√	√	√	√	√

Contemporary *haiku* in prose Nos. 1-7 are classified into AA, AU and UA subcategories, as seen in the lefthand column. The presence of a large ‘A’ with a small one (AA), not only indicates an AC as AA but also indicates the *downstep* phenomenon



(§2.3.3). Various symbols are used in this table and are defined as follows. The (✓) is given when the AC of a subject's recitation corresponds with the expected one.

Unexpected AC patterns are indicated as follows: The symbol (/1) indicates a counter expectation for UA; the AC for UA should be L in the first phrase and H in the second phrase, but the symbol (/1) indicates that the first peak is higher than the second peak.

The symbol (/2) shows an unexpected outcome for AA, whereby the second peak is higher than the first peak, since the first peak should be higher in the expected AC for AA (*downstep* §2.3.3). The symbol (/1/2) indicates unexpected pitch contours for all the AC types. One peak is supposed to be higher than the other, but the symbol (/1/2) indicates that the height of the first and second peaks are level.

According to Table (4), all subjects recited script Nos. 5 & 6 in UA and Nos. 2 & 3 in AU along with the expected AC, except for subject (c)'s recitation of No. 4 in AA. This unexpected AC could be caused by the subject's lexical reanalysis of the phrase as an idiom, as observed and discussed in the LP results for §5.1.1. Overall, I conclude that the AC for Contemporary *haiku* in prose match the expected AC and that this is a shared trait among native Japanese speakers in general, since only one phrase was recited with unexpected AC.

#### **5.1.4 Contemporary *Haiku* in Verse: Accentual Combination Observation**

I conducted the same observations and checked AC for Contemporary *haiku* in verse (Nos. 11-17) as shown in Table (5).

**(5) AC Observation - Contemporary *haiku* in verse**

AC and Scripts		a	b	c	d	e	f	g	h
AA	No. 11 <i>ha</i> ↓ <i>ru ga</i> - <i>ku</i> ↓ <i>ru no wa</i>	✓	✓↑	✓	✓	✓	✓	✓	✓
	No. 14 <i>ha ya</i> ↓ <i>ne</i> - <i>ha ya o</i> ↓ <i>ki</i>	✓	✓	Λ1Λ2	✓	✓	✓	✓	✓
	No. 17 <i>ko no</i> ↓ <i>ko wa</i> - <i>i</i> ↓ <i>tsu ka</i>	✓	✓	✓	✓	✓	✓	✓	✓
AU	No. 12 <i>su ki</i> ↓ <i>na</i> - <i>ya sa i wa</i>	✓	Λ1Λ2↑	✓	✓	✓↑	✓	✓	✓
	No. 13 <i>ka</i> ↓ <i>na ri</i> - <i>do gi tsu i</i>	✓	Λ2!	✓	✓	✓	✓	✓	✓
UA	No. 15 <i>a su no</i> - <i>te</i> ↓ <i>n ki wa</i>	✓	✓	✓	✓	✓	✓	✓	✓
	No. 16 <i>ki no o no</i> - <i>te</i> ↓ <i>su to</i>	✓	✓	✓	✓	✓	✓	✓	✓

Three unexpected AC are found in Table (5). Subject (b) recited Nos. 12 & 13 in AU with unexpected AC as did subject (c) with No. 14 in AA. Regarding No. 14, the same explanations as offered in §5.1.3 for AC in Contemporary *haiku* in prose are applied to the phenomena here, which is due to the subjects' reanalyses of the phrases. As for Nos. 12 & 13, I believe the subjects applied *focus*. I go into more detail regarding this phenomenon in §5.2, through an analysis of Basho's Traditional *haiku*, where it was a more common occurrence.

To summarize this section, the data show that once lexemes are chosen, the LP patterns produced by the subjects' in the recitations were predetermined. Moreover, once LP is assigned, AC also accompany the LP assignments. Most of the recitations matched the expected LP and AC. This suggests that fundamental LP is the main melody of *haiku*. In §5.2 I conduct the same observation for Basho's Traditional *haiku* to see if the results from this section apply or not. As the term "traditional" suggests, Basho's 17<sup>th</sup> century *haiku* sometimes include rather classical and unfamiliar vocabulary for the subjects in the

experiment, as may be the case for many modern speakers of contemporary Japanese.

How LP and AC are affected when the subjects are faced with unfamiliar lexemes in this manner is discussed in more detail in the subsequent section.

## **5.2 Basho's Traditional *Haiku***

The previous section observed how LP and AC are realized in recitation performances of Contemporary *haiku*. This section investigates whether or not the same results for LP and AC found in the previous section are also found in Basho's Traditional *haiku* — *haiku* composed by the well-known Japanese poet, Matsuo Basho. Some published versions of *haiku*, including those of Basho's, are not necessarily displayed in the format of three line spacing, but all the *haiku* in verse used in my experiment were written with spacing in between the lines as a visual reminder to subjects that the lines were verse.

### **5.2.1 Basho's Traditional *Haiku*: Lexical Pitch (LP) Observation**

In this section I present the results found from my observation of LP in Basho's Traditional *haiku*. The same procedure is followed here as was followed for the observation of the Contemporary *haiku*. Table (6) shows a summary of these results and contains the following information: Script No. and the examined phrase with expected LP indicated in parentheses. Subjects are again identified with letters (a-h). When subjects recited a phrase using the expected LP, the phrase is assigned a check symbol (✓). Basho's Traditional *haiku* contain certain lexical items which are not often used in modern Japanese; that is, for the average Japanese speaker, while the lexeme may or may

not be known, they are unfamiliar to the extent that the LP that is assigned to these items is unknown. I myself needed to investigate the LP for these words from the Japanese pitch-accent dictionary, *Meikai Nihongo Akusento Jiten* (Kindaichi, 1958). These rarely used lexical items are marked with a triangle (Δ).

#### (6) Basho's Traditional *Haiku* LP Observation

Script	Phrase	a	b	c	d	e	f	g	h
No. 31	<i>u mi ni</i> (HLL)	✓	✓	✓	✓	✓	✓	✓	✓
	<i>i re ta ri</i> (LHHL)	✓	✓!	✓	✓	✓	✓	✓	✓
No. 32	<i>ka wa zu</i> (LHH)	✓	✓	✓	✓	✓	✓	✓	✓
	<i>to bi ko mu</i> (LHHL)	✓	LHHH ↑	✓	✓	✓	✓	✓	✓
No. 33	<i>i wa ni</i> (LHL)	✓	✓	LHH	✓	✓	✓	✓	✓
	<i>shi mi i ru</i> (LHHL)	✓	✓!	HHHL	✓	✓	✓	✓	✓
No. 34	<i>yu ku hi to</i> (LHHH)	✓	✓	✓	✓	✓	✓	✓	✓
	<i>na shi ni</i> (HLL)	✓	HLH↑	✓	HLH↑	✓	HLH↑	✓	✓
No. 35	Δ <i>na me shi ni</i> (HLLL)	✓	LHHH	LHHH	LHHH	LHHH	LHHH	LHHH	✓
	<i>tsu ma n</i> (LHL)	✓	✓!	✓	✓	✓	✓	✓	✓
No. 36	<i>te nu gu i</i> (LHHH)	✓	✓	LHLL	✓	✓	✓	✓	LHLL
	Δ <i>a bu ru</i> (LHL)	✓	LHH	✓	LHH↑	✓	LHH	LHH	✓
No. 37	Δ <i>chi do ri yo</i> (HLLL)	LHHH	LHHH	LHHH	LHHH	✓	LHHH	LHHH	✓
	<i>yu ki no</i> (LH(H))	HHL	LHH↑	LHH	LLH	LHH	HHH	HLL	LHL

The results seen in Table (6) show that more unexpected pitch patterns occur in Basho's Traditional *haiku* than were seen in the Contemporary *haiku* (Tables 1 & 2). There are a few possible explanations to account for this unexpectedness besides the emergence of Final Pitch Rise (↑) and Semi-Final Pitch Rise (!), which I explain more fully in §5.3.4.

Script No. 37 *yuki-no* is an example phrase with an unexpected pitch pattern; the expected pitch pattern for this phrase is shown to be LH(H), indicated by blue shading. The reason the last H of LH(H) is in parentheses is that this portion of the pitch pattern can be variable. Particles such as the subject marker *ga* or topic marker *wa* usually trigger quite predictable lexical pitch assignment. Vance (2008) states that the genitive marker *no* however, often behaves differently, especially when it combines with a noun consisting of more than one mora that is accented on the final mora. Frequently, this accent on the final mora will disappear before *no*, and the resulting combination is unaccented. In No. 37 *yuki* has more than one mora and is also accented on the final mora. Therefore, the pitch-accent pattern is variable, but “the loss of noun-final accent before *no* is quite inconsistent” (Vance, 2008:156).

A significant number of unexpected LP are also found in the phrases from script No. 35 *nameshi-ni* (lit. ‘rice with green vegetables’), No. 36 *aburu* ‘roast’ and No. 37 *chidori-yo* ‘plover’, indicated by the pink shading. (7) shows both the expected LP pattern as taken from the dictionary as well as the subjects’ actual performance of these phrases. Both the locative marker *ni* and ending marker *yo* are disregarded in (7); the dictionary gives only the pitch patterns for the head constituents of a phrase, and does not include the particles in the LP pattern. For example, *Meikai Nihongo Akusento Jiten* (Kindaichi, 1958) lists *nameshi* (No. 35) with an HLL LP, *aburu* (No. 36) with a LHL LP and *chidori* (No. 37) with an HLL LP. The observation indicates that subjects applied the pitch-pattern LHH, or the no-accent pitch pattern (§2.3.2), to all three examples. There are a few different ways to interpret and account for these findings.

## (7) LP Patterns

	Dictionary	Actual performance
No. 35 <i>na<sup>↓</sup> me shi</i>	HLL	LHH
No. 36 <i>a bu<sup>↓</sup> ru</i>	LHL	LHH
No. 37 <i>chi<sup>↓</sup> do ri</i>	HLL	LHH

Two possible explanations for the occurrence of the no-accent pitch pattern in the three examples in (7) exist. The first explanation I will discuss is a psycholinguistic one; subjects are more familiar with the LH word initial pitch pattern tendency because many Japanese words exhibit this word initial LH pitch pattern. In §2.3.2, I introduced the four different pitch patterns that are available for a single phrase in Japanese, which I repeat here for convenience: (a) no accent, (b) accent on the first mora, (c) accent on the second or subsequent mora, not including the final mora, and (d) accent on the final mora. Besides phrases with the second possibility, (b) accent on the first mora, which has a word initial HL pitch pattern, the other three patterns have a word initial LH pitch combination (Inevitable Pitch Rise §2.3.2). Therefore, the subjects may have favored the LH word initial pitch combination over a word initial HL pitch combination because they are exposed to more instances of LH pitch pattern in daily life. The idea is that the subjects' previous experiences and existing lexical inventories influenced their speech production when facing unfamiliar words. This influence of experience on speaker performance is supported by Ohno (2000, 2006, 2008) in a study on *Rendaku*<sup>23</sup>. Ohno (2008) challenges the findings of previous research on the phonological rules found in the

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<sup>23</sup> *Rendaku* "refers to the replacement of a morpheme initial voiceless obstruent with a voiced obstruent" (Vance, 1987:133).

production of *Rendaku*, and claims that the subjects' previous exposure to similar patterns influenced their use of these patterns when coining words and phrases.

Another potential explanation has to do with the influence of Japanese phonology. Since the meanings of the lexemes were unfamiliar to the subjects, they were unable to assign proper LP. The subjects failed to assign any lexical pitch-accent because they were not familiar with these lexical items. The subjects' unfamiliarity with these lexemes essentially reduced the phrases to meaningless ones. Therefore, subjects simply recited these unfamiliar phrases with the no-accent pattern, as might be expected for the Nonsense *haiku* observation in §5.3.

It is impossible to completely disregard either the psycholinguistic or phonological explanations for why the subjects recited the phrases with the LHH(H) pitch pattern. In my own observations regarding Nonsense *haiku* in §5.3, I posit that phonological factors, such as the lack of lexical Pitch-Accent, are able to account for these data; however, psycholinguistic factors, such as what Ohno proposes should not and cannot be overlooked. In addition to the explanations for unexpected LP patterns that I offer here, further potential explanations for the significantly higher number of unexpected LP patterns in Basho's Traditional *haiku* compared with the results from Contemporary *haiku* exist; that is, there are other factors affecting the assignment of LP which I will address next.

### **5.2.2 Basho's Traditional *Haiku*: AC Observation**

In §5.2.1, I discussed the possible explanations that can account for the unexpected LP patterns in Basho's Traditional *haiku*. This section concerns the various

AC that are found in Basho's Traditional *haiku*. Table (8) is organized according to the different AC types: AA and UA, (there were no AU or UU combinations in the scripts used for this experiment). The table also shows script numbers as well as the phrases of the *haiku*. The location of pitch accent is indicated by the down-pointing arrow (↓). As in §5.1.2, where the (√) indicated a response that fit the expected LP pattern, the same check symbol is used here to indicate that a subjects' recitations fit the expected AC. The symbols (Λ1) and (Λ2) indicate unexpected AC for UA and AA, respectively. The symbol (Λ1Λ2) indicates unexpected AC for all the types. The shaded cells in gray show overlap between the unexpected AC with the unexpected LP from the previous section. The subjects recited the phrases with unexpected LP patterns (See Table (5)); that is, either the first or second pitch peak is higher than the expected pitch contour for AA or UA. Again, the discussion Final Pitch Rise (↑) and Semi-Final Pitch Rise (!), is offered in §5.3.4.

#### (8) Basho's AC Observation

AC	Script	Phrase	a	b	c	d	e	f	g	h
AA	No. 31	<i>u ↓ mi ni - i re ta ↓ ri</i>	√	Λ2!	√	√	√	Λ1Λ2	√	√
	No. 33	<i>i wa ↓ ni - shi mi i ↓ ru</i>	√	Λ2!	Λ1Λ2	√	√	√	√	√
	No. 34	<i>yu ku hi to ↓ - na ↓ shi ni</i>	√	Λ2 ↑	√	√ ↑	√	√ ↑	√	Λ2
	No. 35	<i>na ↓ me shi ni - tsu ma ↓ n</i>	√	Λ2 !	Λ1Λ2	Λ1Λ2	Λ1Λ2	Λ1Λ2	Λ1Λ2	√
	No. 37	<i>chi ↓ do ri yo - yu ki ↓ no</i>	√	Λ2 ↑	Λ2	√	√	Λ1Λ2	Λ2	√
UA	No. 32	<i>ka wa zu - to bi ko ↓ mu</i>	Λ1Λ2	Λ1Λ2 ↑	Λ1Λ2	Λ1Λ2	Λ1Λ2	√	Λ1Λ2	Λ1Λ2
	No. 36	<i>te nu gu i - a bu ↓ ru</i>	√	Λ1	Λ1	Λ1 ↑	Λ1	Λ1	Λ1	Λ2

As seen in Table (8) many unexpected AC are found. There are three reasons to justify the emergence of these unexpected AC.



First, as Table (8) indicates, of the AA AC phrases, there were more occurrences of unexpected AC in Nos. 35 and 37 than in Nos. 33 and 34. Since the LP of Nos. 35 and 37 was also unexpected, there appears to be a correlation between unexpected AC and unexpected LP. When an AC is AA, the pitch contour shape forms a *downstep*<sup>24</sup>. However, quite a few violations of (M2) occurred, where the second pitch peak was higher than the first one. The reason why many subjects recited the phrases with this violation was due to the correlation between AC and LP. The LP pattern that the subjects assigned these phrases was LHHH, which correlates with no-accent LP; this results in an unaccented first syntactic component in AC. Therefore, many unexpected UA AC emerged.

A second reason why subjects recited the phrases with unexpected AC may be due to *focus* (Vance, 2008; Pierrhumbert and Beckman, 1988), at least for the case of UA. Vance (2008) states that “(w)hen a speaker feels that one or the other of the two components in a two component combination conveys particularly important information, the usual response is to put Focus on the component” resulting in unexpected high pitch. It is difficult to observe *focus* in AA because of instrumental factors<sup>25</sup>. *Focus* is likely to create emphasis where the subjects think important information is being conveyed. During the experiment, subjects were reminded that the *haiku* sets were composed by Matsuo Basho. Basho is considered to be one of the most famous of Japanese poets and

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24 *Downstep* is a Japanese phonological phenomenon where the first pitch peak is higher than the second one in both AA and AU pitch contours.

25 As long as the pitch contour shows *downstep* for AA AC, any slight increase in pitch level is unlikely to be observable. This is why, it is impossible to investigate how subjects apply *focus* with accented phrases. It is much easier to investigate how subjects apply *focus* with unaccented phrases, as in UA, since the increase in pitch level will be more visible in unaccented phrases.

his *haiku* often appear regularly in print, such as in Japanese textbooks, literature, and in media. Therefore, most people who received an education in Japan are familiar with his poetry, or at least his name. That is, it is probable that the subjects have heard Basho's *haiku* recited, and that they associate these *haiku* with a particular formality or social status. This formality, and perhaps the familiarity with the methods of recitation may have influenced the subjects' use of *focus* and subsequently, the outcome of their LP and AC. This is difficult to prove however and would entail a separate investigation; for the purposes of this thesis though, I claim that whenever subjects recite Traditional *haiku* with a higher than expected pitch, this is due to *focus*, and this is one of the primary reasons for the resulting unexpected AC.

The third and final reason for the unexpected AC is due to reinterpretation, as can be seen in subject (c)'s recitation of No. 4 *hayane - hayaoki*. She recited No. 33 *iwani - shimiiru* with a LHHHHHL LP pattern even though the expected AC was LHL-LHHL. Subject (c) may have interpreted the entire phrase as a single phrase. Since only a single high pitch peak is observed in this recitation, the first and second components of AC appear to be at about the same level (M1/2).

As a summary of the observation of Basho's Traditional *haiku* recitations, both unexpected LP patterns and unexpected AC were seen more in Basho's Traditional *haiku* than in Contemporary *haiku*, both in prose and in verse. As Table (8) indicates, there are 29 instances of unexpected AC, and 19 of them correspond with instances of unexpected LP as well, which suggests that unexpected LP and AC are overlapping. These observations can be explained by one or more of the following explanations: (i) the

subjects were unfamiliar with the proper LP assignment for some lexemes due to unfamiliarity with the lexemes themselves; the result of unfamiliarity is an example of LP shift to a no-accent pattern, (ii) the subjects use of *focus*, and (iii) the subjects reinterpretation of a phrase as an idiom or set phrase.

### 5.3 Nonsense *Haiku*

One of the significant findings from the previous section was that subjects tended to recite phrases with a no-accent pattern (§2.3.2) when they were not familiar with the vocabulary, suggesting they were unable to assign LP. I clarify this phenomenon by experimenting with the pitch patterns by means of Nonsense *haiku*. This section presents Nonsense phrases that consist of 7 moras of the sound *ta* or combinations of *ta* and *ra*, all lacking any inherent LP assignment.

As discussed in §2.2, every Japanese word has an assigned LP pattern, so examining Nonsense *haiku* verses was necessary in order to detect surface pitch patterns, by separating the pitch patterns from the words. Having the subjects read nonsense verses made it possible to identify the range of strategies subjects use to create pitch patterns (or to identify the surface pitch patterns). Line Bs of Nonsense *haiku* consist of seven moras of *ta* or a combination of *ta* and *ra*, as mentioned earlier. The letter ‘T’ represents *ta* and the letter ‘R’ represents *ra*, as shown in (9). For example, No. 22 is a seven mora line consisting of *ta ta ta ra ra ra ra*.

### (9) Nonsense *Haiku* Script

	μ	μ	μ	μ	μ	μ	μ
No. 21	T	T	T	T	T	T	T
No. 22	T	T	T	R	R	R	R
No. 23	T	T	T	T	R	R	R
No. 24	T	T	T	T	T	R	R
No. 25	T	T	T	T	T	T	R
No. 26	T	R	R	T	R	R	R
No. 27	T	R	R	R	T	R	R

By examining the  $F_0$  of the Nonsense *haiku* recitations, only no-accent pitch patterns are expected to occur in the environment of no LP assignment, which I term (a) “Plateau” type. However, unexpectedly, pitch patterns do occur as if accents were assigned by the subjects themselves, which I term (b) “Default” type. Each type has a few variations which are described in more detail in the next section.

#### 5.3.1 Plateau Type

The first type I call Plateau, which has two variations: Plateau-Flat (P-F) and Plateau-Dcline (P-D) as shown in (10a) and (10b), respectively. The difference between (10a) and (10b) is whether the pitch contour remains flat or declines after the *Inevitable Pitch Rise* of the second mora.

### (10) Plateau Pitch Contour

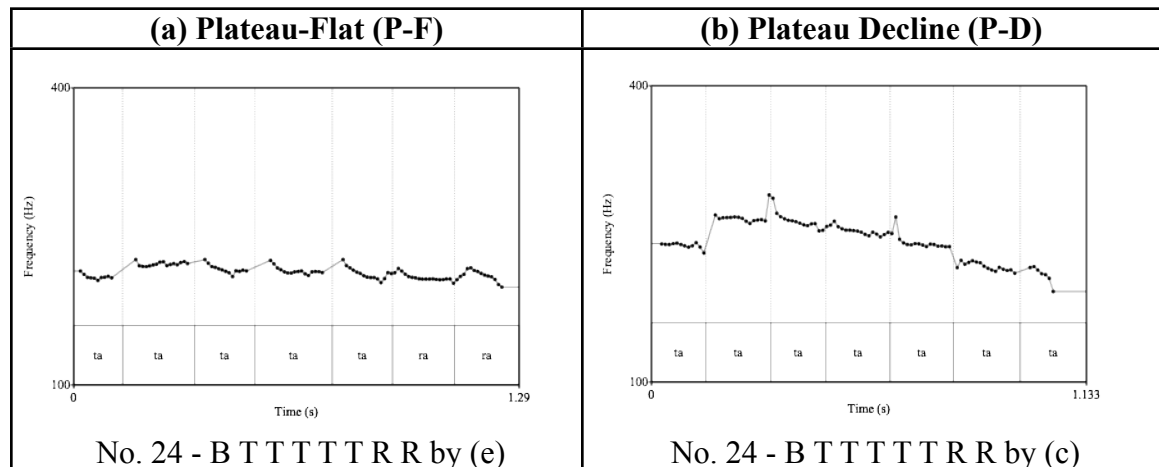


Table (11) shows the occurrence of both the Plateau-Dcline and Plateau-Flat pitch contour types. I discuss the Final Pitch Rise (↑) in more detail, later in §5.3.4.

#### (11) Plateau Pitch Contour Occurrence

	a	b	c	d	e	f	g	h
<b>No. 21 T T T T T T T</b>	P-D	P-D↑	P-D		P-F		P-D	P-D
<b>No. 22 T T T R R R R</b>			P-D		P-F		P-D	
<b>No. 23 T T T T R R R</b>	P-D				P-D		P-D	P-D
<b>No. 24 T T T T T R R</b>	P-D	P-D↑			P-F		P-D	P-D
<b>No. 25 T T T T T T R</b>	P-D↑	P-D↑	P-D↑		P-F↑		P-D	P-D
<b>No. 26 T R R T R R R</b>	P-D	P-F↑		P-D	P-F			P-D
<b>No. 27 T R R R T R R</b>	P-D	P-D↑	P-D		P-F			P-D

Table (11) shows that Plateau-Flat pitch contours are found 7 times whereas Plateau-Dcline pitch contours are found 27 times. The phenomenon of decline is found more in recitations and this is explainable through phonetic and/or phonological theories. I analyze that this is caused by the *declining* phenomenon. The *declining* phenomenon is a situation where a speaker's voice frequency gradually drops towards the end of an utterance (Ohara et al., 2004). Whether this *declining* phenomenon is derived from either phonetic or phonological factors is a matter of ongoing debate. As for the phonetic factors, it has been proposed that there is a relationship between the air supply of the lungs and the *declining* phenomenon (Maeda, 1974, 1976; Strik and Boves, 1995). Others have proposed that this *declining* is an effect of 'purposeful refreshment' applied by speakers who have time to plan in advance a gradual decline of the phrase (Ohara et al., 2004).

It is not easy to determine whether the emergence of frequent occurrences of Plateau-Dcline in reciting Nonsense *haiku* is due to the influence of phonetic or phonological factors; however there are a few reasons to suggest that phonological factors may have influenced subjects to recite phrases with Plateau-Dcline instead of Plateau-Flat. First of all, as Ohara et al. (2004) mentions, the presence of a written script caused their subjects to plan how they would recite the verses. This adequate planning time allowed the subjects to gradually decline the pitch of their recitations towards the end of the verses in order for listeners to parse them more easily. The second reason is visible spacing between the lines on the script. Cole & Miyashita (2006) state the importance of pauses for traditional Japanese verses, and state that “pauses are an inherent part of Japanese meter”. If pauses play an important role in the analysis of traditional verses in Japanese, visible spacing should also play an important role and influence subjects’ recitations. With the help of these “visible pause cues”, it is easy to imagine that the 5-7-5 poetic structure appears to stand more independently line by line. It follows then, that the presence of “visible pause cues” helped the subjects apply *decline* as ‘purposeful refreshment’ before moving on to the next line.

Moreover, many subjects who recited with Plateau-Flat made mistakes reciting them, so they seemed to struggle to recite the line Bs because they had to focus on counting the seven mora which are composed of repetitions of the sounds *ta* and *ra* that don’t bear any meaning. It is easy to lose the *haiku* “flavor” and switch to a monotonous rhythm once subjects take too long to count the moras. For these reasons, subjects recited more phrases with Plateau-Dcline pitch contour patterns.

### 5.3.2 Default Type

The second type I call Default type, which means that pitch contours appear as if accent is assigned in the phrase. The Default is named for the *default-accent* phenomenon in Japanese phonetics (Vance, 2008), because the pitch contour shares a similar tendency with *default-accent*, where the third mora from the end is accented and remains low pitch for the last two moras (§2.3.2). This *default-accent* tends to occur in either meaningless syllables or recently borrowed words (Vance, 2008: McCawley, 1968). The *default-accent* (D) type is further sub-divided into two variants: “Default 4” (D4) and “Default 5” (D5); these terms were chosen because it is the fourth and fifth mora from the end, respectively, that are higher than the rest of the phrase. For example, *default-accent* shown in (12a) indicates that the pitch of the third to last mora is higher compared with the final two. The fourth from last (12b) and fifth from last (12c) moras are higher than the rest in those respective Line Bs.

#### (12) Default Pitch Contour

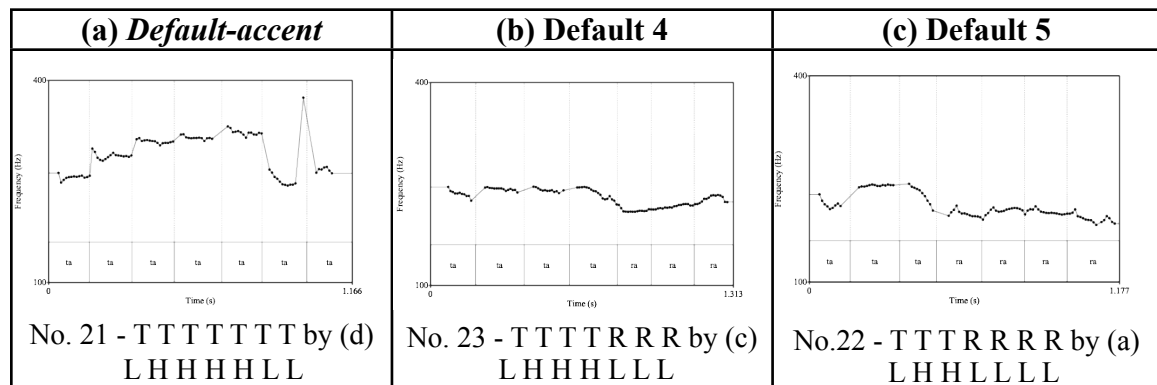


Table (13) shows the occurrences of *default-accent*, Default-4 and Default-5 pitch contour types.

### (13) Default Pitch Contour Occurrence

	a	b	c	d	e	f	g	h
<b>No. 21</b> T T T T T T T				D		D		
<b>No. 22</b> T T T R R R R	D5	D5↑		D4↑		D4		D5↑
<b>No. 23</b> T T T T R R R		D4↑	D4	D ↑		D ↑		
<b>No. 24</b> T T T T T R R			D4	D ↑		D		
<b>No. 25</b> T T T T T T R				D ↑		D		
<b>No. 26</b> T R R T R R R			D4			D5	D5	
<b>No. 27</b> T R R R T R R				D ↑		D	D4	

As for the number of pitch contour patterns in the recitation shown in Table (13), *default-accent* occurred ten times, Default-4 occurred seven times and Default-5 occurred five times. The occurrences of Default-4 and Default-5 may have been triggered by the sound combinations of *ta* and *ra*, because they were not found in the single mora sounds of No. 21 ‘T T T T T T T’. When the TR combinations are divided into either combinations of three & four moras such as No. 22 ‘[T T T] [R R R R]’ and No. 26 ‘[T R R] [T R R R]’, or combinations of four & three moras such as in No. 23 ‘[T T T T] [R R R]’ and No. 27 ‘[T R R R] [T R R]’ it may unconsciously remind the subjects of morpho-syntactic segmentations. Subjects may have recited these phrases with Default-4 and Default-5 patterns based on their experience of seeing three & four and four & three mora divisions in *haiku*. This is quite similar to how Ohno (2008) suggests people tend to compose new *rendaku* terms based on what they have heard in the past. Crucially, the TR combinations may have influenced, but could not have determined the pitch patterns because the same variations were also found in the recitations for No. 21 which is

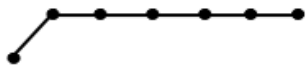
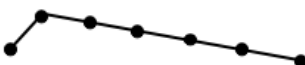
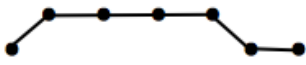
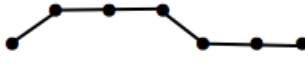
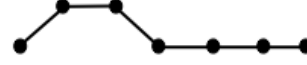


composed of only one repeated mora. Even though subjects' experiences triggered the recitations with Default-4 and Default-5 patterns, these occurrence can also be explainable through Japanese phonology.

### 5.3.3 Japanese Phonological Reflections

The illustrations in Table (14) show the simplified pitch contour variations that were observed above: Plateau and Default types.

(14) Simplified Pitch Contours

	Variation 1	Variation 2	Variation 3
<b>Plateau</b>	(a) Plateau-Flat	(b) Plateau-Default	-
			-
<b>Default</b>	(a) Default-Accent	(b) Default 4	(c) Default 5
			

Some of the pitch patterns shown in (14) can be analyzed and explained by Japanese phonology. Observing the illustrations, a few common Japanese phonological features are found. First, all the pitch contours start with a low pitch for the first mora, and increase towards the second mora (Inevitable Pitch Rise). The reason why none of the subjects initiated HL pitch patterns must be due to the characteristics of the Nonsense *haiku*, which lack LP assignment. When there isn't any assigned accent, it is reasonable to recite the phrase with no-accent, resulting in the Inevitable Pitch Rise. In addition, this phenomenon involves another Japanese phonological rule, namely Variable Level Pitch Start, because the pitch height of the first and second moras differ. The third common feature that is found in Plateau and Default Types is Terminal Fall, which states that once

a pitch contour falls, it can not rise again within that same single phrase. The Inevitable Pitch Rise, Variable Level Pitch Start and Terminal Fall phenomena are considered fundamental Japanese phonological constraints (§2.3.2). The outcomes indicate that native Japanese speakers do obey Japanese phonological rules even with regards to Nonsense *haiku* that are not assigned any accent.

Based on the observation of Nonsense *haiku* recitations, native Japanese speakers share the two main pitch-patterns of Plateau and Default. Although there are a few variations for each pattern, the subjects' recitations of the phrases are explainable through Japanese phonological tendencies such as *declining* for Plateau-Drop type and *default-accent* for Default type. Moreover, other Japanese phonological rules regarding pitch are found: Inevitable Pitch Rise, Variable Level Start and Terminal Fall. That is, native Japanese speakers do not violate any rules of Japanese phonology, even with the nonsense sound combinations. In addition, the fact that a few pitch pattern variations are found in Nonsense *haiku* implies that individual subjects tend to have their own unique preferred pitch patterns. More details for this implication are offered and explained in the next section.

#### **5.3.4. Individual Pitch Pattern Observation**

The main focus of the previous section was to examine the pitch pattern tendencies in general. This section is concerned with the pitch patterns of individual subjects. Table (15) shows the number of different pitch patterns that were selected by each individual. It indicates that each subject has a preferred pitch-pattern.

### (15) Preferred Pitch Contour

Pitch Contour types	a	b	c	d	e	f	g	h
Plateau-Flat	-	1	-	-	6	-	-	-
Plateau-Divide	6	4	4	1	1	-	5	6
<i>Default-Accent</i>	-	-	-	5	-	5	-	-
Default 4	-	1	3	1	-	1	1	-
Default 5	1	1	-	-	-	1	1	1

Based on the results of (15), I posit that individual subjects have their own preferred pitch patterns in reciting Nonsense *haiku*. For instance, subject (a) favors Plateau-Divide and subject (e) favors Plateau-Flat among Plateau types. Subjects (d) and (f) both prefer *default-accent* while others preferred either Default-4 or Default-5 among the Default types. Although each subject has their own preferred pitch pattern, it is unlikely that they would be able to recite something with their preferred pitch pattern once LP had been assigned.

However, one place where individual variations of preferred pitch patterns are allowed to occur is at the end of a phrase. Many phrases in the scripts end with a particle, so LP is not strictly assigned. Also, when LP does occur at the end of a phrase, a high pitch can function as intonation rather than strict LP. As briefly mentioned earlier, these are instances of Final Pitch Rise (↑) and Semi-Final Pitch Rise (!). These phenomena were observed in Line Bs from Basho's Traditional *haiku* and from all Contemporary *haiku* in prose and in verse, except for Nonsense *haiku*. Table (16) shows all the phrases from Line Bs that appeared with either Final Pitch Rise (↑) or Semi-Final Pitch Rise (!),

and indicates the Script Number, phrasal content with accentual symbols consisting of either (↑) or (!), and the prominent location. The prominent parts are indicated through bolding in the phrases.

**(16) Final Pitch Rise (↑) & Semi-Final Pitch Rise (!) Occurrences**

	Script	Phrase with Accent Symbols	Location
↑	No. 1 & 11	ha ru ga - ku ru no <b>wa</b> ↑	line-final mora
	No. 2 & 12	su ki na - ya sa i <b>wa</b> ↑	line-final mora
	No. 32	ka wa zu - to bi ko <b>mu</b> ↑	line-final mora
	No. 34	yu ku hi to - na shi <b>ni</b> ↑	line-final mora
	No. 36	te nu bu i - a bu <b>ru</b> ↑	line-final mora
	No. 37	chi do ri yo - yu ki <b>no</b> ↑	line-final mora
!	No. 3	ka na ri - do gi <b>tsu</b> i !	second mora from the end
	No. 31	u mi ni - i re <b>ta</b> ri !	second mora from the end
	No. 33	i wa ni - shi mi <b>i</b> ru !	second mora from the end
	No. 35	na me shi ni - tsu <b>ma</b> n !	second mora from the end

According to Table (17), there is a pattern for the emergence of Final Pitch Rise and Semi-Final Pitch Rise; the Final Pitch Rise tends to occur on short syllables and the Semi-Final Pitch Rise tends to occur on long syllables, except for *umini-iretari* in No. 31. The precise reasons for this are not yet clearly understood, but definitely indicate an area in need of further examination.

Regarding the pitch contours, some of the more prominent moras were easy to observe even in the context of the pitch contour. (18) shows the environment where Final

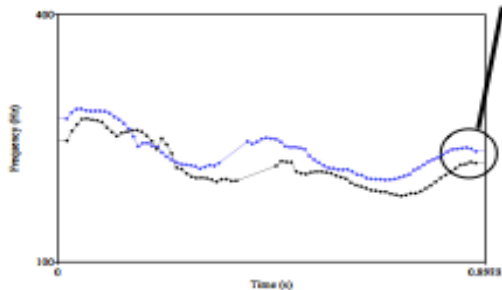
Pitch Rise was found for No. 1, as recited by Subject (b), and the environment where there was no Final Pitch Rise in the recitation of No. 1 by Subject (d).

### (18) Final Pitch Rise Pitch Contour Comparison

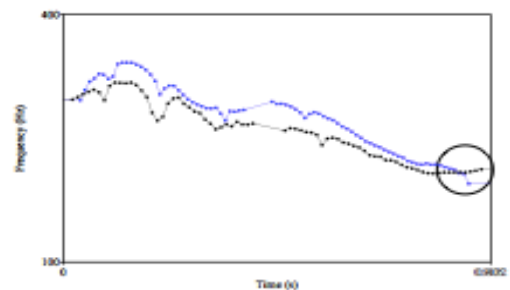
a) with Final Pitch Rise (↑)

b) without

No. 1&11 'ha ru ga - ku ru no wa' (↑)



<No. 1 by (b)>



<No. 1 by (d)>

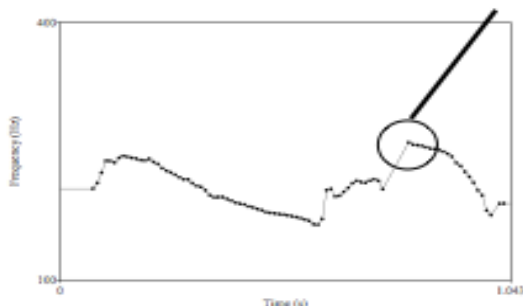
(19a) shows the environment where Semi-Final Pitch Rise was found for No. 31 as recited by subject (b), and (19b) shows the environment without a Semi-Final Pitch Rise occurrence in the recitation of No. 31 by subject (a).

### (19) Semi-Final Pitch Rise Pitch Contour Comparison

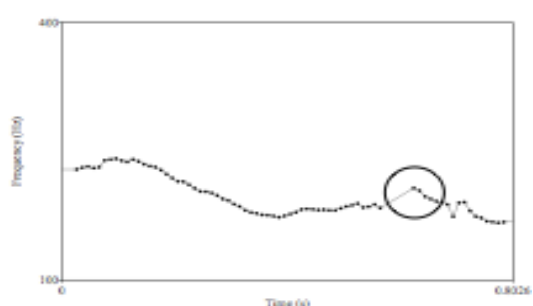
a) with Semi-Final Pitch Rise (!)

b) without

No. 31 'u mi ni - i re ta ri' (!)



<No. 31 by (b)>



<No. 31 by (a)>

Table (20) indicates that number of the Final Pitch Rise occurrences in Nonsense *haiku* and in the other types of *haiku* recitations.

## (20) (↑) and (!) Occurrence Observation

Number of (↑)	a	b	c	d	e	f	g	h
Nonsense <i>haiku</i>	1	7	1	4	1	1	0	1
Contemporary <i>haiku</i> in prose		2					1	
Contemporary <i>haiku</i> in verse		3			1			
Basho's Traditional <i>haiku</i>		5		2		1		
Total	1	17	1	6	2	1	1	1

Based on Table (20), the number of occurrences of Final Pitch Rise and Semi-Final Pitch Rise varied depending on the subjects. In addition, these phenomena seem to appear randomly across pitch pattern types, but subjects (b) and (d) repeatedly applied these more than other subjects. The fact that Final Pitch Rise and Semi-Final Pitch Rise appear frequently in only a limited number of subjects' recitations can be construed as individual preference. I claim that these Final Pitch Rise and Semi-Final Pitch Rise behaviors function as another example of "purposeful refreshment", which is the same as what was observed with the feature of *declining* discussed in §5.3.1. If *declining* functions as "purposeful refreshment" before moving on to the next phrase, then this Final Pitch Rise and Semi-Final Pitch Rise should function similarly. This is because both of these tactics can be realized as a means of easing parsing for listeners. As further evidence, neither of these phenomena, Final Pitch Rise nor Semi-Final Pitch Rise, were found at the end of Line Cs, because there is no line to follow after Line C. However, these phenomena may occur in longer verses such as *waka* or *tanka*, where subsequent verses beyond Line Cs occur, but that investigation is beyond the scope of this current study.

The observation of Nonsense *haiku* recitations contributed to the discovery of, not only the two pitch contour types of Plateau and Default, but also to the discovery of individual pitch pattern preferences by the subjects. As far as the previous observations are concerned, while factors such as subjects' interpretations, *focus*, unfamiliarity with certain lexemes and/or Final Pitch Rise can all trigger unexpected LP and AC in subjects' performances, the fundamental melody of *haiku* is achieved through LP and AC. These results confirm my first and second hypotheses that (i) native Japanese speakers share tendencies in terms of pitch patterns when reciting *haiku*, and (ii) LP plays a significant role in creating melody in *haiku*. My third hypothesis, which is concerned with (iii) why *haiku* are referred to as *uta*, is dealt with in the next section.

## **5.4 F<sub>0</sub> Measurement**

The results of the previous section confirm that the assignment of LP for each lexeme creates the melody in *haiku*, so in this section I conduct further observations in order to examine rhythm more closely, by comparing pitch contours between Contemporary *haiku* in verse and in prose. The pitch range of Contemporary *haiku* in verse and in prose was measured and the results show that subjects recite Contemporary *haiku* in verse with a wider pitch range than in prose, as described below.

### **5.4.1 F<sub>0</sub> Measurement: Contemporary *Haiku* in Prose and in Verse**

In order to show that poetic verse is more melodic than prose, I compared the pitch range differences between Contemporary *haiku* in prose, Nos. 1-7, and in verse, Nos. 11-17. The highest and lowest pitch measurements of Line Bs were measured. The

following Table (21) explains how exactly the wider range was produced for the poetic verses. The circle and triangle symbols indicate different types of *haiku*, either in prose or verse form. The differing colors of black and white indicate the measurement location. The white/empty circle (○) indicates the lowest pitch value of Contemporary *haiku* in prose and the black/filled circle (●) indicates the highest pitch value of Contemporary *haiku* in prose. The white/empty triangle (△) represents the lowest pitch value of Contemporary *haiku* in verse and the black/filled triangle (▲) indicates the highest pitch value of Contemporary *haiku* in verse. The unit of Table 21 is Hertz (Hz).

**(21) Pitch Range Value (Hz)**

<b>Prose</b>	Lowest (○)	Highest (●)	<b>Verse</b>	Lowest (△)	Highest (▲)
<b>No. 1</b>	181	284	<b>No. 11</b>	173	291
<b>No. 2</b>	184	252	<b>No. 12</b>	180	274
<b>No. 3</b>	179	276	<b>No. 13</b>	169	283
<b>No. 4</b>	190	265	<b>No. 14</b>	163	274
<b>No. 5</b>	186	294	<b>No. 15</b>	149	294
<b>No. 6</b>	193	279	<b>No. 16</b>	172	285
<b>No. 7</b>	177	269	<b>No. 17</b>	163	294
<b>Average</b>	184	274	<b>Average</b>	167	285

According to the average values in Table (21), the lowest and highest pitch values of Contemporary *haiku* in prose are 184 Hz and 274 Hz, respectively. The lowest and highest pitch values of Contemporary *haiku* in verse are 167 Hz and 285 Hz, respectively. In other words, the lowest value in verse is lower than that of prose, and the highest value in verse is higher than that of prose, on average. Figure (22) is schematized based on the results of Table (21). The pitch range of *haiku* in prose is schematized in (22a) and in



verse in (22b). The solid horizontal line shows the pitch range of Contemporary *haiku* in prose. As can be seen, the convex/curve shape of the pitch range in (22b) extends both higher and lower than the solid line, especially as compared with (22a).

## (22) Pitch Range Comparison by Curve Figure

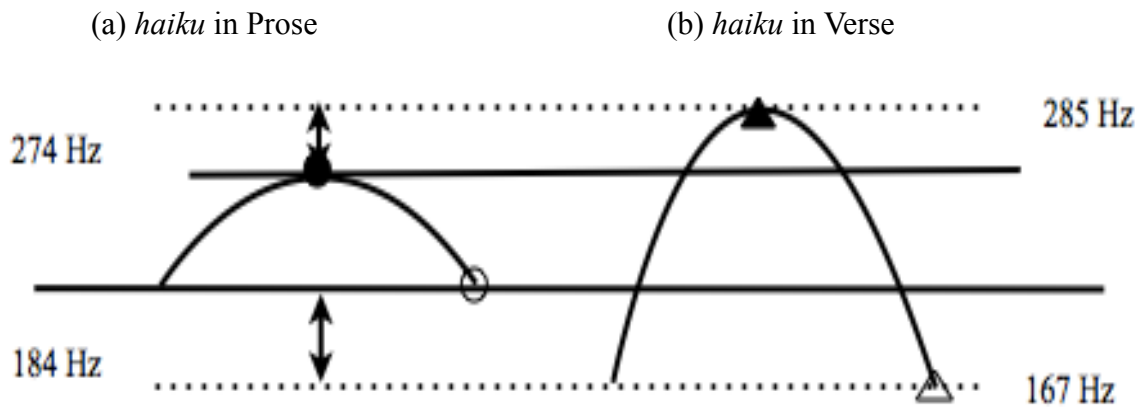
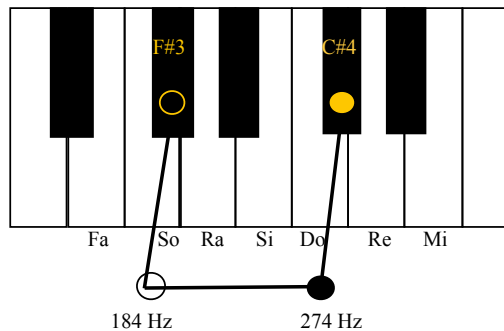


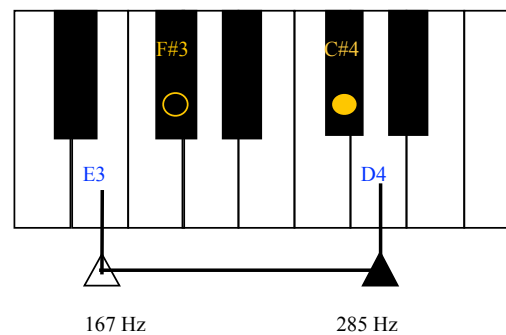
Figure (23) is another schematic illustration that is converted from the pitch values in Table (21). The four different heights of frequency are described using the illustration of a piano keyboard. (23a) indicates the pitch range of Contemporary *haiku* in prose: the lowest and highest equivalences to the notes on a piano keyboard are F#3 and C#4, respectively. (23b) indicates the pitch range of Contemporary *haiku* in verse: the lowest and highest equivalences to the notes on a piano keyboard are E3 and D4, respectively.

## (23) Pitch Range with Piano Notes

### (a) Contemporary *haiku* in prose



### (b) Contemporary *haiku* in verse

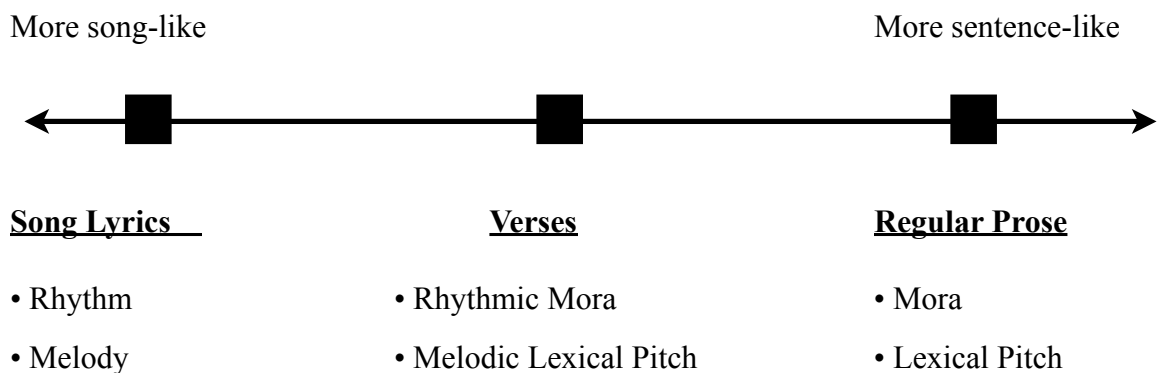


As shown in Table 21 and Figures 22 & 23, the pitch range of Contemporary *haiku* in verse is consistently measured with a wider pitch range. In other words, the melody of Contemporary *haiku* in verse is more melodic and musical.

## 5.4.2 The Relationships Between Song and Prose

As a final point of discussion regarding this experiment, I present the relationship between song lyrics and regular prose on a continuum, as illustrated below in Figure 24.

### (24) Continuum of Songs and Regular Prose



On the extreme left end are song lyrics, and on the extreme right is regular prose.

Although the main elements of songs lyrics are rhythm and melody, the main elements of

regular prose are words that have neither a restriction on the number of moras nor their assigned LP. From the mid-point of the continuum moving towards the left, elements increasingly become more song-like, and moving towards the right they become instead more sentence-like. Poetic verses, including *haiku*, stand in-between the two extremes of song lyrics and regular prose due to the two compromised features, that are rhythmic mora and melodic LP. This confirms my third hypothesis as to why *haiku* or other Traditional verses are referred to and treated as *uta* or ‘songs’.

## §6 Conclusions

In this section, I summarize the findings of this thesis, present the implications of this work and offers areas for further research.

### 6.1 Summary

In this thesis, I have observed (i) how lexical pitch (LP) and accentual combinations (AC) were reflected in Contemporary *haiku* in prose and in verse, and in Basho's Traditional *haiku*. I have also discussed how subjects recite Nonsense *haiku*, where there is no inherent lexical pitch assignment. I have also measured the pitch range between Contemporary *haiku* in prose and in verse.

Six findings from the observation account for the pitch patterns in Japanese *haiku*. First, subjects recited Contemporary *haiku* in prose and in verse with expected LP patterns. Second, on the contrary, more unexpected LP patterns and AC were found in the recitations of Basho's Traditional *haiku*. These occurrences of unexpected LP and AC patterns can be explained by the subjects' unfamiliarity with lexemes in the phrases, and the application of *focus*, or how the subjects apply emphasis in a phrase. Third, another finding from Basho's Traditional *haiku* recitations was the discovery of pitch pattern shifts for unfamiliar lexemes. Whenever the subjects were unsure of where to assign idiosyncratic LP patterns, they tended to shift any pitch patterns to a no-accent pitch pattern. Fourth, based on the data of Nonsense *haiku* recitations, pitch patterns are mainly categorized into two types, termed Plateau and Default, with a few variations for each. Many phenomena are explainable through aspects of Japanese phonology

including *default-accent* and *declining*. Moreover, native Japanese speakers didn't violate any Japanese phonological tendencies such as Inevitable Pitch Rise, Variable Level Pitch Start or Terminal Fall. Fifth, Final Pitch Rise and Semi-Final Pitch Rise appeared as 'purposeful-refreshment' at the end of phrases, regardless of the script type. These are also considered to be personal preferences. Sixth, a wider pitch range was observed in the recitations of Contemporary *haiku* in verse than in prose. That is, Contemporary *haiku* in verse is recited more melodically. In conclusion, my hypotheses have been supported in that native Japanese speakers: (i) retain pitch patterns in reciting *haiku* when they know the proper pitch assignment, but they tend to shift to a no-accent pitch pattern when they face unfamiliar lexemes, (ii) tend to recite Nonsense *haiku* with either Plateau-Divide or *default-accent* pitch patterns, and these are supported by Japanese phonological/phonetic notions, and (iii) recite *haiku* in verse with a wider pitch range than in prose, which means that pitch in Japanese creates musical melody in Traditional verses.

## 6.2 Implications

Since the study of pitch in verse in Japanese and other non stress-accent languages is lacking in the field of linguistics, this study of pitch patterns in *haiku* sheds light on an understudied aspect of Japanese phonology. Some of the findings from the observations in this thesis relate to subfields such as psycholinguistics, historical linguistics and literature.

First, the experiments conducted in this thesis clarify the importance of performance. Metric studies in general are mainly argued only from the content of the scripts. This may have caused verses to be primarily subject to the field of literature, and not the field of linguistics. However, some researchers have proposed the importance of observations of performance, especially for metric studies (Lehiste, 1992; Cole & Miyashita, 2006). From observing the recitation data, empirical results support theoretical notions of phonology in terms of pitch patterns, such as *declining*, *default-accent* and also Japanese phonological tendencies, such as Inevitable Pitch Rise and Terminal Fall.

Second, this thesis directly contributes to the area of metrical theory in Japanese. To begin with, many metric studies are primarily concerned with the strong-weak metric system as seen in iambic or trochaic foot types in stress-languages. Since Japanese is not a stress-accent language, the foot is lacking. Previous researchers have acknowledged that Japanese metric theory is concerned only with the rhythm that mora creates. For instance, significant findings for the Japanese metric system in traditional verses is the discovery of a common Japanese *shichigo-cho* or ‘7-5 meter’ (Bekku, 1977), importance of pauses for mora-counting (Bekku, 1977; Cole & Miyashita, 2006) and the redefinition of foot as bimoraic foot in Japanese (Poser, 1990). Since this thesis is the first contribution to the field of pitch in Japanese Traditional verses, to my knowledge, it shows the importance of observations of pitch patterns.

Third, the contribution of this thesis is not limited to the Japanese language, but also to general metric studies. Subjects recited verses with more melodic performances

compared with those of regular prose in the experiment. These results may not be limited to verses in Japanese. Many studies among stress-languages have focused on various aspects of rhythm. Due to this focus on rhythm, other elements of prosody have been neglected. Just as melody must be considered to fully grasp Japanese verses, the importance of pitch to other languages, in addition to the pitch-accent ones, can not be understated.

Fourth, this research can be analyzed within the framework of Optimality Theory (OT). Based on Nonsense *haiku*, lexical pitch in Japanese verses is ranked higher than surface pitch, which is the pitch contour base minus any meaningful words. This is represented in Figure 25 below:

#### **(25) OT Constraint Ranking**

Lexical Pitch (Faithfulness) >> Surface Pitch Contour (Markedness)

Since surface pitch contours are more violable than lexical pitch, lexical pitch is ranked higher.

Fifth, the results from the experiment also contribute to psycholinguistics as well. There are three main contributions given: (i) Subjects recited Nonsense *haiku* with Default-4 and Default-5 pitch contour types as if the meaningless phrases had inherently assigned pitch, which they do not. These emergences of Default-4 and Default-5 types can be derived from their experiment. (ii) Instances of *focus* were found more in Basho's Traditional *haiku*. Subjects may have had a different mind set prior to reciting *haiku* composed by such a famous poet. (iii) Subjects recited the phrases with a wider pitch range once they realized the scripts were written in the *haiku* poetic structure.

Sixth, as for the perspective of historical linguistics, lexical pitch pattern shifts were found when subjects faced unfamiliar lexemes. This thesis shows that when this occurred, the subjects recited these phrases with a no-accent pattern. It is reasonable to assume that classical words, many of which are unfamiliar to the speakers are likely to trigger a shift to the no-accent pitch pattern in Japanese.

Seventh, this thesis contributes to the field of literature as well, especially in regards to the clarification of the position of verses in Japanese. *Haiku* is usually studied under the field of literature, even though *haiku* are considered to be *uta* or ‘song(s)’, which is more traditionally the domain of music. The reason why *haiku* is not fully classified as ‘uta’ is due to the characteristics of LP retention in Japanese verses; however, the reasons for *haiku* being referred to as *uta* is due to its musical features, such as the importance of combinations of uttered and silent moras and the wider pitch range or melody observed in recitations. As mentioned previously, as the ranking in Optimality Theory implies, lexical pitch is ranked higher than any surface pitch contour or preferred melody by subjects. In this sense, *haiku* is usually explored in the field of literature, even if the status of verses in Japanese, including *haiku*, is positioned in-between songs and prose.

### **6.3 Issues for Further Research**

This thesis leaves a few issues for further research. First, the experiment focused only on observations of Line Bs of *haiku*. By observing the other Lines A and C, the complete pitch patterns could be analyzed. Based on my intuitions, the Lines A, B and C



taken together, form a bell curve, with the peak of Line B being higher than that of the peaks of Lines A or C. Second, it would be interesting to look at pitch patterns taken from recitations of male subjects. Male subjects may recite *haiku* differently than female ones. Many female speakers' readings seemed to occur with more feelings; therefore, the pitch range between Contemporary *haiku* in prose and in verse may be narrower. Investigating male subjects' pitch patterns in *haiku* may contribute to the field of sociolinguistics if the results were to differ from that of female subjects. Third, *haiku* were utilized in this thesis as representative of Traditional Japanese verses; examining other Traditional verses such as *katauta* or *tanka* is necessary in order to generalize the results of this thesis. Fourth, I discussed in §5 the difficulties in examining *focus*. It is worth investigating subjects' familiarity with *haiku* before recording recitations to see if there is a correlation between the level of familiarity with various lexemes, poets and *haiku* and the emergence of *focus*. Fifth, it would be worth investigating further pitch patterns that occur with words immediately preceding the genitive marker *no*. In §5, all of the pitch patterns of *kinoo-no* or 'yesterday's' and *asu-no* or 'tomorrow's' were recited with no-accent patterns (LHH-H). The constituent with *no* is attached to the second phrase in Line B. On the other hand, some subjects recited the pitch of *no* in *chidori-no* with high pitch while others did so with low pitch. The constituent with *no* appears at the end of Line B, and there is a pause right before Line C. These results may be caused by the location of the constituent that ends with the genitive marker *no* in the phrase. More examples of constituents that take *no* in various places, such as the first component of Line B and/or the second component of Line B, are needed to test this phenomenon. The

sixth area in need of further research is regarding the recitations of professional broadcasters. Since these individuals should be more familiar with “proper” LP patterns as they exist in Japanese accent dictionaries, there may be fewer instances of unexpected LP patterns, especially for Basho’s Traditional *haiku*. Finally, it would be interesting to compare *haiku* recitations by non-expert subjects as in this experiment with expert poetry readers accustomed to reciting traditional *haiku* who often appear on the Japanese educational television network *Nippon Hoso Kyokai* (NHK) or ‘Japan Broadcasting Corporation’.

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## APPENDICES

### APPENDIX A: Demographic Survey

ID	Gender	Age	Country of birth	Home city	Dialect
(a)	Female	22	Japan	Yokohama	Tokyo
(b)	Female	19	Japan	Yokohama	Tokyo
(c)	Female	20	Japan	Chiba	Tokyo
(d)	Female	22	Japan	Saitama	Tokyo
(e)	Female	19	Japan	Tokyo	Tokyo
(f)	Female	21	Japan	Miyagi	Tokyo
(g)	Female	20	Japan	Saitama	Tokyo
(h)	Female	20	Japan	Fukuoka	Tokyo

### APPENDIX B (a): *Haiku* Script in Japanese

No. 1	モンタナの春がくるのはまだ先だ。		
No. 2	サラさんの好きな野菜はトマトです。		
No. 3	その赤はかなりどぎつい色ですね。		
No. 4	来年は早寝早起きがんばろう。		
No. 5	寒いなあ。明日（あす）のてんきは晴れがいい。		
No. 6	これぼうや。きのうのテストみせなさい。		
No. 7	おもしろい。この子はいつか漫才師。		
No. 11	モンタナの	春がくるのは	まだ先だ
No. 12	サラさんの	好きな野菜は	トマトです
No. 13	その赤は	かなりどぎつい	色ですね
No. 14	来年は	早寝早起き	がんばろう
No. 15	寒いなあ	明日（あす）のてんきは	晴れがいい
No. 16	これぼうや	きのうのテスト	みせなさい
No. 17	おもしろい	この子はいつか	漫才師

No.21	た た た た た	た た た た た た た	た た た た た
No.22	た た た ら ら	た た た ら ら ら ら	た た た ら ら
No.23	た た た た ら	た た た た ら ら ら	た た た た ら
No.24	た ら た た た	た た た た た ら ら	た ら た た た
No.25	た ら ら た た	た た た た た た ら	た ら ら た た
No.26	た た ら ら ら	た ら ら た ら ら ら	た た ら ら ら
No.27	た た た ら ら	た ら ら ら た ら ら	た た た ら ら
No.31	暑き日を (あつきひを	海にいれたり うみにいれたり	最上川 もがみがわ)
No.32	古池や (ふるいけや	蛙飛び込む かわずとびこむ	水の音 みずのおと)
No.33	閑さや (しずかさや	岩にしみ入る いわにしみいる	蟬の声 せみのこえ
No.34	この道や (このみちや	行く人なしに ゆくひとなしに	秋の暮れ あきのくれ)
No.35	忘れ草 (わすれぐさ	菜飯に摘まん なめしにつまん	年の暮れ としのくれ)
No.36	ごを焚いて (ごをたいて	手拭あぶる てぬぐいあぶる	寒さ哉 さむさかな
No.37	冬牡丹 (ふゆぼたん	千鳥よ雪の どりよゆきの	ほととぎす ほととぎす)

#### APPENDIX B (b): Haiku Script in English

No.1	mo n ta na no ha ru ga ku ru no wa ma da sa ki da.
No.2	sa ra sa n no su ki na ya sa i wa to ma to de su.
No.3	so no a ka wa ka na ri do gi tsui i i ro de su ne.
No.4	ra i ne n wa ha ya ne ha ya o ki ga n ba ro o.
No.5	sa my i na a. a shi ta no te n ki wa ha re ga i i.
No.6	ko re bo o ya. ki no o no te su to mi se na sai.
No.7	o mo shi ro i. ko no ko wa i tsu ka ma n za i shi.



No.11	mo n ta na no	ha ru ga ku ru no wa	ma da sa ki da
No.12	sa ra sa n no	su ki na ya sa i wa	to ma to de su
No.13	so no a ka wa ka	na ri do gi tsui i	i ro de su ne
No.14	ra i ne n wa ha	ya ne ha ya o ki	ga n ba ro o
No.15	sa mu i na a	a shi ta no te n ki wa	ha re ga i i
No.16	ko re bo o ya	ki no o no te su to	mi se na sa i
No.17	o mo shi ro i	ko no ko wa i tsu ka	ma n za i shi
No.21	ta ta ta ta ta	ta ta ta ta ta ta ta	ta ta ta ta ta
No.22	ta ta ta ra ra	ta ta ta ra ra ra ra	ta ta ta ra ra
No.23	ta ta ta ta ra	ta ta ta ta ra ra ra	ta ta ta ta ra
No.24	tar a ta ta ta	ta ta ta ta ta ra ra	ta ra ta ta ta
No.25	ta ra ra ta ta	ta ta ta ta ta ta ra	ta ra ra ta ta
No.26	ta ta ra ra ra	ta ra ra ta ra ra ra	ta ta ra ra ra
No.27	ta ta ta ra ra	ta ra ra ra ta ra ra	ta ta ta ra ra
No.31	a tsu ki hi wo	u mi ni i re ta ri	mo ga mi ga wa
No.32	fu ru i ke ya	ka wa zu to bi ko mu	mi zu no o to
No.33	shi zu ka sa ya	i wa ni shi mi i ru	se mi no ko e
No.34	ko no mi chi ya	yu ku hi to na shi ni	a ki no ku re
No.35	wa su re gu sa	na me shi ni tus ma n	to shi no ku re
No.36	go o ta i te	te nu gui i a bu ru	sa mu sa ka na
No.37	fu yu bo ta n	chi do ri yo yu ki no	ho to to gi su