Title
Recursivity, Prosodic Adjunction, and the Role of Informativeness in Compound Nouns

Author
Angeles, Andrew

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RECURSIVITY, PROSODIC ADJUNCTION, AND THE ROLE OF INFORMATIVENESS IN COMPOUND NOUNS

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Andrew Angeles

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The Dissertation of Andrew Angeles
is approved:

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Associate Professor Ryan Bennett, Chair

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Professor Junko Ito

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Professor Jaye Padgett

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Professor Haruo Kubozono

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Peter Biehl
Vice Provost and Dean of Graduate Studies

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Abstract

Recursivity, Prosodic Adjunction, and the Role of Informativeness in Compound Nouns

Andrew Angeles

Compounding, the creation of words by combining two or more words, has long been a topic of interest in various fields of linguistics. This is because compounds seem to straddle the boundary between "words" and "phrases" and have some amount of internal structure (Scalise and Vogel 2010). This raises a question for research on the syntax-prosody interface about how syntactic structure is mapped onto prosodic structure when compound words are concerned. Whereas the fundamental difference between syntactic structure and phonological structure has traditionally been held to be that syntactic structure allows recursion and phonological structure disallows recursion, phenomena like compounding call to question whether disallowing recursion in phonological structure is tenable. If recursion is allowed in phonological structure, however, the issue becomes just how much recursion is allowable. Compound words provide a crucial case for investigation because while they seem to act like words on the one hand, a well-known property of compound words in many languages is that they are infinitely recursive, such that novel compounds can be created productively. Furthermore, compounds have been noted to be able to include phrasal structure such as sentence fragments. It is plausible, then, to expect that recursion may occur in

phonological structure when considering such recursive cases and cases in which phrasal structure is involved.

Compounds in Japanese have long been observed to exhibit a large variety of compound prosodies. Ito and Mester (2003, 2007, 2018a, 2021) have developed a theory that accounts for the variety of compound prosodies in Japanese by crucially proposing that recursive structure is involved. The theory they develop predicts a set of structures of which a subset is observed in Tokyo Japanese. In this dissertation, I demonstrate that Kansai Japanese exhibits a compound type, which I refer to as the word-phrase compound, which was predicted by Ito and Mester's theory, but which was not observed in Tokyo Japanese because Tokyo Japanese does not have the prosodic phenomena required to diagnose it. Accordingly, this serves as a confirmation of the theory. This dissertation demonstrates, based on the crucial similarity of compounds with non-compound words and phrases in Kansai Japanese, that recursive structure naturally and elegantly predicts and explains the typology of compound prosodies in Kansai Japanese, and that an approach that does not make use of recursive structure requires positing additional prosodic categories which may not otherwise be well-motivated.

Although a theory involving recursion in prosodic structure predicts the word-phrase compound in Kansai Japanese, however, an interesting problem arises when attempting to account for the prosodic structure through typical syntax-prosody mapping mechanisms. Whereas the compound types in Tokyo Japanese and non-word-phrase compounds in Kansai Japanese are generally straightforwardly derived based on the length of their second component, word-phrase compounds cannot be. In this dissertation, I explore the possibility that non-syntactic, non-phonological, and non-morphological factors are involved in this mapping, extending Bell and Plag (2012)'s work, which suggests that informativeness, a gradient, frequency-based factor, has an influence on right-hand stress in English compounds. Based on novel fieldwork data collected for this work, I demonstrate that informativeness may play a role in whether a compound in Kansai Japanese can have the word-phrase prosodic structure, suggesting that non-syntactic, non-phonological, and non-morphological factors may be important for syntax-prosody mapping as well.

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Chapter 1: Introduction

1.1 Introduction

Compounds have often been noted to straddle the boundary between "words" and "phrases," having some amount of internal structure (Scalise and Vogel 2010).

On the one hand, compounds have the characteristics of "words." As a starting point, we can define a compound as a word which consists of two or more words (Fabb 1998). Compounds often have a meaning which builds on one, but not the other, of its elements, e.g., *television stand*, which is a type of stand, not a type of television. Alternatively, compounds may have a meaning which is distinct from the mere sum of their parts (though still somewhat compositional, even if it is not fully predictable, as Fabb notes), e.g., *blackboard*, which refers not to any kind of black-colored board, but to a board used as a writing surface, which may or may not be black, on which one writes with chalk. Compounds may also involve bound roots, such as the use of Latin or Greek affixes or roots to create new words, including in established words like *biology* from *bio-* 'life' and *-(o)logy* 'study of,' or used productively as in *Pieology* (a pizza restaurant name; 'study of (pizza) pie'), or as in Sino-Japanese root compounding, like *seibutugaku* 'biology' from *sei* 'life,' *butu* 'thing,' and *gaku* 'study.'

On the other hand, compounds may also have the characteristics of "phrases," which may include phonological, morpho-syntactic, and semantic characteristics. Morpho-syntactically speaking, while short compounds like *blackboard* may be argued to be lexically listed and thus more easily identified as single lexical unit "words," it is more difficult to argue the same for larger compounds, e.g., *college entrance examination study guide*, a type of guide, not a type of college, entrance, examination, or study, which are clearly constructed from the combination of smaller elements and are unlikely to be listed. Importantly, compounds can be formed freely and readily in this way (Bauer 2003). In terms of phonological characteristics, Chomsky and Halle (1968) noted that some compounds have a special compound stress on the first element, as in *ólive oil*, while others appear to have the nuclear stress pattern associated with phrases, such as *apple píe*, which has a primary stress on the second, final element, much like the phrase *He is shy*.

This duality in the characteristics of compounds has made them a topic of interest for many areas of linguistics, including syntax, phonology, morphology, semantics, and the interfaces between areas. This interest has naturally given rise to questions concerning what kind of linguistic units their elements are, their structure, which component of grammar compounding is associated with, how compounds get their interpretation, how compounds are mapped to phonological structure, and how their phonological structure differs from and resembles those of, for example, words and phrases.

The present work focuses on the phonology of compounds, particularly their prosodic structure, and their consequences for theories of prosody, the syntax-prosody interface, and the interaction between phonology and factors such as lexical frequency and semantic relations between compound members. An important question in the study of compounds concerns their prosodic structure. Do compounds have the same prosodic structure as words, as phrases, or potentially both? Do they have their own compound-specific structure? Which prosodic categories are necessary to account for them? Finally, this dissertation has two central questions. The first question concerns whether compounds can provide evidence and support for recursive prosodic structure. The second question concerns whether non-syntactic, non-phonological, non-morphological factors can influence not only the prosody of compounds, but also the mapping of compound structures from the syntax to the prosody.

In this dissertation, I argue from evidence from Kansai Japanese compounds that the prosodic word and the phonological phrase, with no intermediate prosodic category (e.g., the clitic group, composite group, or other similar domain) between them, sufficiently account for the prosodic structure of compounds. Furthermore, I argue that compounds provide evidence for phrasal organization in prosodic structure which does not result from the mapping of a syntactic phrase to a phonological phrase. The natural result of this conclusion is that recursion must arise if a phonological phrase mapped from a syntactic phrase includes a compound which is mapped to a phonological phrase. As a result, I argue that the answer to the first central question is yes – compounds can provide evidence and support for recursive prosodic structure. While it has been previously argued, e.g., in Vigário (2010), that there is only evidence supporting the necessity of asymmetrical recursion and that compounds have flat, non-recursive structure, the present work argues that Kansai Japanese provides evidence for both asymmetrical and symmetrical recursion. I show in this dissertation that the large typology of compound types found in Kansai Japanese falls out naturally from relativizing certain phonological phenomena to different levels of prosodic categories, e.g., maximal prosodic word vs. minimal prosodic word, such that phonological phenomena observed in compounds are associated with maximal, non-minimal words, minimal phonological phrases, and any level of phonological phrase. In Kansai Japanese, this reveals a compound type not previous attested in Tokyo Japanese, due to a richer prosodic system in Kansai Japanese. This provides confirmation for the theory of prosodic structure using recursion developed by Ito and Mester (2003, 2007, 2018a, 2021). Furthermore, I argue that allowing recursivity in Kansai Japanese compound prosodic structures has the desirable consequence of not requiring a proliferation of prosodic categories, which would risk positing prosodic levels which may not have stable syntactic correspondents and whose hierarchical ranking is unclear, resulting in questions about their universal utility. The approach taken in this dissertation relies only on widely-accepted basic primitives of prosodic structure, namely the prosodic word and phonological phrase.

Finally, Kansai Japanese exhibits a compound type – the one which I argue herein involves asymmetrical recursion – which does not seem to arise due to the same factors that influence the appearance of the other compound types. Based on evidence from novel fieldwork, I argue that the answer to the second central question is also yes – this asymmetrically recursive compound type arises due to informativeness, a gradient, frequency-based factor, which is non-syntactic, non-phonological, and non-morphological, and that such factors should also be taken into account in syntax-prosody mapping. The investigation presented here is an extension to Kansai Japanese of a previous investigation of the question of “compound” vs. “nuclear” stress in English compounding based on the informativeness of the second element undertaken by Bell and Plag (2012). I extend their investigation to the unique Kansai Japanese compound and find a role for the informativeness of both the first and second element in influencing compound prosodic structure, providing further evidence supporting a role informativeness in compound prosody more broadly. I argue that not only does informativeness influence how a compound is pronounced, but also that it does so because informativeness influences the syntax-prosody mapping process, resulting in a unique, informativeness-based prosodic structure otherwise unavailable to syntax-prosody mapping. Consequently, I argue that informativeness should be taken into account in syntax-prosody mapping as well.

1.2 Overview of the Dissertation

The rest of the dissertation is structured as follows.

Chapter 1 introduces some important characteristics of Japanese phonology, including the phonemic inventory and the importance of moras, syllables, and feet.

Chapter 2 introduces the notion of accent in Japanese. With accent defined, the chapter turns to a descriptive discussion of the prosodic characteristics of simplex and compound words in Tokyo Japanese, Kansai Japanese, Nagasaki Japanese, and Kagoshima Japanese. Several dialects are discussed here in order to place the prosodic system of Kansai Japanese within the larger picture of Japanese dialects in general, the ways in which it is similar to other dialect systems, the ways in which it is distinct from the other dialect systems, and how the four systems are related to each other in developmental terms. In the course of this discussion, the notion of "compound accent," which is to be distinguished from "retained accent," will be discussed as well. This chapter primarily focuses on N2 length as the factor influencing the different compound types, and some of the prosodic structure distinctions to be made in Chapter 3 are not yet made.

Chapter 3 discusses the syntax-prosody of Japanese compounds beginning first with the syntactic and prosodic structures of Japanese compounds. The full typology of seven compound types in Kansai Japanese (six in Tokyo Japanese) is introduced here. I discuss the motivations for associating phonological phenomena with prosodic domains, and how the full typology of compounds found in Kansai Japanese straightforwardly results from these associations. With that established, the chapter then turns to how the syntactic structure is mapped onto prosodic structure in Kansai Japanese. One compound type – the word-phrase compound – resists straightforward explanation, as its structure does not seem to be fully conditioned by syntax-phonology correspondence. This complication is also discussed briefly in this chapter. Although this compound resists straightforward explanation in terms of syntax-prosody mapping, its existence is completely in line with the predictions made by the diagnostic factors developed in this chapter.

Chapter 4 discusses the system that yields the accentual and prosodic characteristics of the seven compound types introduced in Chapter 3. This chapter proposes that there is a necessity for the juncture between members of a compound word to be a targetable object to which accent can be aligned, as no combination of alignment constraints can properly place compound accent in all cases in Kansai Japanese without referring to the juncture. This chapter also discusses the implications of recursion for a theory of the syntax-prosody interface and proposes that not only must symmetrical recursion be a part of a theory of prosodic structure, but asymmetrical recursion is necessary as well. In particular, this discussion argues that, without recursive structure, accounting for the large typology of compound types in Kansai Japanese results in the stipulation of a large amount of prosodic categories between the prosodic word and the phonological phrase, despite all compound types arising from the same syntactic structure. Such intermediate prosodic categories do not otherwise arise outside of compounds in Kansai Japanese, have no stable syntactic correspondent, have an unclear ranking with relation to each other in the prosodic hierarchy, and are numerous enough that it is questionable whether all languages have them. Furthermore, an approach which avoids recursion within compounds may still be unable to be avoid recursion when compounds are placed in larger utterances. I argue that recursive structure, incorporating both symmetrical and asymmetrical recursion, provides a clean explanation for Kansai Japanese compounds, showing the relationship – despite distinctions – between certain compound prosodies and non-compound prosodies (which is taken as evidence of the same prosodic category being in play) and without proposing extra prosodic categories.

Chapter 5 returns to the problem of the word-phrase compound and why it cannot be straightforwardly derived from syntax-phonology correspondence. I discuss possible other conditioning factors, including informativeness based on lexical frequencies and the semantic relationship between members of a compound. I then present results and discussion of a statistical model and analysis based on additional fieldwork which was conducted in order to gather data to test hypotheses concerning the relationship between informativeness and the availability of the word-phrase parse. I argue that informativeness does play a role in the availability of the word-phrase parse in Kansai Japanese. Furthermore, because the word-phrase parse was predicted as an additional structure in Chapter 3, I propose that the influence of informativeness is not only on pronunciation but on the actual syntax-prosody mapping, resulting in mapping to an otherwise unavailable prosodic structure, as far as typical syntax-prosody mapping goes in Kansai Japanese.

Chapter 6 concludes.

1.3 Background on Japanese Phonology

In this chapter, I briefly overview some important aspects of Japanese phonology which are relevant for the present discussion. Most of this discussion is based on Tokyo Japanese, but Kansai Japanese and other dialects are discussed as well, and the features discussed here apply to all of the dialects of interest. Before proceeding to the discussion, I first give a note on the notation of accent and the romanization system used in the present work.

An apostrophe (’) is used to mark the location of the pitch fall of an accent (a change from a H(igh) tone to a L(ow) tone) in words, both in romanization and in the uncommon cases where an IPA transcription is given. The apostrophe is placed after the accented mora, e.g., *ka’sa* ‘umbrella;’ *ka* bears a high tone, and *sa* bears a low tone. Accented monomoraic words are notated with the apostrophe following their sole mora, e.g., *hi’* ‘day;’ *hi* bears a high tone, and the low tone of the accent will shift onto following material when it is present. This apostrophe is equivalent to the accent corner used in Japanese accent dictionaries.

In principle, Japanese words are presented in romanization and not in IPA as the phonemic and phonetic specifics of the segments in Japanese words is not in general relevant for the discussion of Japanese compounds beyond this chapter. Where IPA is used, it is indicated with forward slashes, as is conventional.

This dissertation uses a modified form of the *Kunreisiki* (Cabinet Ordinance System) romanization of Japanese, one of the two most widely used romanization systems for Japanese, the other being the Hepburn system (Shibatani and Kageyama 2015). While the Hepburn system attempts to approximate pronunciation in an English-based spelling system and is common in general usage, an advantage of the *Kunreisiki* system is that the system is phonemic, with a one-to-one correspondence between syllables in the *Kunreisiki* system and the Japanese *kana* syllabary.

The version of *Kunreisiki* used in this dissertation follows spellings and usage guidelines from the Agency for Cultural Affairs, Government of Japan (“Roomazi no Tudurikata [Romanization Spelling Method],” n.d.). As prescribed by the guidelines, the moraic nasal is indicated with an apostrophe following an *n* when it precedes a vowel or /j/ to distinguish it from onset *n*, e.g., *an'i* /aN.i/ 'easy' vs. *ani* /a.ni/ 'older brother;' *in'yoo* /iN.jo:/ 'yin and yang' vs. *inyoo* /i.njo:/ 'enclosure.' An exception is the treatment of long vowels. In the prescribed guidelines, long vowels are marked with a circumflex, e.g., *tôkyô* /to:kjo:/ 'Tokyo.' As is common in the linguistics literature on Japanese, in this dissertation, long vowels are represented by doubling the vowel instead of marking it with a circumflex. Thus, Tokyo is rendered not as *tôkyô*, but as *tookyoo*. Besides the common usage of this notation scheme, this allows for convenience in notating pitch falls which occur internal to a long vowel, with the accented mora containing the first part of the long vowel. Thus, *biiru* 'beer,' which is accented on the first mora, is notated as *bi'iru*. In a few cases which are not presented as examples relevant for the discussion in this dissertation, the more familiar Hepburn romanization system is used, such as in referring to Japanese logograms as *kanji*, rather than as *kanzi*, as they would be spelled in *Kunreisiki*.

1.3.1 Phoneme and Syllable Inventory

The vowel inventory of Japanese is given in (1) and (2), adapted from Shibatani (1990), Vance (2008), and Kubozono (2015). The following discussion on vowels is based on Kubozono (2015); the reader is directed to this work for further discussion and references.

(1) Monophthongs

	Front		Back	
	Short	Long	Short	Long
High	i	i:	u	u:
Mid	e	e:	o	o:
Low			a	a:

(2) Diphthongs

Diphthongs
ui
oi
ei
ai

As shown in (1), Japanese distinguishes five vowel qualities, /i/, /e/, /u/, /o/, and /a/, transcribed as *i, e, u, o,* and *a* respectively. These are phonetically realized as [i], [e], [ɯ], [o], and [a] (Kubozono 2015). /u/ is usually produced as unrounded [ɯ] in Tokyo Japanese, but dialects may differ with respect to the degree of rounding of /u/. /u/ is slightly rounded in the Western dialects, including Kansai dialects like Kyoto Japanese (Shibatani 1990). Tokyo Japanese /i/ and /u/ undergo vowel devoicing following voiceless consonants, e.g., [haʃi̥] 'chopsticks,' though they often resist devoicing when accented, even in devoicing environments, e.g., [ʃɯ'to] 'capital.' Vowel devoicing also occurs in Kyushu dialects, like Kagoshima Japanese, but is less noticeable in Kansai dialects, like Kyoto Japanese (Shibatani 1990).

Japanese also distinguishes short and long vowel lengths, with each of the five short vowels having a long counterpart; long vowels are about two to three times longer than short vowels. Long vowels are not distributed equally throughout the Japanese lexicon and are found mostly in the non-native lexical strata – the older Sino-Japanese lexical stratum consisting of loanwords from Chinese and the newer loanword lexical stratum consisting of more recent loans from western languages. They are relatively rare in the native lexical stratum, as Old Japanese (ca. 700-800 AD) did not have vowel length distinctions. Those long vowels which do exist in the native lexical stratum arose from diachronic sound changes, e.g., Old Japanese *tepu* 'butterfly' → Modern Japanese *tyoo* /tʃoː/, Old Japanese *kakamu* 'write (presumptive)' → Modern Japanese *kakoo*.

As a note on terminology, the term "lexical stratum" is used in its typical sense to refer to the different segments of the Japanese lexicon, i.e., native Japanese words (*yamatokotoba* 大和言葉 'Yamato words' or *wago* 和語 'Japanese words'), Sino-Japanese words (*kango* 漢語 'Chinese words'), and loanwords (*gairaigo* 外来語 'foreign words') (Shibatani 1990). These distinctions are important as the different classes have different phonological characteristics, as discussed in this chapter.

Long vowels are transcribed as double their short vowel equivalents, with one exception. Thus, /i:/ /u:/ /o:/, and /a:/ are transcribed *ii*, *uu*, *oo*, and *aa* respectively. The exception to this practice is long /e/, which is transcribed as *ei*. The reason for this is that dialects differ in whether this is pronounced as a long vowel /e:/, as in most of Japan, or as /ei/, as in, for example, the Kyushu region, which is where Kagoshima is located. The /ei/ pronunciation is also found in general Japanese in particularly careful speech, even where it would usually be pronounced /e:/ in normal speech (Hirayama 1960).

The consonant inventory of Japanese is given in (3), from Kubozono (2015), adapted from Shibatani (1990).

(3) Consonants

	Labial	Dental-Alveolar	Palatal	Velar	Glottal
Plosive	p b	t d		k g	
Fricative		s z			h
Nasal	m	n			
Liquid			r		
Glide	w		j		

The following discussion is based primarily on Kubozono (2015). The reader is directed to this work as well as Shibatani (1990), Labrune (2012), and Tsujimura (2014) for further discussion and references regarding the Japanese consonant system.

(3) displays consonants which are part of the native phonemic inventory of Japanese. In terms of transcription, the *Kunreisiki* romanization symbols match the IPA symbols given in (3), with the exception of /j/, which is transcribed in *Kunreisiki* as *y*.

Japanese also exhibits several other consonants due to allophony. These include the following: /s/ is realized as [ʃ] before /i/ and [s] elsewhere; /z/ is realized as [dʒ] before /i/ and [z] elsewhere; /t/ as [tʃ] before /i/, [ts] before /u/, and [t] elsewhere; /d/ as [dʒ] before /i/ and [d] elsewhere; and /h/ as [ç] before /i/, [ɸ] before /u/, and [h] elsewhere. Several of the aforementioned allophones involve palatalization before /i/; all other consonants can also be palatalized (Tsujimura 2014), e.g., /n/ is realized as [n^j] before /i/.

It should be noted that several of the sounds noted as allophones above also participate in phonemic contrast in certain parts of the Japanese lexicon, primarily in the Sino-Japanese and loanword lexical strata. Thus, /ʃ/, /dʒ/, /tʃ/, as well as other palatalized consonants like /m^j/, /r^j/, and /k^j/, among others, are in some cases in contrastive distribution with their non-palatal correspondents, /s/, /z/, /t/, /n/, /r/, and /k/. Accordingly, minimal pairs such as the following are observed.

(4) Contrast in plain vs. palatalized consonants in Sino-Japanese words

a. *saku* /saku/ 'production' ~ *syaku* /ʃaku/ 'shaku (unit of measurement)'

b. *taku* /taku/ 'table' ~ *tyaku* /tʃaku/ 'counter for clothing'

c. *zoo* /zo:/ 'elephant' ~ *zyoo* /dʒo:/ 'article (e.g., in a constitution)'

d. *maku* /maku/ 'curtain' ~ *myaku* /m^{j}aku/ 'pulse'

e. *raku* /raku/ 'easy' ~ *ryaku* /r^{j}aku/ 'abbreviation'

f. *kaku* /kaku/ 'each' ~ *kyaku* /k^{j}aku/ 'guest'

Contrasts in these sounds are also observed in loanwords from western languages, as in /katto/ 'cut' vs. /k^{j}atto/ 'cat.' In addition to contrasts observed in loanword lexical strata, contrasts are observed in pockets of the native lexicon as well, where palatalization arose as a result of sound changes, e.g., *too* 'ten' ~ *tyoo* 'butterfly' (the latter from Old Japanese *tepu*), *koo* 'this way' ~ *kyoo* 'today' (the latter from Old Japanese *kepu*; see Frellesvig 2010). Palatal consonants preceding /i/ are simply transcribed with one of the consonants shown in (3), e.g., *sita* 'bottom,' *ziyuu* 'freedom,' *tihoo* ‘region.’ Palatalized consonants preceding all other vowels are transcribed as the corresponding non-palatalized consonant, with a following *y*. Thus, the examples with palatalized consonants in (4) are transcribed as *syaku*, *tyaku*, *zyoo*, *myaku*, *ryaku*, and *kyaku*.

Similarly, sounds such as [ts] and [ɸ] are observed in environments other than preceding /u/ in primarily loanwords from western languages, such as /tsaitogaisuto/ ‘Zeitgeist/ and /ɸaito/ ‘fight.’ Kubozono (2015) writes that these and the palatalized consonants may thus be seen as becoming established as independent phonemes (though see Labrune 2012 and references for arguments to the contrary).

In addition to the consonants listed in the table above, Japanese also has two moraic consonants: a moraic obstruent, traditionally represented as /Q/, and a moraic nasal, traditionally represented as /N/. These consonants are “moraic” because they contribute weight to the syllables of which they are a part, and when they occur, they always occur in coda position. The moraic consonants are phonetically realized as a stop or nasal sharing the place of articulation of the following consonant. The moraic nasal can appear word-finally, where it varies in realization as either [ŋ] or a nasalized version of the preceding vowel, e.g., /hoN/ → [hoŋ] ~ [hõõ] ‘book’ (Shibatani 1990). Moraic obstruents, on the other hand, cannot appear word-finally, except in some interjections where it is realized as [ʔ] or [tʔ], e.g., [aʔ] ~ [atʔ] ‘oh, oh dear.’ The moraic nasal is transcribed as *n*, e.g., /siNbuN/ *sinbun* ‘newspaper,’ while the moraic obstruent is represented as a copy of the following consonant, e.g., /kaQta/ *katta* ‘won,’ /gaQko:/ *gakkoo* ‘school.’

1.3.2 Moras

In Prosodic Hierarchy Theory (Selkirk 1978, Nespor and Vogel 1986/2007), one of the units of prosodic organization is the prosodic word. In Match Theory (Selkirk 2011), syntactic terminals X^0 are mapped to prosodic words. Thus, words such as *neko* 'cat' and *hon* 'book' are mapped to prosodic words. Below the level of the prosodic word are further levels of prosodic organization which are relevant for accent in Japanese – the mora, the syllable, and the foot, discussed below. Section 1.4 continues the discussion of the prosodic hierarchy and Match Theory.

As a preliminary to this section, the Japanese syllable template is given here, adapted from Vance (2008). Palatalized consonants are included in the Cs given in the template below[1]. The second half of a long vowel is represented as a colon (:), while the second half of a diphthong is represented as V. N and Q represent the moraic nasal and moraic obstruent discussed in section 1.3.1.

[1] Thus, CVN represents both /CVN/ and /C^jVN/. This differs from Vance's notation C(/y/), where (/y/) denotes an optional glide.

(5) Japanese syllable templates (Vance 2008)

a. V

b. CV

c. CVN

d. CVQ

e. CVV

f. CV:

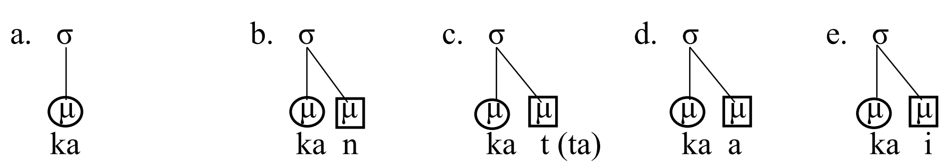
Syllables of the types displayed in (5a) and (5b) are considered light syllables, while the syllables in (5c) through (5f) are considered heavy syllables.

First, we consider moras. A mora is a unit of timing or rhythm, which may also be thought of as a beat (Vance 2008). Every syllable in Japanese consists of one or two moras, and moras determine syllable weight in Japanese, with one mora syllables having only a vowel (and a possible onset) and two mora syllables having either a vowel followed by a moraic nasal, moraic obstruent, a diphthong, or a long vowel. It is well-known that the mora plays a significant role as a basic prosodic unit in the phonology of Japanese.

Orthographically, the Japanese syllabary has a near one-to-one correspondence between mora and *kana* syllable (Shibatani and Kageyama 2015). The exception to this one-to-one correspondence lies in the orthographic representation of *yoo'on*, that is, *kana* with palatalized consonants, which, despite being monomoraic, are represented by two *kana* characters. These are represented by a sequence of a *kana* syllable representing *Ci*, where C is a consonant, followed by a smaller-than-normal *kana* syllable representing *ya*, *yu*, or *yo*, e.g., きゃ *kya*, which is made up of the *kana* き *ki* followed by a small や *ya*.

A crucial property of the mora is its ability to serve as an independent unit, even when it does not form a syllable on its own, as moras may or may not overlap with a syllable (Kubozono 1999, 2015). When moras do overlap with a syllable, they are realized with the form (C)V (Tsujimura 2014). Such moras may either stand alone, overlapping with the syllable such as *ki*, or be the first mora in a heavy syllable, such as *kon*. Kubozono (2015) gives four types of moras which do not overlap with syllables and are dependent on a preceding mora: 1) the moraic nasal or coda nasal, 2) the moraic obstruent or the first half of a geminate, 3) the second half of a long vowel, or 4) the second half of a diphthong. These types of moras form syllables with their preceding moras, thus making the resulting syllables heavy syllables. Following Ito and Mester (2018a), I refer to moras which can stand alone or which are the first mora in a heavy syllable as "head moras" and moras which are dependent on another mora as "non-head moras." The following diagrams illustrate the difference.

(6) Head moras (in circles) and non-head moras (in squares)



In (6a), the sole mora of the syllable *ka* overlaps with the syllable. As the only mora in the syllable, it must be the head mora of the syllable. (6b) through (6e) exemplify heavy syllables with the four types of non-head moras given above. The head mora in each example is *ka*. In (6b), the non-head mora is the moraic nasal. In (6c), *katta* ‘won,’ only the heavy syllable *kat* is diagrammed; here the non-head mora is the moraic obstruent serving as the first half of the geminate *tt*. In (6d), the non-head mora is the second half of a long vowel, while in (6e), the non-head mora is the second half of a diphthong. The distinction between head and non-head mora (and the distinction between syllable and mora) will be crucial for the discussion in this section and the remainder of the dissertation.

Since a syllable may contain multiple moras, as shown above, syllable and mora counts may differ. The following examples with syllable and mora counts and divisions, based on a table and examples from Kubozono (2015), demonstrate this. Following Kubozono’s notation, syllables are separated by periods (.), while moras are separated by hyphens (-).

(7) Syllable count versus mora count (from Kubozono 2015)

Word	Gloss	Syllable Count	Mora Count
a. *toyota*	'Toyota'	3 (to.yo.ta)	3 (to-yo-ta)
b. *obama*	'Obama'	3 (o.ba.ma)	3 (o-ba-ma)
c. *kurinton*	'Clinton'	3 (ku.rin.ton)	5 (ku-ri-n-to-n)
d. *bussyu*	'Bush'	2 (bus.syu)	3 (bu-s-syu)
e. *roketto*	'rocket'	3 (ro.ket.to)	4 (ro-ke-t-to)
f. *otooto*	'younger brother'	3 (o.too.to)	4 (o-to-o-to)
g. *kaaten*	'curtain'	2 (kaa.ten)	4 (ka-a-te-n)
h. *gaikoku*	'foreign country'	3 (gai.ko.ku)	4 (ga-i-ko-ku)
i. *saidaa*	'cider'	2 (sai.daa)	4 (sa-i-da-a)

Because head moras overlap with syllables, mora counts and syllable counts are at least equal, and syllable counts cannot exceed mora counts. (7a) and (7b) only consist of head moras, resulting in identical mora and syllable counts of three moras and three syllables. Separations between mora and syllable accounts can be observed in (7c) through (7i). These examples display the four types of non-head mora. The moraic nasal is shown in (7c) *ku-ri-**n**-to-**n*** and (7g) *ka-a-te-**n***. The moraic obstruent/first half of a geminate is shown in (7d) *bu-**s**-syu* and (7e) *ro-ke-**t**-to*. The second half of a long vowel is shown in (7f) *o-to-**o**-to*, (7g) *ka-**a**-te-n*, and (7i) *sa-i-da-**a***. Finally, the second half of a diphthong is shown in (7h) *ga-**i**-ko-ku* and (7i) *sa-**i**-da-a*.

That words can be divided into moras as shown in the "Mora Count" column in (7) is suggested by native speaker intuitions of how many units words can be divided into. Moras are intuitively units of rhythm or timing (Vance 2008), and as mentioned above, of weight and length. Thus, as discussed in Tsujimura (2014), for example, while an English speaker is likely to divide the word *London* into two, *lon* and *don*, a Japanese speaker is likely to divide the word, loaned as *rondon*, into four – *ro*, *n*, *do*, and *n*.

Similarly, while Japanese and English speakers would both divide *Obama* (7b) into three parts, *O-ba-ma*, English speakers would divide *Clinton* (7c) into two, *Clin-ton*, and Japanese speakers would divide the loan form *kurinton* into five, *ku-ri-n-to-n*. This suggests that Japanese makes use of a prosodic unit smaller than the syllable but larger than a segment. That this is the case is important for accent because accent may depend on moras, syllables, or both, depending on the dialect.

The independence of the mora as a basic prosodic unit is also evident from the mora's role in poetry and music. The mora is the basic unit of meter in Japanese poetry and songs (McCawley 1965, Kubozono 1999). Traditional poetry is composed of lines which have 5 or 7 moras, in alternating patterns (McCawley 1965). For example, *haiku* poetry is characterized by three lines, in which the first and third line are composed of 5 moras and the second line is composed of 7 moras. Additionally, traditional Japanese songs usually have a one-to-one correspondence between moras and notes (Kubozono 1999).

Phonologically, the mora plays an important role as a unit of phonological length as well. Since at least McCawley (1965), (Standard) Japanese has been noted to be a "mora-counting" language. That is, certain phonological rules and processes depend on the number of moras in a word. Especially relevant for our purposes is the role of mora count in the placement of accent. For example, evidence from accent patterns in all lexical strata, but particularly the Sino-Japanese and loanword lexical strata, and even in nonce words, suggests that the antepenultimate mora is the default location for accent in Japanese (Kubozono 2006, Vance 2008). This has been formulated as an antepenultimate accent rule. The Japanese antepenultimate accent rule, at least for Tokyo Japanese, places accent on the syllable containing the third mora from the end of the word (Kubozono 2015 and references therein).

Observe in the following loanword examples from Vance (2008). For clarity, syllables are enclosed in parentheses, and moras are separated by hyphens.

(8) Antepenultimate accent in loanwords (Vance 2008)

a. *(pa')(zya)(ma)* 'pajamas' (3 syllables, 3 moras)

b. *(pa-i)(ro'-t)(to)* 'pilot' (3 syllables, 5 moras)

c. *(ho-o)(mu')(ra-n)* 'homerun' (3 syllables, 5 moras)

In each example, accent is placed on the antepenultimate mora: *pa* in (8a), *ro* in (8b), and *mu* in (8c). As Vance points out, although the example in (8a) has accent on the antepenultimate *syllable*, this is not the case in (8b) and (8c), where it falls on the antepenultima *mora*, which is in the *penultimate* syllable. Accent occurs on the antepenultimate syllable in (8a) because the antepenultimate mora overlaps with the antepenultimate syllable. Indeed, all of the accented moras in (8a) overlap completely with syllables. However, in (8b) and (8c), accent occurs in the penultimate syllable because it is the penultimate syllable, not the antepenultimate syllable, that contains the antepenultimate mora. This is important evidence to suggest that the mora is a basic prosodic unit on which the placement of accent in Japanese depends.

1.3.3 Syllables

The syllable is not irrelevant to Japanese, however. McCawley (1965) notes that Standard Japanese, although mora-counting, is also a syllable language, as the mora is not the sole determinant of accent location in Japanese. Consider the following examples. (9a-b) are from Vance (2008), and (9c-d) are from Sugito (1995)'s dictionary. As above, syllables are delineated with parentheses and moras with hyphens.

(9) Non-antepenultimate mora accent in loanwords (Sugito 1995, Vance 2008)

a. *(e)(re)(be'-e)(ta-a)* 'elevator' (4 syllables, 6 moras)

b. *(ko-n)(pu)(re'-k)(ku)(su)* '(psychological) complex' (5 syllables, 7 moras)

c. *(a)(do)(be'-n)(tya-a)* 'adventure' (4 syllables, 6 moras)

d. *(sa)(bu)(ta'-i)(to)(ru)* 'subtitle' (5 syllables, 6 moras)

In the examples in (8), observe that the location of accent does not fall in a specific syllable counting from the end of the word. Accent falls in the penultimate syllable in (9a) and (9c) but in the antepenultimate syllable in (9b) and (9d). However, although syllable count itself does not influence the location of accent (thus excluding Standard Japanese as a syllable-counting language), syllable structure, in the form of the distinction between head and non-head moras, nonetheless plays a role. When the antepenultimate mora is a non-head mora, accent is placed instead on the head mora in the same syllable, the preantepenultimate mora, as shown in (9); accent never falls on a non-head mora in Standard Japanese. Importantly, however, it *can* fall on an antepenultimate non-head mora in other dialects, such as the Kansai Japanese dialects, as shown in (10) below from Sugito (1995).

(10) Antepenultimate non-head mora accent in loanwords in Osaka Japanese

a. *(pa-i)(na-p')(pu)(ru)* 'pineapple' (4 syllables, 6 moras)

b. *(ki)(ro)(ri-t')(to)(ru)* 'kiloliter' (5 syllables, 6 moras)

c. *(a)(bu)(ra-k')(ko-i)* 'greasy' (4 syllables, 6 moras)

d. *(pi)(a)(ni-s')(si)(mo)* 'pianissimo' (5 syllables, 6 moras)

Accordingly, the syllable must be considered a relevant prosodic unit for Japanese in addition to the mora.

1.3.4 Feet

Although feet were previously assumed not to have consequences for Japanese morphophonology, Poser (1990a) provides evidence to the contrary in proposing that bimoraic feet are in fact crucial as a templatic element to several processes, including the formation of hypocoristics from the first one or two feet of a name like *hanatyan* from (*hana)ko* and *kentyan/kenzabutyan* from (*ken)(zabu)roo*, "geisha/bargirl client names" like *o-hoo-san* from *honda*, which takes the first syllable of a name (in this case *ho*) and lengthens it into a bimoraic foot, "rustic girls' names" like *ohana* from the first foot in *(hana)ko*, and in word formation in a secret language associated with the entertainment industry, known as *zuuja-go* ‘jazz language, jazzese’ (see also Ito, Kitagawa, and Mester 1996 for analysis and references), which involves the reversal of words, among other processes, with crucial reference to bimoraic feet, e.g., *hiikoo* from *koohii* ‘coffee,’ in which both the original word and the derived word have two bimoraic feet which are reversed, and *siimee* from *mesi* ‘meal,’ which involves lengthening of the original word’s syllables, resulting in a quadrimoraic, two foot word, which is then reversed.

For the present work, the most important phenomenon among the phenomena which Poser discusses is the use of the bimoraic foot in the placement of accent in noun-noun compounds. Traditionally, compounds are divided into two classes: compounds with “short” N2s (where N2 means the second member of the compound) consisting of one to two moras which place accent at the end of N1 (where N1 means the first member of the compound), as in (11a-b) and compounds with “long” N2s consisting of three or more moras, which place accent at the beginning of N2, as in (11c-d). Note that the hyphen here denotes the boundary between members of the compound. The notation N1 for the first member of a compound and N2 for the second member of a compound will continue to be used for the rest of the dissertation.

(11) Compounds with short N2 vs. compounds with long N2 (Poser 1990a)

a. *ga'imu* 'foreign affairs' + *syoo* 'ministry' = *gaimu'-syoo* 'Foreign Ministry'

b. *abura* 'oil' + *musi* 'insect' = *abura'-musi* 'cockroach'

c. *nuno* 'cloth' + *fukuro'* 'bag' = *nuno-bu'kuro* 'cloth bag'

d. *de'nki* 'electricity' + *kamiso'ri* 'razor' = *denki-ka'misori* 'electric razor'

The crucial difference between compounds of the type found in (11a-b) and the compounds of the type found in (11c-d), argues Poser, is that "short" N2s consist of only one foot, while "long" N2s consist of more than one foot. According to Poser, accent placement appears to "ignore" the last two moras of a compound, and thus, he proposed the invisibility or extrametricality of the final foot. As a result, accent may only fall on a mora preceding the extrametrical final foot. In an Optimality Theory framework, extrametricality is expressed by the family of NONFINALITY constraints, whose utility in the treatment of Japanese compound accent with the foot-based constraint NONFINALITY(FOOT) has been demonstrated in analyses such as Kubozono (1995) and Ito and Mester (2018a).

Further refinements to the typology of Japanese compounds suggest that compounds with "long" second members should actually be divided into two classes: compounds with "long" second members consisting of three to four moras, and compounds with "overlong" second members consisting of five or more moras (Kubozono and Mester 1995, Kubozono, Ito, and Mester 1997). At three to four moras, long N2s consist of up to two feet, while five mora or longer N2s consist of greater than two feet. The basis for this separation lies in the distinction between accent location in compounds with “long” N2s, which place accent at the beginning of N2, and “overlong” N2s, which retain their original accent in its original location. Thus, the crucial element that distinguishes compounds with long N2s from compounds with overlong N2s is again foot count.

Beyond compounds, additional evidence for the utility of the bimoraic trochaic foot in Tokyo Japanese is provided by Ito and Mester (2016), in their account of unaccentedness in Japanese. Taking up the issue of the tendency of 4 mora words in Japanese to be unaccented, they propose that these forms tend to be unaccented because unaccentedness is the optimal way to fulfill the requirements of both RIGHTMOST, a constraint requiring that the foot containing accent be as far to the right as possible, and NONFINALITY(FOOT’), requiring that the foot containing accent not be final in the word. As accent on any mora in the word would violate one or the other, the optimal candidate is one which is simply unaccented. Crucially, this holds only for quadrimoraic words containing two feet. Quadrimoraic words not containing two feet, on the other hand, are accented, suggesting that the difference arises crucially due to foot structure, not simply mora count.

Evidence for the foot in Kyoto Japanese, a Kansai Japanese dialect, is provided by Tanaka (2018), who extends the Ito and Mester (2016) analysis to Kyoto Japanese. Tanaka notes that Tokyo and Kyoto Japanese show similar accent patterns in 3 and 4 mora loanwords and argues that the constraint system proposed by Ito and Mester, with some modifications, including the inclusion of HL tonal sequences as trochaic feet, derives the accent system of Kyoto Japanese in loanwords.

Accordingly, I take the foot to be crucial to Japanese phonology and accent placement.

1.4 The Syntax-Prosody Interface and Match Theory

1.4.1 The Prosodic Hierarchy

In the previous section, I discussed the importance of the mora, the syllable, and the foot in the phonology of Japanese. These units of organization comprise the lower part of the prosodic hierarchy of Prosodic Hierarchy Theory (Selkirk 1978, Nespor and Vogel 1986/2007), which argues that utterances are organized into smaller, hierarchically ordered constituents, or prosodic categories, in prosodic structure, which is influenced by, but distinct from, syntactic structure. I assume in this dissertation the following prosodic hierarchy (from Ito and Mester 2012), which contains prosodic categories that are generally posited to be part of the prosodic hierarchy. I will have little occasion to refer to the utterance (υ) and intonational phrase (ι) levels in the present discussion, but they are presented in (12) for completeness.

(12) Prosodic Hierarchy

υ	utterance	
ι	intonational phrase	
φ	phonological phrase	
ω	prosodic word	(interface categories)
f	foot	(rhythmic categories)
σ	syllable	
μ	mora	

The prosodic categories in Prosodic Hierarchy Theory can be divided into those which are influenced by syntactic structure and those which are not influenced by syntactic structure. Following Ito and Mester (2012), I refer to the former as "interface categories" and the latter as "rhythmic categories." The prosodic word, itself an interface category, serves as the dividing line between the interface categories and the rhythmic categories. As shown, interface categories are all categories above and including the prosodic word, and rhythmic categories are all categories below the prosodic word.

The rhythmic categories are "purely phonological" and are not involved in the interfaces with other components of grammar (Nespor and Vogel 2007 [1986]). Rather, these categories concern the organization of segments into larger units, which are influenced by constraints on, for example, syllable structure and stress (Ito and Mester 2012). On the other hand, the interface categories *are* influenced by syntactic structure, through constraints on the correspondence between syntactic and phonological categories, such as those provided by alignment theory (Selkirk 1995) and Align-Wrap Theory (Truckenbrodt 1999) which is based on Selkirk's alignment theory, which requires alignment of the left or right edges of a syntactic constituent with the left or right edges of a prosodic one, and Match Theory (Selkirk 2011), which requires exact correspondence between syntactic and prosodic constituents.

However, it has long been observed that mismatches sometimes arise between syntactic constituents and prosodic constituents, an observation which serves as an important motivation for Prosodic Hierarchy Theory. For example, Kubozono (1989) describes a mismatch in Tokyo Japanese wherein the syntactic structure [[[[A] B] C] D] is treated in the prosody as if it had the structure [[A B][C D]]. In constraint-based approaches, this has led to the argument that the constraints which are involved in the syntax-prosody mapping are violable, and that higher ranked phonological well-formedness constraints interacting with the mapping constraints can create non-isomorphisms.

An important characteristic of the categories of the prosodic hierarchy is that they serve as the domains of application of phonological and phonetic processes (Nespor and Vogel 1986/2007). As a result, if processes can be identified to be associated with certain prosodic categories, these can be used to argue for a particular prosodic structure. As we will see in Chapter 3, the ideas of non-isomorphism between syntactic structure and prosodic structure as well as the association of specific processes to specific prosodic domains plays an important role in the prosodic structure and accentual behavior of Japanese compounds.

For further discussion of and references regarding the prosodic hierarchy and issues of the syntax-prosody interface, see overviews by Elordieta (2008), Elfner (2018), and Bennett and Elfner (2019).

1.4.2 Match Theory

Given that, in Prosodic Hierarchy Theory, prosodic structure is influenced by, but distinct from, syntactic structure, it is necessary, then, for syntactic structure to be mapped onto prosodic structure. It has been proposed that this is accomplished by some set of constraints which govern how mapping occurs. As mentioned in the previous section, two approaches to mapping are alignment theory (Selkirk 1995)/Align-Wrap Theory (Truckenbrodt 1999) and Match Theory (Selkirk 2011). In this dissertation, I adopt the newer Match Theory.

In Match Theory, the correspondence between syntactic structure and prosodic structure is accomplished through universal constraints which require exact correspondence (a "match") in alignment between the edges of syntactic constituents and the edges of prosodic constituents. That is, exact correspondence is essentially the combination of the ALIGN-LEFT and ALIGN-RIGHT constraints of alignment theory, acting like a conjoined constraint. Selkirk argues that this results in a strong tendency for syntactic and prosodic constituents to correspond exactly and, thus, for syntax to be faithfully mapped onto prosodic structure. In other words, exact correspondence is the expected, default outcome of syntax-prosody correspondence. This correspondence is bidirectional: there are constraints which enforce the correspondence of syntactic constituents with prosodic constituents (SP constraints, i.e., syntax-phonology constraints) and constraints which enforce the correspondence of prosodic constituents with syntactic constituents (PS constraints, i.e., phonology-syntax constraints). Selkirk argues that both types of correspondence are necessary. Given this, exact SP correspondence means that the left and right edges of syntactic constituents are aligned with the left and right edges of prosodic constituents. Exact PS correspondence means that the left and right edges of prosodic constituents are aligned with the left and right edges of syntactic constituents. In formal terms, these correspondences are defined as follows, from Selkirk (2011). Constraints of the family in (13a) I will refer to as MATCH-SP constraints, and constraints of the family in (13b) I will refer to as MATCH-PS constraints.

(13) a. Match(α,π) (MATCH-SP constraints)

The left and right edges of a constituent of type α in the input syntactic representation must correspond to the left and right edges of a constituent of type π in the output phonological representation.

b. Match(π,α) (MATCH-PS constraints)

The left and right edges of a constituent of type π in the output phonological representation must correspond to the left and right edges of a constituent of type α in the input syntactic representation.

Constituents of type α and constituents of type π are presented in the table below, with their correspondences.

(14) Correspondence of syntactic and prosodic constituents

α	**π**
CP	ι
XP	φ
X^0	ω

Given these correspondences, then, a MATCH constraint may require a CP to match with an intonational phrase ι or a syntactic terminal X^0 to match with a prosodic word ω.

We can observe how these constraints work in the following table which compares how four candidates compare on the two types of constraints. For the purposes of this demonstration, α is a syntactic phrase XP, and π is a phonological phrase φ. The constituent violating each constraint is given in lieu of violation asterisks.

(15) MATCH(XP,φ) vs. MATCH(φ,XP)

Input: $[_{VP}$ V $[_{NP}$ N]]	MATCH(XP,φ)	MATCH(φ,XP)
a. $(_{\varphi}$ V $(_{\varphi}$ N))		
b. $(_{\varphi}$ V) $(_{\varphi}$ N)	VP	$(_{\varphi}$ V)
c. $(_{\varphi}$ V N)	NP	
d. $(_{\varphi}$ $(_{\varphi}$ V) N)	NP	$(_{\varphi}$ V)

As the table demonstrates, the violation profiles of each constraint are different, resulting from the direction of correspondence. MATCH(XP,φ) compares the input syntactic structure with the output prosodic structure and requires that a syntactic phrase be matched with a phonological phrase. A good way to understand this correspondence is suggested by Kalivoda (2018), ignoring the fact that constituents of type α are different objects from constituents of type π and referring to them both as Π: MATCH(XP,φ) is like MAX(Π) – if a constituent Π exists in the syntactic representation, then it must exist in the phonological representation as well. Candidate (15a) performs perfectly on this constraint, because the left and right edges of VP correspond to the left and right phonological phrase edges of the outer phonological phrase, while the edges of NP correspond to the edges of the inner phonological phrase in the prosodic structure. Candidate (15b) violates MATCH(XP,φ) once because the edges of VP do not perfectly correspond with the edges of one prosodic constituent. That is, the left edge of the syntactic phrase VP corresponds with the left edge of the phonological phrase containing V, but the right edge of the syntactic phrase VP does not correspond to the right edge of the phonological phrase containing V. It is true that the left edge of the syntactic phrase VP corresponds to the left edge of the phonological phrase containing V, and the right edge of VP corresponds to the right edge of the phonological phrase containing N, and thus, both edges of VP correspond to the edges of *some* phonological phrase. However, what is crucial here is that the edges of VP do not correspond to both edges of the *same* phonological phrase, which is a requirement of matching, and thus, this candidate incurs a violation on this constraint for VP. Finally, candidates (15c) and (15d) each violate MATCH(XP, φ) once because NP has not been mapped onto a phonological phrase at all. While the right edge of NP corresponds to the right edge of a phonological phrase, the left edge of NP does not correspond to the left edge of any phonological phrase.

Turning to MATCH(φ,XP), this constraint compares the output phonological structure with the input syntactic structure and requires that a phonological phrase be matched with a syntactic phrase. As above, Kalivoda suggests that PS correspondence amounts to DEP(Π) – if Π exists in the phonological representation, then it must exist in the syntactic representation as well. Candidate (15a), as it did on MATCH(XP,φ), performs perfectly on MATCH(φ,XP), as the left and right edges of all phonological phrases in the phonological structure match the left and right edges of all syntactic phrases in the syntactic structure. Candidate (15c) also performs perfectly on MATCH(φ,XP), despite having a different prosodic structure from the perfectly-matched candidate (15a). This is because, although candidate (15c) does not perfectly match the input, the left and right edges of the lone phonological phrase match the left and right edges of the largest XP in the input. No additional phonological phrase has been built which does not match some XP in the syntactic structure. Finally, candidates (15b) and (15d) each violate MATCH(φ,XP) once because they have both built a phonological phrase around V which does not correspond to a syntactic phrase in the syntactic structure. While the left edge of the phonological phrase containing V does correspond to the left edge of VP, the right edge of this phonological phrase does not correspond to the right edge of any syntactic phrase.

Thus, MATCH-SP constraints and MATCH-PS constraints have different consequences, and their relative rankings will thus produce different results. In a system which prioritizes perfect matching (i.e., MATCH-SP and/or MATCH-PS are undominated in the system), candidate (15a) will result.

Thus, perfect matching is the default expectation, but mismatches may occur as well. How do these mismatches occur? In Match Theory, mismatches occur when perfect matching would result in violations of higher-ranked phonological well-formedness constraints. For example, a language may have a requirement that phonological phrases be minimally binary, as defined in the following constraint.

(16) BINMIN-φ: Phonological phrases are minimally binary.

Assign one violation for a φ which has fewer than two branches.

If such a constraint is ranked higher than the MATCH constraints, then mismatches may occur, as shown in the following tableau.

(17) Non-isomorphism driven by higher ranked BINMIN-φ

Input: [$_{VP}$ V [$_{NP}$ N]]	BINMIN-φ	MATCH(XP,φ)	MATCH(φ,XP)
a. ($_{φ}$ V ($_{φ}$ N))	($_{φ}$ N)!		
b. ($_{φ}$ V) ($_{φ}$ N)	($_{φ}$ V)! ($_{φ}$ N)	VP	($_{φ}$ V)
c. ☞ ($_{φ}$ V N)		NP	
d. ($_{φ}$ ($_{φ}$ V) N)	($_{φ}$ V)!	NP	($_{φ}$ V)

When BINMIN-φ dominates both MATCH constraints, as shown here, candidate (17c) emerges as the winner. Candidate (17c) violates MATCH(XP,φ) because the NP is not matched to a phonological phrase. However, if NP were matched to a phonological phrase, as in candidate (17a), the resulting phrase would be unary, rather than binary, violating the requirements of BINMIN-φ. Thus, the less perfectly-matched candidate (17c) emerges as the winner instead. If MATCH(XP,φ) is ranked above BINMIN-φ, then the perfectly-matched candidate (17a) wins instead. Candidates (17b) and (17d) are harmonically-bounded; in a system with these constraints, outputs must not build edges which have no correspondents in the input (here, the right edges of the (smallest) phonological phrase containing V in candidates (17b) and (17d)).

These three aspects of Match Theory – MATCH-SP constraints, MATCH-PS constraints, and mismatches arising from highly ranked phonological well-formedness constraints – play an important role in this dissertation. Phonological well-formedness constraints include restrictions on the size of prosodic categories, such as requirements that prosodic words must be minimally binary or that phonological phrases must be maximally binary on some level of prosodic representation. These will be discussed in more detail in Chapter 3.

Previewing the discussion of Kansai Japanese compounds in Chapter 3, schematically, all Kansai Japanese compounds have the following syntactic structure.

(18) x^0

x^0 x^0

It is because of the interaction of the constraints above that perfect matches will arise in some instances and mismatches will arise in other instances. The perfect match case (namely, in "word-word compounds" in Kansai Japanese) yields the following prosodic structure.

(19) ω

ω ω

In the mismatch cases, "foot-foot compounds," "foot-word," "word-foot compounds," "mono-phrasal compounds," and "bi-phrasal compounds" in Kansai Japanese will arise instead. (Compound types will be introduced and discussed in Chapter 2). These mismatch cases have the following prosodic structures, respectively.

(20)

a. Foot-foot

ω

f f

b. Foot-word

ω

f ω

c. Word-foot

ω

ω f

d. Mono-phrasal

φ

ω ω

e. Bi-phrasal

φ

φ φ

The subject of this dissertation is compound nouns, so the correspondences of interest involve the mapping of syntactic terminals – specifically N – to prosodic structure. Thus, given the α-to-π correspondences given in the table in (14) above, the perfect matching scenario is that Ns will be matched to prosodic words ω. In non-isomorphic situations, phonological well-formedness constraints will cause some Ns to be matched with feet f or with phonological phrases φ. These non-isomorphisms between syntactic and prosodic structure result in compounds exhibiting different prosodic features with respect to accent and a word's overall prosodic pattern.

1.5 Compounds

As discussed above, compounds are often noted for being in some ways word-like and in some ways phrase-like. Below, I present a brief overview of their word-like and phrase-like characteristics.

1.5.1 Compounds Are Word-like

Although the precise definition of "compound" remains under debate (see, for example, Lieber and Štekauer (2009) and Scalise and Vogel (2010)), definitions of "compound" by Fabb (1998) and Bauer (2001, 2003, 2017) are a useful starting point and form the basis for the coming discussion. Fabb begins his discussion of compounds by defining a compound as a word that consists of two or more words. Bauer (2001) gives a similar definition, adding further detail, defining a compound as "a lexical unit made up of two or more elements, each of which can function as a lexeme independent of the other(s) in other contexts, and which shows some phonological and/or grammatical isolation from normal syntactic usage." Bauer (2017) comments that compounds are "words in the sense that they are lexemes," where lexeme is defined (in Bauer 2003) as "a dictionary word, an abstract unit of vocabulary," which "is realized by word-forms, in such a way that the word-form represents the lexeme and any inflectional endings that are required." In terms of their lexical categories, the lexemes which serve as the elements of a compound are diverse, with compounds being made up of nouns, verbs, adjectives, and adverbs, among others (Scalise and Vogel 2010).

The idea of compounds as single "words" or "units" formed from two or more units is most easily seen with compounds that are orthographically written as one word (in languages whose orthographies have spaces), under the assumption, discussed by Bauer (2017), that orthographic unity reflects native speaker intuitions about wordhood. Such compounds include *blackboard*, mentioned in the introduction, and those in (21) below. Non-English compounds are taken from the sources listed next to the relevant examples below.

(21) Some compounds that are orthographically one word

a. *blackbird*

b. *bedroom*

c. *vleessoep* (Dutch: 'meat soup,' Don 2009)

d. *portalettere* (Italian: 'postman,' carry-letters; Bauer 2017)

e. 어께동무 *ekkay-tongmu* (Korean: 'childhood friend,' shoulder-comrade; Lee and Ramsey 2000)

f. *Donaudampfschifffahrtsgesellschaftskapitänsmütze* (German: 'Cap of the captain of the Danube steam ship company,' Danube-steam-ship-journey-journeyman-captain-cap; Neef 2009)

Of course, orthographic unity cannot be taken as a reliable indicator of compoundhood, as many compounds are written as orthographically separate (Bauer 2017), such as the English compounds in (22), taken from Punske (2016).

(22) Some compounds that are not orthographically unified

a. *apple pie*

b. *chemistry laboratory*

c. *toy factory*

d. *Madison street*

Furthermore, there may be variation in orthographic practices. For example, according to Lee and Ramsey (2000), some people write *yelum-panghak* 'summer vacation' in Korean as a "compound word" consisting of one word, as, in principle, compounds are written as one word in Korean, while other people write it as a "phrase" consisting of two words, as shown below.

(23) *yelum-panghak* 'summer vacation' (Korean, Lee and Ramsey 2000)

a. as "one word": 여름방학 (*yelumpanghak*)

b. as "two words": 여름 방학 (*yelum panghak*)

Although there is some variability in the reliability of orthographic practices, with some languages (e.g., German) showing greater propensity for orthographic unity, the fact that orthographic unity is possible in some cases provides some evidence for the "single unit"-hood of compounds.

Another word-like characteristic of compounds is that they may have a meaning which is distinct from the mere sum of their parts. Compounds have traditionally been classified as either endocentric or exocentric. As explained by Fabb (1998), endocentric compounds are compounds that have a head, which represents the core meaning of the word. Thus, for example, in *blackbird*, *bird* is the head, because it represents the core meaning of the word: a *blackbird* is a type of *bird*. Often, this leads to compounds having specialized meanings, as *blackbird* refers to a specific species of bird, not simply a bird that is black. Exocentric compounds, on the other hand, are compounds which lack a head. For example, a *blackhead* is a type of acne, not a type of head; the *head* portion of *blackhead* does not represent the core meaning of *blackhead*. Given this, compounds act as their own lexeme, in the sense defined by Bauer, as discussed above. Consider the following examples.

(24) Compounds often have specialized meanings

a. *blackbird* – a specific species of bird
b. *White House* – the residence and workplace of the President of the United States
c. *pickpocket* – a person who steals from people's pockets

As mentioned above, the meaning of (24a) *blackbird* is specialized and refers to a specific species of bird, not simply a bird that is black, a meaning which is expressed by the phrase *black bird*. As Punske (2016) writes, it is completely acceptable to refer to a member of the species as a *blackbird*, regardless of whether that specific bird is black or not, such as in the case of an albino blackbird. Similarly, (24b) the *White House* refers specifically to the residence and workplace of the President of the United States and not to just any white-colored house. (24c) *pickpocket*, when it is a noun, is an exocentric compound, whose meaning refers to a person who steals from people's pockets, not a type of pocket, a type of pick, or a specific version of the action of picking. Thus, these compounds are lexemes in and of themselves.

Another piece of evidence suggesting compounds as single units is, as Bauer (2001) notes, that one of the elements of a compound is often resistant to further marking or modification. For example, morphology can often only apply to the compound as a whole, rather than to individual parts of the compound. Consider, for example, *dog walker*, a person who walks dogs. Although dog walkers often walk multiple dogs at one time, the first element, *dog*, is not marked with the plural marker. The plural-marked *dogs walker* is, at least to my ear as a native speaker of American English, infelicitous, and only the whole compound can be marked as plural, i.e., *dog walkers*, referring to multiple people who walk dogs. Similarly, internal elements of a compound are often resistant to modification. For example, the phrase *a very black board*, describing a board with a particularly dark, black color, is well-formed, while the phrase **a very blackboard* is not (at least, in general discourse, apart from metalinguistic modification) (Lieber and Štekauer 2009 and Bauer 2017). It should be noted, however, that the inability to mark an element of a compound is not universal, as can be seen in Italian in (21d), *portalettere* 'postman' (carry-letters), in which *lettere* is the plural of *lettera* and indicates 'letters,' not the plural 'postmen.' A constructed English parallel, on the other hand, might be *letter carrier*, rather than ?*letters carrier*.

Another way in which compounds have been suggested to be words rather than phrases is in their phonological characteristics. Chomsky and Halle (1968), for example, proposed the Compound Rule and the Nuclear Stress rule, which produce a well-known distinction between strings of words which receive stress on their left constituent through the Compound Rule (e.g., *bláckboard*), identifying these strings as compounds, and strings of words which receive stress on their right constituent through the Nuclear Stress Rule (e.g., *black bóard*), identifying these latter strings as phrases. While these generalizations are not absolute (e.g., exceptions such as *apple píe*, which is clearly as much a compound as *ápple cake* is), there is a sense in which compounds are single units phonologically speaking as well. Phonological characteristics which distinguish compounds from phrases are observed in other languages as well, including different stress or tone patterns, changes in voicing, segment deletion, and other processes (see Lieber and Štekauer 2009 for a sample of languages). A characteristic that is particularly relevant for the present investigation is culminativity, which limits (primary) stresses or accents to one occurrence per word. As we will see in Japanese, the culminativity restriction is active in simplex and compound words, suggesting an affinity between compounds and words.

1.5.2 Compounds Are Phrase-like

However, despite the word-like nature of compounds as discussed above, there is nonetheless a phrase-like character to compounds. Perhaps the most important property of compounds is that compounds can be infinitely recursive, a fundamental property of syntax (Namiki 2001). This can be seen in the following examples, which I have constructed for this discussion.

(25) Recursivity in compounds

a. examination
b. entrance examination
c. college entrance examination
d. college entrance examination study guide
e. college entrance examination study guide production
f. college entrance examination study guide production company
g. college entrance examination study guide production company headquarters
h. college entrance examination study guide production company headquarters closure
i. (and so on)

Each compound may thus serve as the input to another application of compound formation, and there is no principled limit to this recursion (Namiki 2001). New compounds can be formed in any language, and children show the ability to create novel compounds as early as age 2 and 3 (see Di Sciullo 2009 for discussion and references).

Another characteristic of compounds is that compounds can be made with phrases as constituents, as in the following examples from Bruening (2018). The relevant compounds are bolded.

(26) Compounds with phrasal constituents

a. I gave her a **don't-you-dare! look**.

b. She baked her fiancé a sweet **I-love-you cake**.

c. She had that **What-a-strange-person-you-are! look**.

Compounds such as these, like those that infinitely apply recursion, are also easily constructed and regularly used. Bruening (2018) offers this particularly long compound, for example.

(27) Compound with a long phrasal constituent

"Growing Kids? The Yellow Pages is your **oh-boy-they-need-more-shoes-and-clothes-and-we-should-start-braces-for-their-teeth-now directory.**"

Thus, while some compounds, such as *blackboard*, *portalettere* 'postman' (Italian), or even *television stand* may be argued to be lexicalized and thus listed, it is implausible to claim that all compounds must be lexicalized and listed due to the infinitely recursive nature demonstrated in (25) and the ability for compounds to include phrasal constituents as shown in (26) and even particularly long ones as in (27). Furthermore, such expansions are performed freely and readily. Speaking about recursivity in compounds, Bauer (2003) describes this as "created on the spur of the moment and forgotten again immediately," suggesting that such compounds are indeed often simply generated rather than memorized. Bruening offers further examples of compounds with phrasal constituents from article titles and text, TV show scripts, and product ads. Thus, Bauer writes, reasons such as these can be taken as evidence for the close affinity of compounding with syntax.

1.5.3 Why Compounds in Syntax-Prosody Research?

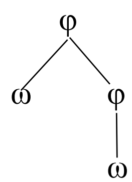
The dual nature of compounds as in some ways word-like and in some ways phrase-like is significant for research on the syntax-prosody interface because it allows for a multi-pronged investigation of the ways in which syntax is mapped onto prosody, assuming a syntax-prosody mapping theory such as Match Theory. On the one hand, because of their word-like nature, compounds may be expected to map onto prosodic words (ω), under the assumption that compounds are X^0 nodes in the syntax, which, in Match Theory, would be mapped to a prosodic word under exact match conditions. A compound like *television stand* would be expected to map to a prosodic word, which will be produced with one primary stress on *television*. However, on the other hand, because of their phrase-like nature, particularly when compounds become quite long, it might be expected that, despite being X^0 nodes in the syntax, they will end up being mapped to phonological phrases (φ) instead, under the pressures of well-formedness constraints which prevent exact matching of an X^0 to a prosodic word due to the compound's long size. Thus, we might expect to see a longer expression such as (25h) or (27) above being parsed as a phonological phrase or broken down into several phonological phrases.

The possibility of compounds being mapped to phonological phrases is interesting for questions regarding the availability of recursion in prosodic structure, which has been a central question in research on the syntax-prosody interface. Early work at the interface suggested that while recursion is a fundamental property of syntax, the hierarchical structure of phonology is, by contrast, finite, adhering to the Strict Layer Hypothesis, by which prosodic constituents of the same type may not be nested within each other in prosodic structure (Nespor and Vogel 1986/2007). Much work has suggested that the Strict Layer Hypothesis is too strong, and that there is evidence for recursion in prosodic structure as well, e.g., Ito and Mester (2007), Selkirk (2011), Elfner (2015). See Elfner (2018) and Bennett and Elfner (2019) for further discussion and references. If recursion is allowed into the theory, then how much recursion is permissible and in what form is a question for continued research and is a central question for the present work. For example, Vigário (2010) argues that, while recursion has a role to play in prosodic structure, its role is limited and restricted only to asymmetrical recursion, that is, recursion in which only one daughter of a recursive node is of the same prosodic category, while the other is of a lower category, e.g., $[_{\omega}\ [_{\omega}$ …$][_{\sigma}$ …]]. In this work, I present evidence that suggests that recursion in prosodic structure is necessary and not limited to asymmetrical recursion. Indeed, it appears that both symmetrical and asymmetrical recursion are necessary at both the prosodic word and phonological phrase levels.

Compounds provide an interesting window into the syntax-prosody interface because of the possibility of expressions which are not themselves syntactic phrases nevertheless being mapped to phonological phrases. In Match Theory, phonological phrases are ideally mapped from syntactic phrases. If it is the case that certain types of words can also be mapped to phonological phrases, then the result, once compounds and the phrases containing them have been mapped to prosodic structure, is recursive prosodic structure, with phonological phrases (corresponding to syntactic phrases) containing phonological phrases (corresponding to compounds). Thus, the investigation of compounds adds to research on the availability of recursion in prosodic structure.

The target of the present investigation, compounding in Kansai Japanese, is especially interesting for research on recursion in prosodic structure because it builds on previous research by Ito and Mester (2003, 2007, 2018a, 2019, 2021) that suggests, first, that recursion is necessary in the prosodic structure of (Tokyo) Japanese compounds, and, second, that an important way to understand the diversity in compound accentuation in Japanese is to divide compounds into different prosodic structures. Their work shows both symmetrical and asymmetrical recursion, with words which recursively dominate a word and a foot (asymmetrical recursion), words which recursively dominate two words (symmetrical recursion), and phrases which recursively dominate two phrases (symmetrical recursion). The present investigation proposes that these same categories are present in Kansai Japanese, along with an additional category not present in Tokyo Japanese, an asymmetrically recursive phrasal compound in which a phrase recursively dominates a phrase preceded by a word in the following configuration in (28). The superscript H and L indicate high and low register respectively, while the apostrophe indicates the location of accent. These will be discussed in Chapter 2.

(28) Asymmetrical recursion at the phrase level in a Kansai Japanese compound



^{H}*simin-*^{L}*kaigi'situ*

'citizens' meeting room'

This kind of compound behaves differently from both a compound which is mapped to a phrase which dominates two words $(_{\varphi}\ \omega\ \omega)$ and a compound which is mapped to a phrase which recursively dominates two phrases $(_{\varphi}\ \varphi\ \varphi)$. Importantly, however, the word serving as N1 has the same characteristics as N1 of a $(_{\varphi}\ \omega\ \omega)$ compound, while the word serving as N2 has the same characteristics as N2 of a $(_{\varphi}\ \varphi\ \varphi)$. If a separate prosodic category is posited in order to avoid recursion in (28), this would result in two prosodic categories showing the same characteristics. I argue that the single prosodic category phonological phrase is all that is necessary to account for the $(_{\varphi}\ \varphi\ \varphi)$ and $(_{\varphi}\ \omega\ \varphi)$ patterns, with the result being that both symmetrical and asymmetrical recursion are necessary for a theory of prosodic structure. Additionally, I argue that this is evidence for asymmetrical recursion in the mapping of word syntax to prosodic structure parallel to asymmetrical recursion in the mapping of phrasal syntax to prosodic structure, e.g., Elfner (2015). The availability of this kind of structure for compounds means, as discussed above, that when compounds are considered in the broader context of phrasal syntax-prosody mapping, recursive prosodic structure will result.

Having overviewed the word-like and phrase-like characteristics of compounds and their relevance for research on the syntax-prosody interface, I now turn to the core topic of the dissertation, Japanese, in particular the Kansai dialects of Japanese.

Chapter 2: Accent

2.1 Pitch Accent or Tone?

Japanese is commonly described as a "pitch accent" language. Yip (2002) and Hyman (2009) argue for pitch accent languages as a subset of tone languages, the latter because there seems to be no set of characteristics which reliably identify pitch accent languages as a primitive type as compared to stress languages and tone languages or which distinguish between pitch accent languages and tone languages. I follow Hyman's argument here and treat Japanese in tonal terms for the present analysis, occasionally referring to it as a "limited tone language." However, for convenience and continuity with previous work on Japanese accent, I continue to refer to the Japanese accentual HL complex as "accent."

Per Yip (2002), a tone language is one in which the pitch of the word can change the word's core meaning. Another definition by Hyman (2001) is "A language with tone is one in which an indication of pitch enters into the lexical realization of at least some morphemes." Limited tone languages feature more limited use of tone than languages more commonly recognized as tone languages, such as Mandarin. Two ways in which this tone use is "limited" are in the number and distributional patterns of tones and the functional load of tone in lexical distinctions.

Among the more “limited” uses of tone is a smaller inventory of tones, often just one or two (Yip 2002). In the case of Japanese, only two tones, high and low, are necessary to describe the system. Furthermore, as argued by Pierrehumbert and Beckman (1988), it is only necessary to specify certain moras – the accented moras in a word – as being associated with tones. All other moras receive their pitch value by an interpolation between accentual tones and various boundary and phrasal tone and can be underspecified both underlyingly and on the surface. I adopt this analysis in this dissertation.

Both prototypical tone languages like Mandarin or Cantonese and limited tone languages like Japanese use tone for lexical contrast. Consider the following examples in Cantonese (29) and Tokyo Japanese (30). For Japanese, tone-to-mora correspondences are given in terms of Hs (high tone) and Ls (low tone) next to the words in order to demonstrate their prosodic shape. Note that the nominative particle *ga* is included in the Japanese examples to maximally illustrate the difference between (30a), an unaccented word, and (30b), an accented word. The difference between unaccented and accented words will be expanded on in the discussion of Japanese prosody.

(29) Tonal minimal sextuplet for the syllable *[yau]* in Cantonese (Yip 2002)

a. high level ‘worry’

b. high rising ‘paint (noun’)

c. mid level ‘thin’

d. low level 'again'

e. very low level 'oil'

f. low rising 'have'

(30) Tonal minimal triplet in Tokyo Japanese (Hirayama 1960)

a. *hasi-ga* LH-H 'edge'

b. *hasi'-ga* LH-L 'bridge'

c. *ha'si-ga* HL-L 'chopsticks'

As shown above, tone plays a role in both Cantonese and Japanese in changing a word's core meaning. What distinguishes the two is that prototypical tone languages such as Cantonese usually rely quite heavily on tone to make such distinctions. That is, tone in these languages has a heavy functional load. In limited tone languages, however, the functional load of tone is significantly smaller. While examples like those in (30) show that limited tone languages like Japanese can use tone to make lexical distinctions, tonal minimal pairs and triplets are relatively uncommon. For example, Labrune (2012) mentions that, according to Sibata and Shibata (1990), as quoted by Kubozono (2001), only 14% of segmentally homophonous words in Tokyo Japanese are distinguished accentually. However small the functional load of tone in Japanese, however, it seems to be nonetheless clear that tone is not an insignificant factor in distinguishing between lexical items. This being the case, Japanese qualifies as a kind of tone language assuming the definitions by Yip (2002) and Hyman (2001) discussed above.

2.2 Accent and Tone Bearing Units

Kubozono (2015) notes that the term “accent” has been used to refer to two notions: 1) the overall prosodic pattern of a word, such as those displayed in (30) above, and 2) a phonological prominence found inside a word. In this paper, the term “accent” will refer only to the second notion. The terms “prosodic pattern” and “prosodic shape” will be used to refer to the first notion.

Accent in Japanese is realized as a pitch fall.[2] Unlike so-called stress accent languages, for which it is widely recognized that lexical words have one syllable marked for the highest degree of metrical prominence (“obligatoriness” and “culminativity,” as discussed in Hyman 2009), it is not a requirement for Japanese words to have a accentual/prosodic prominence. Words with a prominence are called “accented,” and words without a prominence are called “unaccented.” Consider the following examples from Tokyo Japanese. As above, the nominative particle *ga* is given here to distinguish between unaccented words and final accented words, and the surface prosodic patterns of the words are given as well. The location of the pitch fall is given in the words as an apostrophe (’), while the pitch fall is indicated as an HL tone sequence in the prosodic pattern schematics.

[2] Other dialects, like Shizukuishi Japanese, realize accent as a pitch rise. The two dialects with accent treated in this paper, Tokyo and Kansai Japanese, realize accent as a pitch fall. The reader is directed to Uwano (1999, 2012) for discussion of other accent realizations.

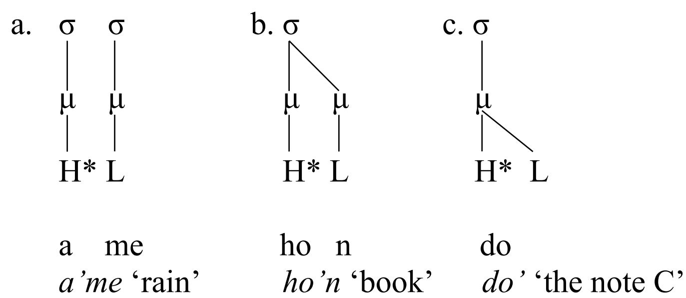
(31) Accent in Tokyo Japanese (Haraguchi 1999)

a.	*i'noti-ga*	HLL-L	'life'
b.	*koko'ro-ga*	LHL-L	'heart'
c.	*otoko'-ga*	LHH-L	'man'
d.	*sakura-ga*	LHH-H	'cherry tree'

(31a-c) show examples of accented words. All show accent realized as a pitch fall, though the location of accent differs from word to word the fall may even end within a following particle, as in (31c). (31d), on the other hand, is an unaccented word and shows no pitch fall at all.

I leave specific discussion of the pitch values of other moras to the next subsection. However, it is useful to say here that, as argued by Pierrehumbert and Beckman (1988), the other moras receive their pitch values from interpolations between accentual tone targets and phrasal or boundary tone targets. As such, following their work, it is necessary to posit a high tone target and a low tone target to represent accent. In this paper, I assume a bitonal representation of accent, adopted by Ito and Mester (2018a), as H*L, an accentual high tone and an accentual low tone, which are each linked to a mora (which may be the same mora, in monomoraic words, like (32c)), as shown below.

(32) Representation of accent (Ito and Mester 2018a)



As shown in (32), accent often falls in between moras, whether these moras overlap with syllables, as in (32a), or are a head and a non-head mora in the same syllable, as in (32b). However, some monomoraic words are accented as well, such as *do'* 'the note C' or *hi'* 'day,' in which case the pitch fall happens mora-internally, creating a contour. It should be noted that this mora-internal fall only occurs when the word occurs with no following particle. When there is a following particle, the low tone of the accentual complex occurs on the particle instead, e.g., *hi'-ga*, which has the prosodic profile H-L, with the accentual low tone on the particle.

To conclude this subsection, let us consider tone-bearing units and accent-bearing units in Japanese. It was mentioned above that McCawley (1965) noted Standard/Tokyo Japanese to be a mora-counting, syllable language. What this means is that the language computes accent location by counting moras. In Tokyo Japanese, default accent is placed on the antepenultimate mora. When the antepenultimate mora is a non-head mora, accent shifts onto the head mora of the syllable, the preantepenultimate mora. Because of this, the accent-bearing unit of Japanese is the syllable, not the mora. However, the tone bearing unit is the mora, not the syllable. This can be seen in a comparison of (32a), in which each mora, and thus each syllable, bears one tone, with (32b), in which each mora in the same syllable bears one tone. (32c) appears to provide an argument that the tone-bearing unit is really the syllable, as (32c), like (32b), features a single syllable with a contour. However, contour tones are generally only found in two cases. First is in monomoraic words like *do'* or *hi'*, where there are not enough moras for the word to avoid a monomoraic contour when in isolation. Monomoraic accented words can retain their contours only in isolation. Otherwise, they lose their contours when following material, such as a particle, is attached. Thus, *hi'* is pronounced as HL in isolation, but as just H when suffixed with the nominative particle *ga*, with the latter receiving the accentual L tone. The second place in which contour tones appear is on heavy syllables. This is to be expected, as heavy syllables have at least two moras, and each mora can bear one of the tones of the contour. Thus, the tone-bearing unit is the mora in Tokyo Japanese.

This separation between the syllable and the mora as the accent-bearing unit and the tone-bearing unit is not the case in all dialects. Kansai Japanese, for example, is a mora-counting, mora language (Kubozono 2012). As a result, moras bear tones, just like Tokyo Japanese. However, unlike Tokyo Japanese in which syllables bear accent, *moras* bear accent in Kansai Japanese. This means that accent may fall on a non-head mora, as shown in the examples below from Kubozono (2012). Recall that the moraic nasal, moraic obstruent, and the second part of a long vowel or a diphthong are always non-head moras in Japanese.

(33) Accent on non-head moras in Kansai Japanese

a. *in'do* 'India'

b. *koo'tya* 'black tea'

While these examples would be accented on a head mora of the syllable as *i'ndo* and *ko'otya* in Tokyo Japanese, they are accented on the non-head mora in Kansai Japanese. Thus the accent-bearing unit and the tone-bearing unit of Kansai Japanese are both the mora.

Kagoshima Japanese, on the other hand, can be considered a syllable-counting, syllable language. Unlike Tokyo and Kansai Japanese, which compute accent location by counting moras, Kagoshima Japanese counts syllables instead, and a pitch fall, if present, always occurs across syllable boundaries, even in heavy syllables, where a pitch fall is allowed in Tokyo or Kansai Japanese. Consider the following examples, again from Kubozono (2012). Note that, while a pitch fall may occur in any location in Tokyo and Kansai Japanese words, a fall in Kagoshima Japanese, if present at all, will always occur between the penultimate and final syllable.

(34) Syllable as accent and tone bearing unit in Kagoshima Japanese

a. *kedamo'no* 'wild animal'

b. *in'do* 'India'

c. *wasin'ton* 'Washington'

In (34a), the syllable and mora counts are identical at 4 each. Since there are four syllables here, the pitch fall in Kagoshima Japanese, occurs between the third and the fourth syllables. (34b) has 2 syllables and 3 moras (*i-n-.do*), and the pitch fall occurs between the second and third mora. (34c), which has 3 syllables and 5 moras (*wa-.si-n-.to-n*), most clearly makes the case that the basic prosodic unit of Kagoshima Japanese is the syllable. If Kagoshima Japanese were a mora-counting language, then the pitch fall would be placed between *to* and *n*, yielding **wasinto'n*. However, because it counts syllables, accent is in fact placed between the second and third syllables, *sin* and *ton*, yielding *wasin'ton*.

The differences between these three dialects in terms of the accent-bearing units is relevant for the present discussion, particularly the difference in accent-bearing unit between Tokyo Japanese and Kansai Japanese. As we shall see, this difference is a crucial factor in my account of compound accent alignment in compounds with short N2s.

We now turn to the specifics of accent in simplex and compound words in the Tokyo, Kansai, Kagoshima, and Nagasaki Japanese dialects.

2.3 Characteristics of the Accentual Systems of Tokyo, Kansai, Kagoshima, and Nagasaki Japanese in Simplex Words

2.3.1 Tokyo Japanese

Words may be either unaccented or accented in Tokyo Japanese, with accent being characterized by an HL fall, which may in principle be located on any mora in a word.[3] As stated in the previous subsection, I follow Ito and Mester (2018a) in assuming that accent is represented with an H*L tonal complex in which each tone is associated to a mora. Below, I also refer to this tonal complex as the "accentual complex," its H* as the "accentual H/high," and its L tone as the "accentual L/low." Generally speaking, whether a word is unaccented or accented and, if the word is accented, the location of accent, are unpredictable and must be lexically specified.[4] The pitch of all moras besides the accented mora and the immediately following mora (to which the L of the accentual complex associates) are predictable (Pierrehumbert and Beckman 1988, Haraguchi 1999). Words begin with an "initial rise" (in phrase-initial position) associating an L tone to the first mora of the word and an H tone to the second mora of the word, provided that neither association clashes with the association of either tone

[3] Per Uwano (1999)'s typology of Japanese accentual systems, Tokyo Japanese has a multi-pattern accent system, in which there are as many as n patterns for words of length n moras (with accent able to fall on any mora) plus an unaccented pattern.
[4] There are two important exceptions to this generalization: loanwords overwhelmingly have antepenultimate accent (see Kubozono 2006 and 2008) and many quadrimoraic words are unaccented (see Ito and Mester 2016).

of the accentual complex to the first or second mora. Initial rise does not occur when a word is in a non-phrase initial position, in which case, words begin with an H tone rather than an L tone (Haraguchi 1999).

Initial rise (or lack of it) may be thought of as an interaction of constraints such as the following.

(35) INITIAL-LOW/PHRASEINIT (INIT-L/PHRASE): A word at the beginning of a phrase must begin with an L tone. Assign one violation for a phrase-initial word that does not begin with an L tone.

(36) ALIGN-LEFT-HIGH/WORD (ALIGN-LEFTH): A high tone must be aligned as far to the left as possible in a word. Assign one violation for every mora that intervenes between the left edge of a high tone and the left edge of a word.

The accentual H does not move to accommodate ALIGN-LEFTH due to a constraint barring such movement, NOFLOP, as proposed by Alderete (2001).

(37) NOFLOP-ACCENT (NOFLOP): An accent must not be moved from its input position. Assign one violation for an accent in the output (if present) which is not linked to its corresponding input position.

The following tableaux shows these constraints in action. Here and throughout, an overbar (e.g., $\overline{\text{sa}}$) is used to indicate high tone and an underbar (e.g., $\underline{\text{sa}}$) is used to indicate low tone. An open bracket (“[”) is used to indicate phrase-initial position. An apostrophe (’) is used to indicate the locus of pitch fall, equivalent to the accent corner used in Japanese accent dictionaries. Tableau (39) demonstrates initial rise in phrase-initial position. The high tones of *no* and *si* in (39a) and the high tones of *i* and *no* in (39d) are understood here as separate high tones; in each case, the former tone is from the phrasal H, the latter from the accentual H. This is in keeping with Pierrehumbert and Beckman’s account, wherein the phrasal H and the accentual H are separate entities. The final syllable of (39b, d) and the syllable *no* in (39c) are intentionally unassociated with tone (i.e., lack an overbar or underbar), following Pierrehumbert and Beckman’s surface underspecification account. I assume the representation in (34) here. Because the initial rise occurs due to phrase-initiality, it is not part of the underlying representation. Only the third and fourth moras are associated with tones.

(38) inosi’si
H L

(39) Initial rise in phrase-initial position, *inosi’si* ‘boar’

[/inosi’si/	NoFlop	Init-L/Phrase	Align-LeftH
☞ a. $[\underline{\text{i}}\overline{\text{no}}\overline{\text{si}}\underline{\text{si}}$			***
b. $[\underline{\text{i}}\overline{\text{no}}\underline{\text{si}}\text{si}$	*! W		* L
c. $[\overline{\text{i}}\text{no}\overline{\text{si}}\underline{\text{si}}$		*! W	** L
d. $[\overline{\text{i}}\overline{\text{no}}\underline{\text{si}}\text{si}$	*! W	*! W	* L

Violations of ALIGN-LEFTH are assigned based on how many moras away from the left edge an H tone, represented by an overbar, is. Thus, candidate (39a) incurs 3 violations of this constraint because the first H tone, on *no* is one mora away from the left edge, while the second H tone, on the first *si*, is two moras away from the left edge. Despite the fact that it incurs the most violations of this constraints, it still emerges as the winner because it is better to keep the accent in place (satisfying NOFLOP) and allow an initial rise (satisfying INIT-L/PHRASE) than to move the accent, even if produces what is in effect an initial rise (as in 39b).

On the other hand, when a word is not in phrase-initial position, it does not exhibit an initial rise. This is shown in tableau (40).

(40) Lack of initial rise in non-phrase-initial position, *inosi'si* 'boar'

/inosi'si/	NOFLOP	INIT-L/PHRASE	ALIGN-LEFTH
a. inosisi			***! W
b. inosisi	*! W		* L
☞ c. inosisi			**
d. inosisi	*! W		* L

In Pierrehumbert and Beckman's surface underspecification approach, any moras which are not associated with a tone from a boundary, phrasal, or accentual tone (i.e., moras such as those in the tableau above which had neither an overbar or an underbar) receive their pitch from an interpolation between surrounding tones. Any moras which occur between the first high-toned mora and the accentual high tone receive their pitch from an interpolation between the two high targets. If a word contains no accent, the remaining moras receive their pitch from an interpolation between the high target of the second mora and a phrase final boundary low tone, though pitch remains relatively high compared to pitches following an accent. This difference is represented in (41) below with an overbar for moras which do not follow an accent (i.e., follow the phrasal H tone associated with the second mora) and an underbar for moras which do follow an accent (i.e., follow the accentual L tone). If a word is accented, then any moras between the accentual low and the end of the word receive their pitch from an interpolation between the accentual low target and the final boundary low tone (see Pierrehumbert and Beckman 1988 for more details and discussion). I assume Pierrehumbert and Beckman's analysis as discussed here for Tokyo Japanese in the present work.

The schematics in (41) below demonstrate the prosodic characteristics of simplex words in Tokyo Japanese. In the examples on the left, an overbar is used to indicate high tone, while an underbar is used to indicate low or lower-than-high tones. On the right are the shorthand notations I use in this paper. Because the pitch of all moras except the moras to which the accentual complex is associated are predictable, only the presence and location of accent must be lexically specified (see Poser 1984 for references). This is reflected in the shorthand notations below in the presence or absence of an apostrophe ('), used to indicate the location of the accentual pitch fall, if present. The accentual high falls on the mora preceding the apostrophe, and the accentual low falls on the mora following it. If accent is final in a word (as in the 1 and

2 mora examples in (41b)), then the accentual low falls on following material, such as case particles. The shorthand notation also does not indicate initial rise, as this, too, is predictable. Examples are taken from Hirayama (1960), Sugito (1995) Haraguchi (1999). Four examples are given per category, one example for each word length from 1 to 4 moras.

(41) Prosodic patterns of simplex words in Tokyo Japanese

a. Unaccented

1μ: hi 'day'	shorthand: hi
2μ: musi 'insect'	shorthand: musi
3μ: sakura 'cherry tree'	shorthand: sakura
4μ: hayabusa 'falcon'	shorthand: hayabusa

b. Accented

1μ: hi′ 'fire'	shorthand: hi'
2μ: ana′ 'hole'	shorthand: ana'
3μ: i′noti 'life	shorthand: i'noti
4μ: inosi′si 'boar'	shorthand: inosi'si

As shown, all words two moras or longer begin with an initial rise (unless the first mora is accented, as in *i'noti*). These would not have initial rise (i.e., would begin with a high tone) in non-phrase initial position. The monomoraic words are distinguished by a word-internal contour, which is present in accented monomoraic words, but not unaccented ones. In words that are long enough, such as the trimoraic and quadrimoraic unaccented words and the quadrimoraic accented word, a high plateau is observed from the second mora until the end of the word or the accent. This plateau, as discussed before, results from an interpolation between tonal targets, rather than tone spreading.

2.3.2 Kansai Japanese

The Kansai Japanese accentual system, the most complex of the three systems discussed here, combines aspects of Tokyo Japanese as discussed above and Kagoshima Japanese (discussed below). Like Tokyo Japanese, Kansai Japanese distinguishes between unaccented words and accented words. Accent is characterized by an HL fall and is unpredictable as to its presence and location within a word.[5] Unlike Tokyo Japanese, in which the pitch patterns of nouns differ only in terms of the presence and location of accent, in Kansai Japanese, words are also differentiated by the initial tone of the word, which may be either high or low and influence the tonal melody of the rest of the word. Called *shiki* 式 in the Japanese literature, I will refer to

[5] In Uwano (1999)'s typology, Kyoto Japanese, a Kansai Japanese dialect, like Tokyo Japanese, is also a multi-pattern system. The exceptions given for Tokyo Japanese above appear to hold for Kansai Japanese as well. The majority of loanwords have antepenultimate accent, and a large portion of quadrimoraic words are unaccented (see Tanaka 2018 for discussion).

this difference as "register," following Uwano (1999)'s terminology. The register distinction in Kansai Japanese is equivalent to the pattern distinction in Kagoshima Japanese discussed below in that, while words in Kagoshima Japanese *end* in either HL or H, words in Kansai Japanese *begin* with H or L. I discuss this equivalence below. Register, like the presence and location of accent in Tokyo Japanese, is unpredictable and must be lexically specified. I refer to words which begin with a high tone as "High-beginning register words," henceforth "H-words", and words which begin with a low tone as "Low-beginning register words," henceforth "L-words."

Prosodically, H-words begin with a high tone, and pitch remains high until either the end of the word (unaccented words as in (46a) below) or until an accent is reached, at which point pitch falls (accented words as in (46c) below). High-toned moras between the beginning of the word and the accentual high or the end of the word remain relatively high. Pierrehumbert and Beckman (1988), in their examination of Osaka Japanese, a major Kansai Japanese dialect, with an accent and register system comparable to Kyoto Japanese (Yoshida and Zamma 2001), interpret this stretch of high-toned moras as an interpolation between a left-peripheral word-level high tone and the accentual high in accented words or a word-level boundary high tone at the end in unaccented words. L-words begin with a low tone which stays relatively low until the penultimate mora of a word and rises to a high tone on the final mora (unaccented words as in 46b)) or until an accent is reached, at which point pitch rises to a high tone on the accented mora and falls back to low tone on the following mora (accented words as in (46d)).[6] Moras following an accent are low-toned, as in Tokyo Japanese.

In this paper, I follow Pierrehumbert and Beckman (1988)'s sparsely specified approach for Osaka Japanese and posit that the only tones which need to be specified are the initial tone of a word and the accentual HL complex which is associated with the accented mora and the following mora. All moras in between the two tone targets receive their pitch through an interpolation between the two targets. The boundary high tone target at the right edge in unaccented words I assume to be assigned due to a constraint such as the following, similar to INITIAL-L/PHRASEINIT and ALIGN-LEFT-HIGH given for Tokyo Japanese in the previous subsection. The constraint is marked "categorical," as it will be distinguished from a gradient constraint in the discussion on Kagoshima Japanese below.

(42) FINAL-H (categorical): A word must end with an H tone. Assign one violation for a word which does not end with an H tone.

[6] It should be noted that in L-words, low-toned moras preceding the high tone are not equally low; rather, pitch rises gradually from the initial mora to the accent or end of the word (Pierrehumbert and Beckman 1988, Nakai 2002). This is also interpreted as an interpolation between a left-peripheral word-level low tone (the register tone) and the accentual high or a boundary high tone. According to Kori (1987), the shape of this rise differs based on the material that follows. If the following material is another L-word, then the pitch rises gradually from the word's beginning and then rises steeply for the H on the final mora. If the following material is an H-word, then the pitch rises gradually and at a steady rate throughout the entire L-word. Pierrehumbert and Beckman posit that this difference is due to a difference in timing of the final boundary high tone, not deletion of the boundary tone or complete lack of the boundary tone.

As shown in the examples below, however, it is only unaccented words and final accented L-words which have a final H tone whereas other accented words lack a final H. I assume that a culminativity type constraint such as the following is responsible for this difference.

(43) CULMINATIVITY (ONEPEAK): A word must have no more than one peak (i.e., two or more high tones separated by low-toned moras). Assign one violation for a word which has more than one peak.

Crucially, this assumes that the two high tones are different tonal targets, not the same tone spread across moras. This does not necessarily assume that "spreading" is the sharing of an H-tone across moras, as I assume the Pierrehumbert and Beckman (1988) analysis of an interpolation between tonal targets being responsible for what may look like "spreading." That said, this is consistent with a spreading analysis, since spreading would not violate this conception of CULMINATIVITY.

Ranking this constraint over FINAL-H would result in assignment of a final H in all words except accented ones. Assigning a final H to accented words would create two peaks, violating CULMINATIVITY. Final-accented L-words such as ^{L}*ame*' 'rain' incur no violations of either constraint, as the word ends in an H tone, and there is no more than one peak in the word.

The interaction of these two constraints is demonstrated in the tableaux below. As in the Tokyo Japanese discussion above, some moras are intentionally unassociated with a tone, following Pierrehumbert and Beckman's surface underspecification account.

(44) Final H in unaccented word ^{L}*hayabusa* 'falcon'

/^{L}hayabusa/	CULMINATIVITY	FINAL-H
a. $\underline{\text{ha}}\text{yabu}\overline{\text{sa}}$		
b. $\underline{\text{ha}}\text{ya}\overline{\text{bu}}\text{sa}$		*! W
c. $\underline{\text{ha}}\text{yabusa}$		*! W

(45) No final H in accented word ^{H}*i'nosisi* 'boar'

/^{H}i'nosisi/	CULMINATIVITY	FINAL-H
a. $\overline{\text{i}}\underline{\text{no}}\text{sisi}$		* W
b. $\overline{\text{i}}\underline{\text{no}}\text{si}\overline{\text{si}}$	*! W	L
c. $\overline{\text{i}}\underline{\text{no}}\overline{\text{si}}\text{si}$	*! W	* W

As the tableaux show, a final high tone occurs only when an accent is not present. Thus, it occurs on unaccented ^{L}*hayabusa* 'falcon,' but not in accented ^{H}*i'nosisi*, where the presence of a final H would incur a CULMINATIVITY violation. This interaction between accent and a word-final high tone will play a role in the discussion of word-phrase compounds below, in which accent loss in N1 will make way for the appearance of final H, providing evidence for N1's word-level status.

The schematics in (46) demonstrate the prosodic characteristics of simplex words and the shorthand notation that will be used to represent them in the remainder of this paper. The shorthand notations below reflect the analysis discussed above. The register of each word is specified by a superscript H or L preceding the word, and accent is marked with an apostrophe after the mora bearing the accentual high. Examples are taken from Sugito (1995), Haraguchi (1999), and Nakai (2002). Four examples are given per category, one example for each word length from 1 to 4 moras.

(46) Prosodic patterns of simplex words in Kansai Japanese

Unaccented

a. H-words

1μ: $\overline{\text{ko(o)}}$ ‘child’[7] shorthand: ^{H}ko

2μ: $\overline{\text{usi}}$ ‘cow’ shorthand: ^{H}usi

3μ: $\overline{\text{sakura}}$ ‘cherry tree’ shorthand: ^{H}sakura

4μ: $\overline{\text{niwatori}}$ ‘chicken’ shorthand: ^{H}niwatori

[7] Monomoraic words undergo lengthening in isolation due to a minimal word requirement of two moras in Kansai Japanese (Haraguchi 1999). The second mora resulting from lengthening is enclosed in parentheses here but is not included in the shorthand notation. Hence, *ko* ‘child’ is produced as *koo* in isolation but represented as ^{H}ko in the shorthand given here.

b. L-words

1μ: e(e) ‘picture’ shorthand: ^{L}e

2μ: sora ‘sky’ shorthand: ^{L}sora

3μ: hidari ‘left’ shorthand: ^{L}hidari

4μ: hayabusa ‘falcon’ shorthand: ^{L}hayabusa

Accented

c. H-words

1μ: hi′(i) ‘day’ shorthand: ^{H}hi’

2μ: tu′ti ‘earth’ shorthand: ^{H}tu’ti

3μ: oto′ko ‘man’ shorthand: ^{H}oto’ko

4μ: i′nosisi ‘boar’ shorthand: ^{H}i’nosisi

d. L-words

1μ: (no monomoraic accented L-words)

2μ: ame′ ‘rain’ shorthand: ^{L}ame’

3μ: tama′go ‘egg’ shorthand: ^{L}tama’go

4μ: nokogi′ri ‘saw’ shorthand: ^{L}nokogi’ri

Kansai Japanese thus parallels Tokyo Japanese in distinguishing between unaccented and accented words and, in accented words, the location of accent may fall in principle on any of its moras.[8] Additionally, many of the prosodic patterns of Kansai Japanese L-words resemble the patterns of Kagoshima Japanese. Kansai Japanese unaccented L-words have the same pattern as Kagoshima Japanese H-words, while Kansai Japanese penultimate accented L-words have the same pattern as Kagoshima Japanese HL-words, as will be seen in the next subsection.

2.3.3 Kagoshima Japanese

In Kagoshima Japanese, words, regardless of length, may exhibit one of two prosodic patterns, often called Type A and Type B.[9] Type A words have an HL at the right edge of the word, with the H associated with the penultimate syllable, and the L associated with the final syllable (not moras, as syllables are the relevant unit for tonal placement in Kagoshima Japanese (Kubozono 2012)). Type B words have an H at the right edge of the word, associating with the final syllable. I refer to these tonal differences in the present work as "register," equivalent to register in Kansai Japanese. In words that are long enough, the H-toned mora is preceded by a sequence of L-toned moras (Kubozono 2012). In this paper, I refer to Type A words as HL-words and Type B words as H-words. Type B could potentially also be thought of as LH-words; however, because

[8] Two gaps exist: there are no final-accented H-words and no initial-accented L-words. The source of these gaps is unclear and must be investigated. See Haraguchi (1979, 1999) for discussion.
[9] In Uwano (1999)'s typology, this is a two-pattern system, a type of N-pattern system in which all words, regardless of lexical class or length, can be classified into one of two patterns.

both Type A and Type B involve predictable L-toned plateaus at before the high tone, it seems that this L tone is not part of the lexical register of Kagoshima Japanese words. I accordingly treat Type B as only involving a final H.

The following examples demonstrate the prosodic system of Kagoshima Japanese words. The registers are indicated in the shorthand notations with superscript HL or H following the word. Examples are from Uwano (1999) and Kubozono (2012). Four examples are given per category, one example for each word length from 1 to 4 syllables.

(47) Prosodic patterns of simplex words in Kagoshima Japanese

a. HL-words

1σ: hi ‘sunshine’[10]	shorthand: hi^{HL}
2σ: ame ‘candy’	shorthand: ame^{HL}
3σ: sakana ‘fish’	shorthand: sakana^{HL}
4σ: kedamono ‘animal’	shorthand: kedamono^{HL}

[10] Monosyllabic HL-words are pronounced with a falling contour (Kubozono 2012).

b. H-words

1σ: hi ‘fire’[11] shorthand: hi^{H}

2σ: ame ‘rain’ shorthand: ame^{H}

3σ: inoti ‘life’ shorthand: $inoti^{H}$

4σ: niwatori ‘chicken’ shorthand: $niwatori^{H}$

As shown above, regardless of the length of a word, the sequence HL is found at the right edge of HL-words (47a), while the sequence H is found at the right edge of H-words (47b). Note the nearly identical prosodic patterns of H-words as compared to unaccented L-words in Kansai Japanese in (47b) above, in which the only differences are seen in the behavior of monomoraic/monosyllabic words which still have the shape LH in Kansai Japanese, but are only H in Kagoshima Japanese.[12]

Kubozono (2012) notes that Kagoshima Japanese can be treated in accentual terms – as proposed by Shibatani (1990), who treats Type A words as “accented” and Type B words as “unaccented,” paralleling the difference in the presence or absence of a pitch fall in Tokyo Japanese or Kansai Japanese – or in tonal terms, since there are only two tonal types, HL and H, in Kagoshima Japanese. I follow Ito and Mester (2018b),

[11] Monosyllabic H-words are pronounced with a level pitch (Kubozono 2012).
[12] An additional difference which will not concern us here for the comparison between Kagoshima Japanese and Kansai Japanese arises due to the fact that Kagoshima Japanese uses the syllable as its tone-bearing unit while Kansai Japanese uses the mora. As a result, Kagoshima H-words and unaccented Kansai L-words ending in (or consisting only of) a heavy syllable will also come apart, as in Kagoshima sen ‘one thousand’ vs. Kansai sen.

who analyze the Kagoshima Japanese prosodic patterns as resulting from words being lexically specified with either HL or H and constraints which require these lexically specified tones to be aligned with the right edge of the word.

Though I assume Ito and Mester's analysis, an alternative possibility deserves comment. This alternative possibility uses FINAL-H, parallel to the discussion of Kansai Japanese in the previous subsection. In this alternative analysis, FINAL-H is a gradient constraint with the following definition.

(48) FINAL-H (gradient): There must be an H tone aligned as far to the right in a word as possible. From the right edge of the word, assign one violation for every mora which does not have an H tone until an H tone or the left edge of the word is reached.

This constraint would interact with the following two constraints.

(49) MAX-TONE: Do not delete a tone that was present in the input. Assign one violation for a tone which is present in the input but not present in the output.

(50) NOFLOP-TONE (Alderete 2001): A tone must not be moved from its input position. Assign one violation for a tone which is associated with a position other than its input position.

Assuming that HL-words have only a lexically-specified final L tone, with the H tone coming in due to Final-H, this analysis would predict that H-words end in H and HL-words end in HL rather than having no H tone just because it is not final in the word. This is demonstrated in the tableaux below.

(51) HL-word, *kedamono* 'animal'

/kedamono/	Max-Tone	NoFlop-Tone	Final-H
a. kedamono			*
b. kedamono			**!** W
c. kedamono	*! W		L
d. kedamono		*! W	L

(52) H-word, *niwatori* 'chicken'

/niwatori/	Max-Tone	NoFlop-Tone	Final-H
a. niwatori			
b. niwatori			*! W

One potential problem for the final-L analysis may be the case of compounding in Kagoshima Japanese. As will be seen in the following discussion, compounds take on the register of the first component. However, if the first component has no register, as in the final-L proposal, then there is a question of why the compound looks like an H-word (i.e., has no register), even if the compound has a register to use if the second word is an HL-word (i.e., has register). I leave the question of whether such an analysis would be more appropriate for Kagoshima to future research.

2.3.4 The Relationship Between Register in Kansai Japanese and Register in Kagoshima Japanese: Nagasaki Japanese

That register in Kagoshima Japanese and register in Kansai Japanese are equivalent is suggested when comparing these dialects to Nagasaki Japanese, an "intermediate" dialect that has characteristics reminiscent of both Kansai Japanese and Kagoshima Japanese, and Old Kyoto Japanese, the 12th century ancestor to Kyoto Japanese and earliest recorded Japanese accentual system.

First, let us consider the accentual system of simplex words in Nagasaki Japanese. Nagasaki Japanese, like Kagoshima Japanese, is a two-pattern system (Sakaguchi 2001, Matsuura 2008) in which all words, regardless of length and lexical class, belong to one of two classes, also called Type A and Type B. The two dialects differ in what bears tone – while syllables are the tone bearing units in Kagoshima Japanese, moras are the tone bearing units in Nagasaki Japanese – and the actual realization of Type A and Type B. Type A words are characterized by two initial high toned syllables followed by low toned syllables in trimoraic and longer words (i.e., HHL…) and an initial high tone followed by a low tone in bimoraic words (i.e., HL). Type B words are identical to Kagoshima Japanese Type B words (H-words). Examples are presented below, from Sakaguchi (2001) and Matsuura (2008, 2018).

(53) Prosodic patterns in Nagasaki Japanese

a. Type A words (HL words)

1μ: $\overline{\text{ha}}\underline{\text{a}}$ ‘leaf’[13]

2μ: $\overline{\text{a}}\underline{\text{me}}$ ‘candy’

3μ: $\overline{\text{kuru}}\underline{\text{ma}}$ ‘car’

4μ: $\overline{\text{tomo}}\underline{\text{dati}}$ ‘friend’

5μ: $\overline{\text{kuri}}\underline{\text{sumasu}}$ ‘Christmas’

b. Type B words (H words)

1μ: $\underline{\text{ha}}\overline{\text{a}}$ ‘tooth’

2μ: $\underline{\text{a}}\overline{\text{me}}$ ‘rain’

3μ: $\underline{\text{ino}}\overline{\text{ti}}$ ‘life’

4μ: $\underline{\text{murasa}}\overline{\text{ki}}$ ‘purple’

5μ: $\underline{\text{asufaru}}\overline{\text{to}}$ ‘asphalt’

As stated above, Type B words in Nagasaki Japanese are identical to Kagoshima Japanese H-words, with an H tone aligned to the right edge of the word, preceded by all-L-toned moras, except where the two dialects come apart due to differences in tone

[13] In isolation, monomoraic words are lengthened to two moras. They remain monomoraic when particles are attached. For example, the Type A word for ‘leaf’ is bimoraic in isolation as $\overline{\text{ha}}\underline{\text{a}}$ but monomoraic with attached particles as in $\overline{\text{ha}} - \underline{\text{no}}$ ‘leaf (gen.)’ (Sakaguchi 2001).

bearing unit.[14] On the other hand, Type A words are more reminiscent of H-words in Kansai Japanese: like the fixed left-aligned H tone in Kansai Japanese, in Nagasaki Japanese, two H tones (or one H tone in the case of bimoraic words) are fixed to the first two syllables, with the remainder of the word being low-toned.

This similarity is not coincidental, and a diachronic correspondence can be established between them upon examining Old Kyoto Japanese. Kindaichi (1974, cited by Matsumori 1999 and Sakaguchi 2001), examining accentual correspondences between Japanese dialects, proposed word classes hypothesized to be present in an accentual system ancestral to the dialects examined. No modern dialect retains all of the proposed word types, but the Old Kyoto Japanese dialect recorded in the *Ruizyumyoogisyoo*, a Chinese-Japanese dictionary which recorded accentual information, shows that Old Kyoto Japanese displayed all of the Kindaichi word classes. The Kindaichi word classes – organized by mora count with three classes in one mora nouns, five classes in two mora nouns, and seven classes in three mora nouns – and their tonal characteristics in the *Ruizyumyoogisyoo* are presented below from Matsumori (1999). F in class 5 of two mora nouns refers to a falling contour tone. The bitonal one mora noun classes reflect vowel lengthening, while classes 4 and 5 in two mora nouns reflect differences that arise when the word is suffixed with a particle such as the nominative particle *ga*.

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[14] For example, *ha* 'tooth,' which is $\underline{\text{ha}}\overline{\text{a}}$ in Nagasaki Japanese (Sakaguchi 2001), is simply $\overline{\text{ha}}$ in Kagoshima Japanese (Hirayama 1960).

(54) Kindaichi word classes in nouns (Matsumori 1999)

One Mora Nouns (vowel lengthened)	Two Mora Nouns	Three Mora Nouns
1. HH	1. HH	1. HHH
2. HL	2. HL	2. HHL
3. LL	3. LL	3. HLL
	4. LHH	4. LLL
	5. LFL	5. LLH
		6. LHH
		7. LHL

As the word classes in (54) show, words in Old Kyoto Japanese may begin with either an H tone or an L tone. This is a register distinction, still retained in Modern Kyoto Japanese, a Kansai Japanese dialect, with some changes. While class 3 in two mora nouns and classes 2, 4, and 5 in three mora nouns have changed registers (from L to H) over the course of the development of Old Kyoto Japanese to Modern Kyoto Japanese, the other classes have retained their registers (Frellesvig 2010, Angeles 2019).

That the Old Kyoto Japanese dialect distinguished register is significant in establishing a relationship between register in Kansai Japanese and register in Nagasaki Japanese, and consequently, register in Kagoshima Japanese. According to Sakaguchi (2001), Type A words in Nagasaki Japanese correspond with classes 1 and 2 in one and two mora nouns and the *katati* 'shape' and *azuki* 'red bean' classes (classes 1 and 2 respectively, per Matsumori 2001) in three mora nouns. Accordingly, type A words in Nagasaki Japanese correspond with H-words in Old Kyoto Japanese, which correspond to H-words in Modern Kyoto Japanese. Similarly, Sakaguchi notes that Type B words in Nagasaki Japanese correspond with class 3 in one mora nouns, classes 3, 4, and 5 in two mora nouns, and the *atama* ‘head,’ *inoti* ‘life,’ *usagi* ‘rabbit,’ and *kabuto* ‘helmet’ classes (classes 4, 5, 6, and 7, per Matsumori 1999) in three mora nouns. Although class 2 in two mora nouns and classes 4 and 5 in three mora nouns have changed registers between Old Kyoto Japanese and Modern Kyoto Japanese, the connection can still be made between Nagasaki Japanese Type B words and Modern Kyoto Japanese L-words. Sakaguchi further notes that these correspondences are “very clear,” with few exceptions. Consequently, it can be said that the two-pattern system in Nagasaki Japanese is in actuality a register distinction system, related to the register distinction system in Kansai Japanese.

This conclusion can be further extended to Kagoshima Japanese. According to Matsuura (2008), native words in Nagasaki Japanese and Kagoshima Japanese share the same tone type synchronically. Thus, Type A words in Nagasaki Japanese are Type A words/HL-words in Kagoshima Japanese, and Type B words in Nagasaki Japanese are Type B words/H-words in Kagoshima Japanese. Accordingly, the two-pattern system of Kagoshima Japanese is also essentially a register distinction system, related to the register distinction system in Kansai Japanese. Kagoshima Japanese will be treated as having a register system in the analysis of compounding in Chapter 4.

2.3.5 Comparison of Tokyo, Kansai, Kagoshima, and Nagasaki Japanese Patterns

The table in (55) below gives a comparison of Tokyo, Kansai, and Kagoshima Japanese simplex words and their patterns in trisyllabic and quadrisyllabic words, as the generalizations and differences between patterns are clearest in longer words. Examples are from Hirayama (1960; all dialects), Sugito (1995; Tokyo and Kansai), Kubozono (2012; Kagoshima), and Matsuura (2008, 2014, 2018; Nagasaki). The examples are given in shorthand, but for comparative purposes, the tones of each syllable are also represented, with high-toned syllables in uppercase and low-toned syllables in lowercase. For Kagoshima and Nagasaki Japanese, patterns that do not have an HL pitch fall are listed in the "unaccented" word class, while those that do are listed in the "accented" word class.

(55) Comparison of Tokyo, Kansai, Kagoshima, and Nagasaki Japanese Simplex Words

Trisyllabic				
	Tokyo	Kansai	Kagoshima	Nagasaki
Un-accented	a. saKURA ‘cherry tree’ b. hiDARI ‘left’	c. ^{H}SAKURA d. ^{L}hidaRI	e. otoKO^{H} f. hidaRI^{H}	z. otoKO^{H} aa. tamaGO^{H}
Accented	g. oTOKO’ ‘man’ h. taMA’go ‘egg’	i. ^{H}OTO’ko j. ^{L}taMA’go	k. saKUra^{HL} l. oNAgo^{HL} ‘woman’	bb. ^{H}SAKUra cc. ^{H}NAMIda ‘tears’
Quadrisyllabic				
Un-accented	m. haYABUSA ‘falcon’ n. niWATORI ‘chicken	o. ^{H}NIWATORI p. ^{L}hayabuSA	q. niwatoRI^{H} r. hayabuSA^{H}	dd. murasaKI^{H} ‘purple’ ee. ameriKA^{H} ‘America’
Accented	s. iNOSI’si ‘boar’ t. noKOGI’ri ‘saw’	u. ^{H}I’nosisi v. ^{L}nokoGI’ri	w. inoSIsi^{HL} x. kedaMOno^{HL} ‘animal’	ff. ^{H}TOMOdati ‘friend’ gg. ^{H}HAMAguri ‘common orient clam’

At this point, a note on the correspondence between the prosodic patterns between words in the three dialects is in order. As shown, in some cases, words have essentially the same prosodic pattern. (55h) in Tokyo Japanese and (55j) in Kansai Japanese display a case in which the prosodic patterns demonstrated by the two words are essentially identical – here, *taMA’go* ‘egg’ is LHL in both dialects – at least in isolation. Similarly, (55d) in Kansai Japanese and (55f) in Kagoshima Japanese are both *hidaRI*

(LLH), and (55p) and (55r) are both *hayabuSA* (LLLH). However, more frequently, words have different prosodic patterns between dialects. In some cases, such as (55a-b) and (55m-n) in Tokyo Japanese, words differ from their (55c-d) and (55o-p) Kansai Japanese counterparts in terms of the latter distinguishing register, affecting the overall tonal melody in Kansai Japanese. (55g, s) in Tokyo Japanese and (55i, u) in Kansai Japanese show a case where, while *otoko* 'man' and *inosisi* 'boar' are accented in both dialects, the location of the accent differs between dialects. In some cases, words may differ in presence of a pitch change. For example, *otoKO* in (55e) Kagoshima Japanese and (55z) Nagasaki Japanese lacks a pitch fall, whereas its Tokyo and Kansai Japanese counterparts in (55g) and (55i) have pitch falls and are accented. Two other examples are *tamago* (accented in (55h) Tokyo Japanese and (55j) Kansai Japanese) and *nokogiri* (accented in (55t) Tokyo Japanese and (55v) Kansai Japanese); both lack a pitch fall in Kagoshima Japanese, having the patterns *tamaGO* and *nokogiRI* respectively, not shown in the table above. Nagasaki (55aa) shows a lack of pitch fall in *tamaGO* as well. The reverse is observed in some cases as well, as in (55k) *saKUra* and (55bb), which has a pitch fall in Kagoshima and Nagasaki Japanese but is unaccented in both (55a) Tokyo Japanese and (55c) Kansai Japanese. Similarly, *abura* 'oil' is accented on the first syllable as *a'bura* in Kansai Japanese but unaccented as *abura* in Tokyo Japanese (Sugito 1995).

One possible explanation for these differences in accentedness and accent location may be processes like phonetic peak delay (Xu 1999), shifting accent from the older Kansai system (with ^{H}*oto'ko*, ^{H}*i'nosisi*) rightward in the newer Tokyo system (with *otoko'*, *inosi'si*) (as proposed in Angeles 2019). Matsumori (1999) also discusses changes from accentedness to unaccentedness (e.g., HHHL → HHHH) as a possible change type for Japanese dialects as part of a process of rightward accent shift. Such shifts in addition to other mergers may result in Japanese dialects trending towards simpler systems from the older, more complex systems such as Kansai and Tokyo Japanese (with the latter losing tonal register distinctions) to the newer, simpler systems such as Kagoshima Japanese (Matsumori 2001).

2.4 Introduction to Japanese Compounds

The study of compounds and their accent in Tokyo Japanese has occupied an important place in the study of Japanese pitch accent, but research has focused mainly on Tokyo Japanese, and comparatively fewer studies have been conducted in the service of proposing a formal account of the behavior of compounds in Kansai Japanese and attempting to unify their analysis. Kansai Japanese words are prosodically similar to Tokyo Japanese in many respects. Simplex words in Tokyo Japanese and Kansai Japanese distinguish both the presence and location of accent, an HL pitch fall, as in *otoko'* 'man' in Tokyo Japanese and ^{H}*oto'ko* in Kansai Japanese. Complex words behave similarly in both dialects as well, and, broadly speaking, the same generalizations can be made about them. In compounds with "short" N2s up to four moras in length, the location of accent is related to the length of N2, both members of the compound tend to lose their isolation accent, and a new compound accent is assigned at the end of N1 or at the beginning of N2, before or after the juncture between the two members of the compound (Haraguchi 1999, Nakai 2002). For example, in Tokyo Japanese, *yama'* + *sakura* = *yama-za'kura* 'mountain cherry,' which exhibits loss of the accent of N1 and a junctural accent at the beginning of N2. In Kansai Japanese, ^{H}*ya'ma* + ^{H}*sakura* = ^{H}*yama-za'kura*, exhibiting the same phenomenon. Compounds with "long" second members greater than four moras in length are divided between those which lose the isolation accent of only N1, such as *tihoo-kensatu'tyoo* 'local public prosecutor' in Tokyo Japanese from *tiho'o* 'region' and *kensatu'tyoo* 'public prosecutor, and ^{L}*keizi-sosyoo'hoo* 'Code of Criminal Procedure' in Kansai Japanese from ^{L}*kei'zi* 'criminal matter' and ^{L}*sosyoo'hoo* 'procedural law,' and those which retain the isolation accents of both members, with both types resisting placement of new compound accent, such as *ko'ohaku-utaga'ssen* 'red-white song contest' in Tokyo Japanese and ^{H}*ni'hon-*^{L}*buyookyoo'kai* 'association of Japanese dance' in Kansai Japanese. Some generalizations which describe this division are shared between the two dialects as well, with the former type having N2s up to three feet in length and the latter type often having N2s greater than three feet in length (Kubozono, Ito, and Mester 1997, Nakai 2002, Ito and Mester 2007, 2018a).

Importantly, however, as mentioned above, Kansai Japanese differs from Tokyo Japanese in that Kansai Japanese words distinguish not only the location and presence of accent, but also the register. This is the case in both simplex and compound words. In compounds, the register of N1 affects the tonal melody of the entire compound, with the register of N1 permeating through the whole compound, causing N2 to lose its register tone. For example, the combination of ^{H}*na'iron* 'nylon' with ^{L}*suto'kkingu* results in ^{H}*nairon-suto'kkingu*, in which the whole compound has inherited the H register of N1. This aspect, which I call "register inheritance," is observed for compounds with both "short" and "long" N2s, although it is not observed in compounds with "long" N2s whose members both retain their accents. Register in the Kansai Japanese accentual system parallels register in Kagoshima Japanese, in which both simplex and compound words distinguish final tones (high on the final syllable vs. high on the penultimate syllable and low on the final syllable), and, in compound words, the register of N1 determines the register of the whole compound (Kubozono 2012), with both members of some compounds with long N2s retaining both registers (Haruo Kubozono, p.c.). Register in these two dialects also parallels register in Nagasaki Japanese, in which the register of N1 determines the register of the whole compound when N1 is 1-2 moras in length and the type B register is used when N1 is 3+ moras in length (regardless of the register of N1). Interestingly, when the compound is of the type A register in Nagasaki Japanese, it looks similar to Tokyo and Kansai Japanese compounds with 1-2 mora N2s (Matsuura 2014), which reinforces the idea of Nagasaki Japanese's system being a kind of intermediate between accent/accent+register systems and register systems.

Taking these aspects together, the Kansai Japanese system can be characterized as a combination of the Tokyo, Kagoshima, and Nagasaki systems, as will be discussed in the next subsection. Kansai Japanese simplex words have both an accent component as in Tokyo Japanese and a register component as in Kagoshima and Nagasaki Japanese.

Similarly, Kansai Japanese compound words place compound accent according to the length of their second member as in Tokyo Japanese and inherit the register of the first member as in Kagoshima Japanese and in cases with short N1s in Nagasaki Japanese.

2.4.1 Previous Work on Tokyo Japanese Compound Accent

In this section, I briefly discuss previous work on Tokyo Japanese compound accent which serves as the background for the present work. Note that the discussion in this section primarily concerns compound structures based on the length of N2, so consequently the full typology of Japanese compounds is not discussed here. The full typology is discussed in Chapter 3.

Since McCawley (1965), a standard view on the prosody of compound words in Tokyo Japanese has been that compounds can be divided into two types: compounds with "short" N2s consisting of one to two moras are differentiated from compounds with "long" N2s consisting of three to four moras, as it has been noted that compounds of the former type tend to place a compound accent on the last syllable of N1, while compounds of the latter type tend to place a compound accent on the first syllable of N2. Work by Kubozono, Ito, and Mester (1997) and Ito and Mester (2003, 2007) suggests two additional compound types, one in which the original accent patterns on both members are kept intact and one in which the accent of N1, if any is lost, while the original accent pattern of N2 is retained. Approaches to analysis of these divisions include Poser (1990a), Kubozono (1995), and Ito and Mester (2018a, 2019), from which the present work draws insights.

Poser (1990a), in a demonstration of evidence for foot structure in Tokyo Japanese, accounts for the placement of compound accent in compounds with "long" N2s using final foot extrametricality. In Poser's account, the accent of N2 remains in its original location unless it would fall in the final foot of the compound, in which case accent is deleted, and a new accent is placed on the first syllable of N2. For example, if *inosi'si* 'boar' is the N2 in a compound, the accent of *inosi'si* falls within the final foot of the compound, as shown here: *ino(si'si)*. In this case, the accent is deleted, and the compound would get a new accent on the first syllable of N2, yielding *i'nosisi*. However, if *sutora'iki* 'strike' is the N2, then since the accent is not in the final foot of, as shown in *sutora'(iki)*, the accent of N2 is retained in the compound.

Kubozono (1995) proposed an Optimality Theoretic account for compounds with both "short" and "long" N2s. In this analysis, where compound accent occurs is determined by the interaction of constraints which require accent to fall in the rightmost non-final foot which is aligned with the juncture between members of a compound. For example, in (*si)(ritu)-(dai)(gaku)*[15] 'private university' compound accent must fall in the foot containing *(dai)*, as this is the rightmost, non-final foot. Importantly, this analysis uses an alignment constraint which can place a new accent on the compound and align it with the juncture. Like these analyses, the present work argues for the importance of foot structure, non-finality of an accented foot, and alignment of accent

[15] See Chapter 3 for discussion of footing in Sino-Japanese compounds.

with the juncture in accounting for the prosodic characteristics of Kansai Japanese compounds.

Central to the present work is the proposal by Ito and Mester (2007, 2018a, 2019, 2021) that the reason compounds differ in Japanese is because they differ in prosodic structure. In their analysis of compounds in Tokyo Japanese, Ito and Mester show that some of the complexities of the placement of compound accent shown above can be accounted for if different compounds in fact have different prosodic structures, diagnosed by whether the compound is accented at the end of N1 (56a) or the beginning of N2 (56b), exhibits *rendaku* (56a-b), and if N1 is deaccented (56a-c) or not (56d). The different prosodic structures, divided into word compounds and phrasal compounds, are presented in (56) below from Ito and Mester (2018a). One example of each compound type and the characteristics of each type are given in (57).

(56) Prosodic structures of different compound types (Ito and Mester 2018a)

a. Word-foot b. Word-word c. Mono-phrasal d. Bi-phrasal

(57) Examples and empirical properties of each type

a. Word-foot: *tihoo'-zei* 'local tax'

N1 and N2 lose isolation accent

Compound accent on last syllable of N1

b. Word-word: *tihoo-gi'nkoo* 'local bank'

N1 and N2 lose isolation accent

Compound accent on first syllable of N2

c. Mono-phrasal: *tihoo-kensatu'tyoo*

N1 loses isolation accent

N2 retains isolation accent in original location

d. Bi-phrasal: *tiho'o-kookyooda'ntai* 'local public organization'

N1 and N2 retain isolation accents in original location

Ito and Mester argue that accent is a head feature that must be linked to the head word of a compound (enforced by the action of the constraint HTOHEADWORD), the second word (N2) in the structures shown in (56b-c) above. In the case of (56a), however, Ito and Mester propose that N2 in fact does not project a phonological word; instead it projects only a foot level which is adjoined to the right of N1. As a result, there is only one minimal phonological word, N1, that can be chosen as the head of the compound, explaining why compound accent falls on N1 rather than N2. This proposal that accent must be linked to the head word of a compound is an extension of Ito and Mester (2007), which argues that accent is linked to the head of a minimal phonological phrase. The pattern in (56d) falls out from this and the head word claim: because there are two phonological phrases involved in the compound, the sole phonological words of each phrase are necessarily head words which must retain their accents.

Ito and Mester (2019) expands on the prosodic structure analysis, arguing that a new compound accent appearing at the juncture (though crucially not a "junctural accent" in the sense I argue for in Chapter 4) is a property of a maximal but non-minimal word, ω[+max, -min], the highest projection shown in (56a-b) above, enforced by a constraint WORDMAXACCENT, which requires maximal, non-minimal words to have accent. This constraint interacts with the constraints INITIALFT, requiring a foot to align with the left edge of each prosodic word, NON-FINALITY(FT'), which requires that the head foot (i.e., the foot bearing accent) not be final in the word, and RIGHTMOST, which requires that accent be in the rightmost foot in the word. The interaction of these constraints, ranked INITIALFT >> NON-FINALITY(FT') >> WORDMAXACCENT >> RIGHTMOST places junctural accent in the right location without reference to the juncture between compound members.

As mentioned, the structures presented and discussed above are only a subset of the structures which the theory developed by Ito and Mester (2021 and previous work) predicts. The fully articulated typology of prosodic structures is presented and discussed in more detail in Chapter 3.

This dissertation extends Ito and Mester's account of Tokyo Japanese using differences in prosodic structures to account for compound accent in Kansai Japanese while also arguing for a new structure to be added to the typology of attested prosodic structures, the word-phrase compound. Previewing the upcoming analysis, I argue that all structures proposed by Ito and Mester (2021) are present in Kansai Japanese and are defined on the basis of the same input properties as in Tokyo Japanese. Word-foot compounds (56a), which feature N2 projecting a foot level right-adjoined to a word, occur when N2 is one or two moras – one foot in length. Word-word compounds (56b), in which N2 projects a word level which is sister to the N1 word and both are daughters to another word level, occur when N2 is three or four moras – two feet in length. Mono-phrasal compounds (56c), in which both N1 and N2 project word levels which are daughters to a phonological phrase rather than a prosodic word, occur when N2 is five or six moras – three feet in length. Bi-phrasal compounds (56d), in which both N1 and N2 project their own word and phrase levels which are subsequently daughters to a phonological phrase, may arise when N2 is greater than three feet in length.[16] Two more structures, the foot-foot and foot-word compounds, which are attested in Tokyo Japanese (Ito and Mester 2021), will also be added to this typology in Chapter 3.

As mentioned, I propose that Kansai Japanese exhibits a structure not present in Tokyo Japanese, in which N1 projects a word level, N2 projects both a word and a phrase level, and N1's word and N2's phrase are daughters to a phonological phrase. I will refer to this new structure as a "word-phrase compound." I argue that the reason

[16] Some bi-phrasal compounds do not adhere to this input generalization, such as *ko'ohahaku-utaga'ssen* 'red-white song contest,' in which N2 consists of exactly three feet, which is bi-phrasal in Tokyo Japanese (as shown above), Kansai Japanese (Nakai 2002), and Kagoshima Japanese (Haruo Kubozono, p.c.). What input properties, if any, uniquely define these types of bi-phrasal compounds remains to be investigated.

this structure can be found in Kansai Japanese but not Tokyo Japanese follows from the fact that, between the two dialects, only Kansai Japanese distinguishes register. Whereas the diagnostics of differing prosodic structures in Tokyo Japanese are patterns of input accent loss and compound accent placement, patterns of register retention and loss constitute a third diagnostic in Kansai Japanese, yielding the ability to distinguish between mono-phrasal compounds (which retain only the register of N1 and accent of N2), bi-phrasal compounds (which retain the accents and registers of both N1 and N2), and word-phrase compounds (which retain the registers of both N1 and N2, but retain only the input accent of N2). Chapters 3, 4, and particularly 5 discuss the word-phrase compound in more depth.

The next section presents an overview of compounds in the four dialects.

2.5 Overview of Tokyo, Kagoshima, Kansai, and Nagasaki Japanese Compound Words

With the prosodic characteristics of simplex words established above, the remainder of this chapter will discuss the properties of compound words.

The following notations are used for compounds. The boundary between the two members of the compound is represented by a hyphen (-). In compounds involving phrasal projections, a set of brackets is placed before and after a phrase. Thus, a mono-phrasal compound, which has one phrase projection, would have the shorthand notation

[N1-N2], and a biphrasal compound, which has three phrase projections, would have the shorthand notation [[N1]-[N2]].

2.5.1 The Notion of "Compound Accent"

In the analysis presented here, I refer to two different types of accent in compound words: "compound accent" and the "original accent of N1/N2." This is an important distinction, as the source of the two accent types is different.

By "compound" accent, I refer to a new accent which has been placed on the compound in the process of compounding. This accent is placed on a predictable location – either the last syllable (Tokyo Japanese) or mora (Kansai Japanese) of N1 or the first syllable/mora of N2 – descriptively dependent on the moraic length of N2. That this accent is a *newly placed* accent and not simply the original accent of N1 or N2 moved to juncture can be clearly seen in compounds in which both N1 and N2 are unaccented in the input, as shown in (58) below.

(58) New compound accent when N1 and N2 are unaccented

a. Tokyo Japanese

siritu 'private' + daigaku 'univerity' = siritu – da′igaku 'private university'

shorthand: siritu-da'igaku

b. Kansai Japanese

kasai 'fire' + hoken 'insurance' = kasai – ho′ken 'fire insurance'

shorthand: ^{L}kasai-ho'ken

As will be demonstrated in Chapter 4, compound accent is placed due to a constraint WORDMAXACCENT, which requires maximal, non-minimal words (i.e., word compounds) to bear accent, placing it in a predictable location (due to other interacting constraints).

In contrast, the term "original accent" is used when a compound retains the input accent of one or both members of the compound. This is distinct from "compound accent" because it is identical to an accent in the input and is not newly placed due to the action of constraints. Original accents are observed in phrasal compounds, as shown in (59) below.

(59) Original accent in phrasal compounds

a. Tokyo Japanese mono-phrasal compound

tiho'o 'region' + kensatu'tyoo[17] 'prosecutor's office' = tihoo – kensatu'tyoo 'local prosecutor's office'

shorthand: [tihoo-kensatu'tyoo]

b. Kansai Japanese bi-phrasal compound

ni'hon 'Japan' + buyookyo'okai[18] 'dance association' = ni'hon – buyookyo'okai 'dance association of Japan'

shorthand: [[^{H}ni'hon]-[^{L}buyookyo'okai]]

As shown, in both examples, the original accent of one or both members of the compound are retained; a new accent is not placed at the juncture.

2.5.2 Tokyo Japanese

The following table summarizes the behavior of the four compound types in Tokyo Japanese, which differ in behavior on whether they retain the accent of N1, retain the accent of N2, place a new accent (i.e., "compound accent"), and the location of that

[17] N2 here is itself a compound consisting of *kensatu* 'prosecution, examination' and *tyo'o* 'government office.'
[18] ^{L}*buyoo* 'dance' + ^{H}*kyookai* 'association.'

accent. Each compound type arises due to properties of N2 – its length in moras/feet – in the input.

(60) Summary of Tokyo Japanese compound types

Type	Retain N1 Accent	Retain N2 Accent	Type and Location of Accent
a. 1-2μ N2 (Word-Foot)	No	No	Compound accent on last σ of N1
b. 3-4μ N2 (Word-Word)	No	No	Compound accent on first σ of N2
c. 5-6μ N2 (Mono-phrasal)	No	Yes	Original accent of N2
d. >3 Feet N2 Bi-phrasal	Yes	Yes	Original accents of N1 and N2

These are exemplified in (61) below, correspondingly labeled. As shown, word-foot compounds (60a/61a) delete the original accents of N1 and N2 and place a new compound accent on the last syllable of N1. Word-word compounds (60b/61b) also delete original accents and place a new compound accent on the first syllable of N2. Mono-phrasal compounds (60c/61c) delete the accent of N1 but retain N2's original accent in its original location. Bi-phrasal compounds (60d/61d) retain the accents of both N1 and N2 in their original location. Compound words exhibit the same general pattern as simplex words in terms of predictable tones for moras that do not bear accentual tones, exhibiting initial rise in phrase-initial position, high tone plateaus until the accent (accented words)/end of the word (unaccented words), and low tone plateaus from the accent to the end of the word (accented words). The realization of accent as an HL fall remains the same as well, and, as the minimal phrase is the domain of accent

(Ito and Mester 2007), a compound may have only one accent unless it is bi-phrasal. The examples below are taken from Poser (1990a), Kubozono (1995, 2008), and Ito and Mester (2007, 2018a).

(61) Prosodic patterns of compound words in Tokyo Japanese

a. Word-foot compounds

ω
ω f

yoyaku ‘reservation’ + se′ki ‘seat’ = yoyaku′ – seki ‘reserved seat’

shorthand: yoyaku’-seki

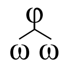
b. Word-word compounds

ω
ω ω

sato ‘village’ + koko′ro ‘heart’ = sato – go′koro ‘homesickness’

shorthand: sato-go’koro

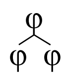
c. Mono-phrasal compounds



tiho’o ‘region’ + kensatu’tyoo[19] ‘prosecutor’s office’ = tihoo – kensatu’tyoo ‘local prosecutor’s office’

shorthand: [tihoo-kensatu’tyoo]

d. Bi-phrasal compounds



tiho’o ‘region’ + kookyooda’ntai[20] ‘public organization’ = tiho’o – kookyooda’ntai ‘local public organization’

shorthand: [[tiho’o]-[kookyooda’ntai]]

2.5.3 Kagoshima Japanese

Kagoshima Japanese only exhibits two compound types: those which exhibit register inheritance and those that do not (Haruo Kubozono, p.c.). The former type corresponds with word-foot, word-word, and mono-phrasal compounds in the previous discussion,

[19] N2 here is itself a compound consisting of *kensatu* ‘prosecution, examination’ and *tyo’o* ‘government office.’
[20] Here too, N2 is itself a compound consisting of *kookyoo* ‘public’ and *dantai* ‘organization.’

while the latter type corresponds with bi-phrasal compounds in Kansai and Tokyo Japanese. These differences are summarized in the table below.

(62) Summary of Kagoshima Japanese compound types

Type	Retain N1 Register	Retain N2 Register
a. Register inheritance	Yes	No
b. No register inheritance (Bi-phrasal)	Yes	Yes

These are exemplified in the examples below. (63a-b) correspond with (62a) and demonstrate register inheritance as the mark of compounding. No additional HL complex or H tone is placed near the juncture between N1 and N2, differing from the juncture-aligned compound accent placement in Tokyo Japanese and Kansai Japanese. Alternatively, register retention could be construed as a kind of junctural marking, associated to the maximal, non-minimal word, in the same way that compound accent is associated to the maximal, non-minimal word (see Chapters 3 and 4). (63c) corresponds with (62b) and lacks register inheritance. Examples are from Uwano (1999) and Haruo Kubozono (p.c.).

(63) Prosodic patterns of compound words in Kagoshima Japanese

a. HL register inheritance

mizu 'water' + kusuri 'medicine' = mizu – gusuri 'liquid medicine'

shorthand: mizu-gusuri^{HL}

b. H register inheritance

yama 'mountain' + nobori 'climbing' = yama – nobori 'mountain climbing'

shorthand: yama-nobori^{H}

c. No register inheritance

koohaku 'red and white' + utagassen 'song contest' = koohaku – utagassen 'red and white song contest'

shorthand: koohaku^{HL}-utagassen^{HL}

2.5.4 Nagasaki Japanese

Like Kagoshima Japanese, compounds in Nagasaki Japanese show register inheritance as well (Matsuura 2014). The Nagasaki Japanese resources consulted for the present investigation (Sakaguchi 2001, Matsuura 2008, 2014, 2018) do not make reference to a compound type analogous to the bi-phrasal compound types, so the present discussion is necessarily limited to discussing only the register inheritance type. This is not taken to mean that bi-phrasal compounds do not exist in Nagasaki Japanese; future investigation may reveal them.

The Nagasaki Japanese system is somewhat more complex than the Kagoshima Japanese system, as the register of the compound as a whole is determined not only by the register of N1, but also by the length of N1 (Matsuura 2014, 2018), yielding the following inheritance patterns.

(64) Summary of Nagasaki Japanese compound types

Type	Retain N1 Register N1 < 3μ	Retain N1 Register N1 ≥ 3μ	Retain N2 Register
a. Register inheritance	Yes	No	No
b. No register inheritance (Bi-phrasal)	??	??	??

First, I discuss compounds which show register inheritance. Register inheritance occurs when N1 is 1 or 2 moras in length. A compound whose N1 is a type A word (has an HL fall in the middle of the word) will inherit the fall (65a), while a compound whose N1 is a type B word (has a rise to H at the end of the word) will inherit the word-final rise (65b). This is shown below with examples from Matsuura (2014), which is again most clearly seen when N1 and N2 differ in isolation register.

(65) Prosodic patterns of compound words in Nagasaki Japanese with register inheritance

a. HL register inheritance

miti 'road' + kusa 'grass' = miti – kusa 'grass along the road'

b. H register inheritance

iro 'color' + kami 'paper' = iro – kami 'colored paper'

Strikingly, the pattern shown in (65a) is reminiscent of word-foot compounds in Tokyo Japanese (and Kansai Japanese, as we will see in the next section); a fall occurs at the juncture between N1 and N2. Here again it can be seen that Nagasaki Japanese is in some sense an intermediate between Kansai Japanese and Kagoshima Japanese.

What distinguishes Nagasaki Japanese from Kagoshima Japanese is that a length effect is observed when N1 exceeds 2 moras in length. When this is the case, the compound shows the type B register with final H, retaining *neither* of the input registers. This is clearest when both N1 and N2 are HL-words, as below from Matsuura (2014).

(66) Lack of register inheritance when N1 is greater than or equal to 3 moras

$\overline{\text{wata}}\underline{\text{ri}}$ 'crossing' + $\overline{\text{roo}}\underline{\text{ka}}$ 'corridor' = $\underline{\text{watari}}$ – $\underline{\text{roo}}\overline{\text{ka}}$

Although there is a lack of register inheritance, this clearly cannot be attributed to the bi-phrasal compound parse, as neither N1 nor N2's input register is retained. It is clear that what has resulted here is still more akin to compounds that project a prosodic word or phonological phrase than the bi-phrasal compound type.

It should be noted that this only occurs when N1 is an HL-word. A reverse version, in which an H-word N1 that is greater than or equal to 3 moras in length is not attested. It is not clear why the lack of register inheritance occurs, though some discussion of this is offered in Matsuura (2018).

The Nagasaki Japanese compound system is interesting in that it presents a case in which N1 can influence the whole compound beyond its register. The length of N1 plays a role as well, suggesting that compound accent need not rely only on the characteristics of N2, and furthermore, suggesting that compound accent need not rely only on the *register* of N1. Other characteristics of N1, such as length, may play a role in compound accent as well. In Chapter 5, I present results suggesting that N1 informativeness may play a role in the availability of the word-phrase parse in Kansai Japanese.

2.5.5 Kansai Japanese

The compound types of Kansai Japanese based on N2 length are summarized below. In addition to the characteristics on which compounds differ in Tokyo Japanese, Kansai Japanese compounds additionally differ on the register of the compound and whether a final H occurs at the end of an unaccented N1. As in Tokyo Japanese, word-foot, word-word, mono-phrasal, and bi-phrasal compounds are defined on the basis of the input properties of N2. Word-phrase compounds are defined here on the basis of their output properties, which, as shown below, clearly demonstrate that they constitute a different class of compound. More discussion of these output properties is given in Chapter 3. In Chapter 5, I propose that the input property (or at least one of them) relevant for word-phrase compounds are non-syntactic, non-phonological, non-morphological frequency-based informativeness factors.

(67) Summary of Kansai Japanese compound types

Type	Retain N1 Accent	Retain N2 Accent	Type and Location of Accent	Compound Register	Final H at end of unaccented N1
a. 1-2μ N2 Word-foot	No	No	Compound accent on last μ of N1	Register of N1	No
b. 3-4μ N2 Word-word	No	No	Compound accent on first μ of N2	Register of N1	No
c. 5-6μ N2 Mono-phrasal	No	Yes	Original accent of N2	Register of N1	No
d. >3 Feet N2 Bi-phrasal	Yes	Yes	Original accents of N1 and N2	N1 and N2 retain original registers	Yes, but only if N2 begins with L
e. Word-Phrase	No	Yes	Original accent of N2	N1 and N2 retain original registers	Yes, but only if N2 begins with L

These compounds are exemplified below in (68). Note that the accent placement patterns of (68a-d) match the accent placement patterns for Tokyo Japanese above. The main difference in these compounds is the permeation of the register of N1 throughout a compound in (68a-c) and the retention of both registers in (68d). There are also cases in which the original register of N1 is *not* retained (Nakai 2002), investigation of which will be left to future work.

The additional compound type in (68e) is made possible by the fact that Kansai Japanese words also contrast by register. These are referred to as 不完全複合語 *hukanzen-hukugoogo* 'incomplete/imperfect compounds' in Nakai (2002), and I refer to them interchangeably in this dissertation as incomplete compounds and word-phrase compounds, These compounds exhibit a “hybrid” pattern between mono-phrasal and bi-phrasal compounds. Word-phrase compounds lose the accent of N1 and retain the accent of N2 (like mono-phrasal compounds) but retain the registers of both N1 and N2 (like bi-phrasal compounds). Furthermore, as discussed above, whether a word shows a final rise or not depends on whether that word is accented or not. In word-phrase compounds, N1 loses its input accent in the compound process, making way for final rise to appear (as long as N2 is an L-word). This dependence on the register of N2 for appearance of a final rise is also seen in non-compound phrases (Kori 1987, Pierrehumbert and Beckman 1988, Nakai 2002). This phenomenon in non-compounds is interpreted by Pierrehumbert and Beckman (1988) as a delay in the appearance of the high tone, wherein it is realized on the first mora of N2 when N2 is an H Register word, but when N2 is an L Register word, it is realized on the last mora of N1. I follow this analysis here for both compounds and non-compounds.

Compound patterns again resemble the accentual patterns found in Kansai Japanese simplex words in that the only specifications that are necessary are the register tone and the location of accent. All other moras receive their pitch through interpolation between specified tonal targets. Compound words may only have one accent unless they are bi-phrasal. Examples are from Haraguchi (1999) and Nakai (2002).

(68) Prosodic patterns of compound words in Kansai Japanese

a. Word-foot compounds

ω
ω f

nyuugaku ‘matriculation’ + hi′ ‘day’ = nyuugaku′ – bi ‘matriculation day’

shorthand: ^{H}nyuugaku’-bi

b. Word-word compounds

ω
ω ω

kasai ‘fire’ + hoken ‘insurance’ = kasai – ho′ken ‘fire insurance’

shorthand: ^{L}kasai-ho’ken

c. Mono-phrasal compounds

φ
ω ω

kei′zi ‘criminal matter’ + sosyoo′hoo[21] ‘procedural law’ = keizi – sosyoo′hoo ‘Code of Criminal Procedure’

shorthand: [^{L}keizi-sosyoo’hoo]

[21] A compound consisting of ^{L}*sosyo’o* ‘litigation’ + ^{H}*hoo* ‘law.’

d. Bi-phrasal compounds

φ
φ φ

tyuu′oo 'center' + koomin′kan[22] 'public hall' = tyuu′oo – koomin′kan

'central public hall'

shorthand: [[^{L}tyuu'oo]-[^{H}koomin'kan]]

e. Word-phrase compounds

φ
ω φ

tyuu′oo 'center' + kaigi′situ[23] 'meeting room' = tyuuoo – kaigi′situ

'central meeting room'

shorthand: [^{L}tyuuoo-[^{L}kaigi'situ]]

2.5.6 Comparison Tables

Comparisons of the three dialects on register inheritance and compound accent placement are given in (61) below. Because Tokyo Japanese does not have register, each compound type is marked "N/A" for register inheritance. Similarly, Kagoshima Japanese does not have an analogue to word-phrase compounds, so it is marked "N/A" for register inheritance. As Nagasaki Japanese has a similar system to Kagoshima

[22] ^{H}*koomin* 'citizen' + ^{H}*ka'n* 'hall.'
[23] ^{L}*kaigi* 'meeting' + ^{H}*si'tu* 'room'

Japanese, it is also marked "N/A" for register inheritance for word-phrase compounds. The bi-phrasal category is marked with "??" for Nagasaki Japanese, as I do not have information about the existence of bi-phrasal compounds in this dialect at this time.

(69) Register inheritance in Tokyo, Kansai, Kagoshima, and Nagasaki Japanese Compounds

Register inheritance?	Tokyo	Kansai	Kagoshima	Nagasaki
a. 1-2μ N2 (Word-Foot) ω ω f	N/A	Yes	Yes	Yes (N1<3μ) No (N1≥3μ)
b. 3-4μ N2 (Word-Word) ω ω ω	N/A	Yes	Yes	Yes (N1<3μ) No (N1≥3μ)
c. 5-6μ N2 (Monophrasal) φ ω ω	N/A	Yes	Yes	Yes (N1<3μ) No (N1≥3μ)
d. >3 Feet N2 (Biphrasal) φ φ φ	N/A	No	No	??
e. Word-Phrase φ ω φ	N/A	No	N/A	N/A

The table in (70) compares the three dialects in terms of accent placement. In Tokyo Japanese, one example per accent placement pattern is shown. Because of register distinctions in Kansai Japanese, two examples are shown for (70a-c), and four examples are shown for (70d). Kagoshima Japanese does not exhibit accent distinctions, so it has N/A for all rows. Although Nagasaki Japanese is similar to Kagoshima Japanese, compounds with the HL register resemble Tokyo and Kansai word-foot compounds in having a fall which occurs at the juncture between N1 and N2. For this reason, a Nagasaki Japanese example is offered in (70a) for comparison. The fall in this case is represented for descriptive purposes with an apostrophe, though I make no claim at this point that this fall is to be identified with accent as it exists in Tokyo and Kansai Japanese; for now, such an analysis is a possibility that deserves further investigation (Matsuura 2018).

(70) Accent placement in Tokyo, Kansai, and Kagoshima Japanese Compounds

	Tokyo	Kansai	Kagoshima	Nagasaki
a. Compound Accent on N1	yoyaku'-seki	^{H}nyuugaku'-bi ^{L}yotei'-bi	N/A	^{H}miti'-kusa
b. Compound Accent on N2	sato-go'koro	^{H}iro-e'npitu ^{L}kasai-ho'ken	N/A	N/A
c. N2 retains isolation accent	tihoo-kensatu'tyoo	[^{H}nairon-suto'kkingu] [^{L}keizi-sosyoo'hoo]	N/A	N/A
d. N1 and N2 retain isolation accent	tiho'o-kookyooda'ntai	[[^{H}tyo'o]-[^{H}itiryuuga'isya]] [[^{H}ni'hon]-[^{L}buyookyo'okai]] [[^{L}gyoomu'zyoo]-[^{L}kasituti'si]] [[^{L}tyuu'oo]-[^{H}koomin'kan]]	N/A	N/A

Having discussed the characteristics of compounds in these dialects, I now turn to issues of the syntax-prosody mapping.

Chapter 3: The Syntax-Prosody of Japanese Compounds

3.1 Japanese Compounds and Their Syntactic Structure

The previous chapter discussed the different types of accent patterns found in Japanese compounds. This chapter discusses the syntactic structure of compounds, focusing on the Kansai dialects of Japanese, and how those syntactic structures are mapped onto prosodic structure through syntax-prosody mapping. While only a subset of the compound typology was discussed in Chapter 2, the full typology is discussed here.

While a large range of lexical categories can participate in compounding in Kansai Japanese, the central focus of the present investigation is noun compounding, consisting primarily of noun + noun compounding and occasionally adjective + noun compounding. The reason for this is that noun compounds present the widest variety of possible accentual patterns. Three characteristics are important. First is the location of accent on the compound. A single accent may occur at the juncture between component words, either on the left, e.g., ^{H}*nyuugaku'-bi* 'matriculation day,' or right side, e.g., ^{H}*oya-go'koro* 'parental love.' It may also occur on a position medial to the second component word but removed from the juncture, e.g., ^{L}*keizi-sosyoo'hoo* 'Code of Criminal Procedure,' or two accents may occur, one on the first component word and one on the second component word, e.g., ^{H}*ni'hon-*^{L}*buyookyoo'kai* 'dance association of Japanese.' Second are patterns of retention of the isolation accents (if any) of the component words. One, both, or neither of the isolation accents of the component words may be retained. For example, *bi* (the form of *hi'* 'day' having undergone rendaku) in ^{H}*nyuugaku'-bi* has lost its isolation accent. Third are patterns of retention of isolation initial register tone of the component words. One or both of the initial register tones of the component words may be retained, as shown in the preceding examples, where an N2 which has lost register does not have a register superscript, while an N2 which has retained register has a register superscript.

Verb compounding, on the other hand, is limited to two patterns – in Tokyo Japanese, these are penultimate accent and unaccented (Nishimura 2013), while in Kansai Japanese, these are unaccented with either high or low register (Haraguchi 1999). These are identical to the regular accentuation systems of non-compound verbs in these dialects and show no special compound accentuation. Similarly, adjective compounding exhibits limited prosody in these dialects as well – in Tokyo Japanese, adjective-headed compounds show only a penultimate accent pattern (Nishimura 2013), while examination of Kansai Japanese adjective-headed compounds listed in Nakai (2002)'s dictionary shows only an antepenultimate accent pattern. Each is a subset of the two patterns available for non-compound adjectives in both dialects – penultimate accent and unaccented in Tokyo Japanese and high register antepenultimate accent and low register unaccented in Kansai Japanese. This is not meant to imply that something about the lexical category affects the mechanism of parsing into particular prosodic categories. Rather, the limited prosodies found in compounding of words of other lexical categories is related to the already limited prosodies found in simplex words of those categories. For example, verbs in Kansai Japanese only exhibit high or low register unaccented patterns, but, without the addition of verbal suffixes such as *-tai* 'desiderative,' accent does not arise in verbs (Haraguchi 1999). The restricted space of prosodic patterns makes these compounds less useful in investigating possible compound prosodic structures, and, thus, I set aside all but noun compounds for the present investigation.

Having restricted the scope of the present investigation, let us turn to noun compounds and their structure. According to Kageyama (2009), Japanese compounds exhibit four patterns of headedness, yielding right-headed compounds, left-headed compounds, double-headed compounds, and headless or exocentric compounds. I follow Namiki (2001) in understanding the concept of "head" to refer to a constituent of a compound which 1) determines the lexical category of the compound, and 2) has a "kind of" or "is a" relation between previous elements of the compound and itself. The four compound patterns are exemplified in (71) below; examples are from Kageyama (2009). Here and throughout, the members of a compound are separated by a hyphen (-).

(71) Japanese compound types by headedness

a. Right-headed: *ha-burasi* ‘toothbrush”

tooth-brush

b. Left-headed: *soo-kin* ‘remit’[24]

send-money

c. Double-headed: *huu-hu* ‘husband and wife’

husband-wife

d. Headless: *kane-moti* ‘rich person’

money-having

Of these, right-headed compounding is by far the most productive pattern (Kageyama 2009) and is thus the central focus of the present work, and I set aside the other compound types. See section 3.4 for discussion on the limited utility of the remaining compound types.

Right-headed compounds are typically of the “modifier-head” type, with the modifier being the first element and the head being the second element. The resulting compound meaning is a hyponym of the second noun (Tsujimura 2014, Bauer 2017), in accordance with the second characteristic of the “head” as discussed by Namiki

[24] Although *sookin* can be used by itself as a noun meaning ‘remittance,’ it can be used as a verb with the addition of the light verb *suru* ‘to do’ as *sookin suru* ‘to remit.’ Per Kageyama (2009), the fact that compounds of these type are left-headed is clear from the transitivity of the resulting verb, which is determined by the left-hand constituent. Thus, *sookin* is transitive because *soo-* ‘send’ is transitive, while another left-headed compound discussed by Kageyama such as *kikoku* ‘return to one’s country’ (return-country) is intransitive because *ki-* ‘return’ is intransitive.

(2001) mentioned above. Observe in the following further examples of right-headed compounds. The literal meaning of each element is provided in parentheses when its composition is not transparent from the English translation.

(72) Japanese compounds

a. *suimin-yaku* ‘sleep medication’

b. *seizin-siki* ‘coming of age ceremony’ (adult-ceremony)

c. *tsunami-keihoo* ‘tsunami warning’

d. *sentaku-sekken* ‘detergent’ (laundry-soap)

e. *kokuritu-hakubutukan* ‘national museum’

f. *gassoo-kyoosookyoku* ‘concerto grosso’ (ensemble-concerto)

g. *nippon-hoosookyookai* ‘Japan Broadcasting Corporation’ (Japan-broadcasting association)

h. *onsei-tazyuuhoosoo* ‘sound multiplex broadcasting’ (sound-multiplex broadcasting)

The compounds in (72) above consist of Sino-Japanese words as both elements. Right-headed compounds accept any combination of lexical strata in their elements (Nishimura 2013), as shown below. Examples (73a, e-f, h) are from Tsujimura (2014), while examples (73b-d, g) are from Nishimura (2013).

(73) Lexical stratum combinations in Japanese compounds

a. native + native: *aki-zora* 'autumn sky'

b. native + Sino-Japanese: *tonbo-kenkyuu* 'study of dragonflies' (dragonfly-research)

c. native + loanword: *ebi-supagettii* 'shrimp spaghetti'

d. Sino-Japanese + native: *benkyoo-dukue* 'study desk'

e. Sino-Japanese + loanword: *sekiyu-sutoobu* 'oil stove'

f. loanword + native: *garasu-mado* 'glass window'

g. loanword + Sino-Japanese: *sakkaa-taikai* 'soccer tournament'

h. loanword + loanword: *teeburu-manaa* 'table manners'

As mentioned in Chapter 2, an important characteristic of right-headed compounds in Japanese is that larger compounds can be created by recursively adding heads to the right (Namiki 2001), as shown below. The following examples were constructed and corroborated with Google searches.

(74) Recursive Japanese compounds

a. *ha-burasi* 'toothbrush'

b. *ha-burasi* + *sutando* 'stand' = *ha-burasi-sutando* 'toothbrush holder'

c. *ha-burasi-sutando* + *setto* 'set' = *ha-burasi-sutando-setto* 'toothbrush holder set'

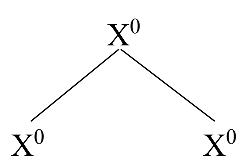
3.2 The Structure of Japanese Compounds

3.2.1 Syntactic Structure

Examining the right-headed compounds that constitute the target of the present discussion, there is no *a priori* reason to posit that these compounds have different morphosyntactic structures. The first component word in each example in (72) above modifies its following head in the same way in all examples, while the second component word in each example is the head in its respective compound in the same way in all examples. Thus, for example, *suimin* 'sleep' (72a), *tsunami* (72c), *kokuritu* 'national establishment' (72e), and *nippon* 'Japan' (72g) are all modifiers, and *yaku* 'medication' (72a), *keihoo* 'warning' (72c), *hakubutukan* 'museum' (72e), and *hoosookyookai* 'broadcasting corporation' (72g) are all heads.

Given this, I treat these compounds as all having the same syntactic structure, given below, following Ito and Mester (2021). In this structure, the component words of a compound are all syntactic X^0 terminals.

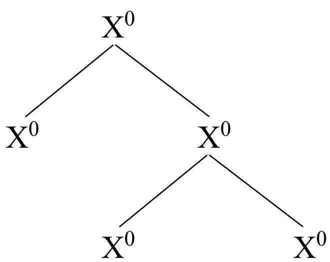
(75) Syntactic structure of compounds



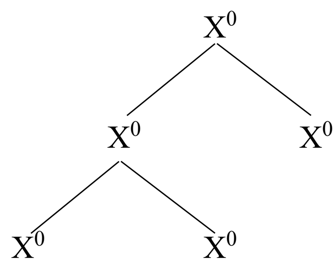
The two X^0 terminals combine to form another X^0. Since compounds are themselves X^0s, larger compounds can be made from compounds in recursive structure. Accordingly, structures such as the following are possible as well, in which at least one of the members of the resulting compound is also a compound.

(76) Compounds with compound terminals

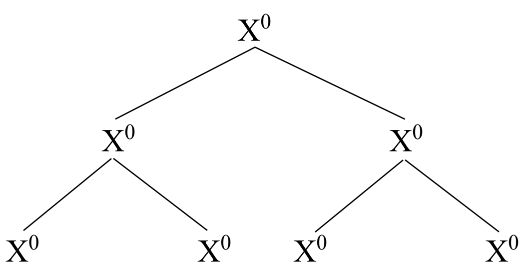
a.



b.



c.



3.3 Prosodic Structures and Prosodic Categories

As discussed in the previous chapter, I follow Ito and Mester (2021 and previous work)'s proposal that compounds in Tokyo Japanese differ in accentuation patterns because they differ in prosodic structure. Although the previous chapter discussed only four prosodic structures in Tokyo Japanese, the theory which Ito and Mester develop predicts a larger typology of prosodic structures, given in (77) below, with their labels.

(77) Typology of prosodic structures (Ito and Mester 2021)

a. Foot-foot
ω
f f

b. Word-foot
ω
ω f

c. Foot-word
ω
f ω

d. Word-word
ω
ω ω

e. Mono-phrasal
φ
ω ω

f. Phrase-word
φ
φ ω

g. Word-phrase
φ
ω φ

h. Bi-phrasal
φ
φ φ

Ito and Mester argue that six of these structures are found in Tokyo Japanese: (77a-e) and (77h). One example for each structure is given in (138).

(78) Typology of prosodic structures in Tokyo Japanese (Ito and Mester 2021)

a. Foot-foot
ω
f f
kome-gura
'rice warehouse'

b. Word-foot
ω
ω f
temuzu'-gawa
'River Thames'

c. Foot-word
ω
f ω
kuti-ge'nka
'oral quarrel'

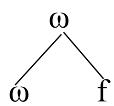
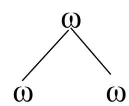
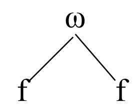
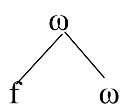
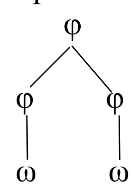
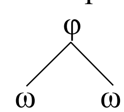
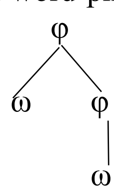
d. Word-word
ω
ω ω
takusii-ga'isya
'taxi company'

e. Mono-phrasal
φ
ω ω
tihoo-kensatu'tyoo
'local prosecutor's office'

f. Bi-phrasal
φ
φ φ
tiho'o-kookyooda'ntai
'local public organization'

Kansai Japanese compound accentuation patterns in largely the same way, and all six compound types found in Tokyo Japanese are also found in Kansai Japanese. However, a seventh compound type can be found in what Nakai (2002) calls 不完全複合語 *hukanzen-hukugoogo* ‘incomplete/imperfect compounds.’ I propose that these compounds show the adjunctive pattern (77g/79g), similar to the word-foot compounds, with the first member being a prosodic word which is sister to a phonological phrase which contains the second member. I call these compounds “word-phrase” compounds. The typology of Kansai Japanese noun compounds, with their proposed prosodic structures, is presented in (79) below. A table summarizing their prosodic characteristics is given in (80).

(79) Prosodic structures of Kansai Japanese compounds

Recursive		Non-Recursive
Adjunction	Coordination	
a. word-foot  ^{H}*nyuugaku'-bi* 'matriculation day' ^{L}*kabuto'-musi* 'beetle (lit. helmet bug)'	b. word-word  ^{H}*syodoo-kyo'ositu* 'calligraphy classroom' ^{L}*otome-go'koro* 'girl's feelings'	c. foot-foot  ^{H}*tori-goya* 'aviary' ^{L}*ai-iro* 'indigo blue'
d. foot-word  ^{H}*oya-go'koro* 'parental love' ^{L}*te-ryo'ori* 'home cooking'	e. bi-phrasal  ^{H}*ni'hon-*^{L}*buyookyo'okai* 'dance association of Japan' ^{L}*tyuu'oo-*^{H}*koomin'kan* 'central public hall'	f. mono-phrasal  ^{H}*nairon-suto'kkingu* 'nylon stockings' ^{L}*keizi-sosyoo'hoo* 'Code of Criminal Procedure'
g. word-phrase  ^{H}*simin-*^{L}*kaigi'situ* 'citizens meeting room' ^{L}*tyuuoo-*^{H}*eiga'kan* 'central movie theatre'		

(80) Summary of prosodic realizations of Kansai Japanese compounds

Word Compounds	Accent Location	Accent Loss	Register Retained
Foot-Foot ω f f	None (unaccented)	N1 and N2	N1
Word-Foot ω ω f	N1 (last mora)	N1 and N2	N1
Foot-Word, Word-Word ω f ω ω ω ω	N2 (first mora)	N1 and N2	N1

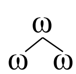
Phrasal Compounds	Accent Location	Accent Loss	Register Retained
Mono-phrasal φ ω ω	N2 (original location)	N1 only	N1
Bi-phrasal φ φ φ	N1 and N2 (original locations)	None	N1 and N2
Word-Phrase φ ω φ	N2 (original location)	N1 only	N1 and N2

As the two tables above shows, these compounds behave in different ways, reflecting their different prosodic structures. In foot-foot compounds (79c), only N1 retains its initial register tone, both N1 and N2 lose their input accents, if any, and the resulting compound is unaccented. In word-foot compounds (79a), only N1 retains its initial register tone, and a compound accent is placed on the last mora of N1. In word-word compounds (79b) and foot-word compounds (79d), only N1 retains its initial register tone, and a compound accent is placed on the first mora of the second member (N2). In mono-phrasal compounds (79f), only N1 retains its register, and the original accent of N2 is retained on N2. In bi-phrasal compounds (79e), both N1 and N2 retain their register, and the original accents of both N1 and N2 are retained in their original locations. The accentual realizations of these patterns is nearly identical to their realization in Tokyo Japanese, with the exception that Tokyo Japanese does not have initial register tones. Word-phrase compounds (79g), unique to Kansai Japanese, are different still from the others: while both N1 and N2 retain their registers, as in bi-phrasal compounds, only N2 retains its original accent, as in mono-phrasal compounds. The differences in these structures' prosodic realizations by accent location and patterns of accent loss and register retention are summarized in the table in (80) above. Note that because Foot-Word and Word-Word compounds have the same prosodic characteristics in terms of accent location, accent loss, and register retention, they are grouped together in (80).

As discussed in the previous section, different syntactic structures cannot account for the accentual differences, as there is no reason to posit different syntactic structures, given that all N1s in right-headed compounds are related to their following N2s in the same way. The differences in prosodic structures must therefore have a different source – the syntax-prosody mapping.

It is well-known that prosodic structure does not always reflect syntactic structure exactly, giving rise to syntax-prosody mismatches. One recent proposal that accounts for this is Match Theory (Selkirk 2011), which I adopt here. In Match Theory, syntactic structure is mapped to prosodic structure through the action of syntax-prosody and prosody-syntax correspondence constraints which require an exact match between syntactic structure and prosodic structure. An important consequence of this mapping mechanism is that prosodic structure, like syntactic structure, will be recursive in the default case, as where there is recursion in syntax, there must also be recursion in prosody under Match Theory. Crucial for the present discussion is that the default mapping of a syntactic terminal in Match Theory is to a prosodic word ω in prosodic structure, meaning that in the default case, compounds with the syntactic structure discussed in section 3.2.1 will be mapped to the following structure, with recursive prosodic words.

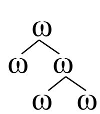
(81) Default prosodic structure from mapping the syntactic structure in (75)



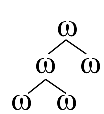
The default prosodic structures of compounds which have compounds as one or both of their components are as follows.

(82) Default prosodic structure of compounds which have compounds as one or both compounds.

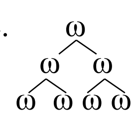
a.



b.



c.



Mismatches may occur when prosodic well-formedness constraints are ranked higher than the mapping constraints, preventing exact matching. As will be seen below, prosodic well-formedness constraints will allow for the splitting of the single syntactic compound structure in (75) into multiple prosodic structures, which will involve feet, prosodic words ω, and phonological phrases φ.

Let us consider the evidence for positing different prosodic structures. As the comparison chart in (80) shows, each compound type can be distinguished from others in terms of patterns of accent loss, register retention, and accent location (if accent is present). These characteristics can be attributed to different prosodic domains, which may be non-recursive, such as a minimal prosodic word, or recursive, such as a maximal prosodic word. The following discussion discusses the motivations for attributing prosodic characteristics to specific prosodic domains.

Before proceeding with this discussion, I present in (83) a modified version of the chart in (80), organized by compound type and each prosodic characteristic which is to be accounted for, in terms of loss and retention (accent and register), and accent location in the compound word. There are four specific characteristics of each compound to be accounted for: 1) the loss or retention of N1's accent, 2) the loss or retention of N2's accent, 3) the loss or retention of N2's register, and 4) the location of accent, if any, in the compound. N1's register is always retained.

(83) Patterns of loss, retention, and accent location in Kansai Japanese compounds

	N1 Accent	N2 Accent	N2 Register	Accent location
Foot-foot ω f f	Lost	Lost	Lost	Unaccented
Word-foot ω ω f	Lost	Lost	Lost	Last mora of N1
Foot-word, Word-word ω f ω ω ω ω	Lost	Lost	Lost	First mora of N2
Mono-phrasal φ ω ω	Lost	Retained	Lost	Original N2 accent
Bi-phrasal φ φ φ	Retained	Retained	Retained	Original N1 and N2 accents
Word-phrase φ ω φ	Lost	Retained	Retained	Original N2 accent

I argue that this constellation of patterns can be accounted for by relativizing the relevant characteristics to different levels of prosodic word and phonological phrase domains, which can be recursive.

First, let us consider word compounds, which are made up of foot-foot, word-foot, foot-word, and word-word compounds. These compounds are all identical in terms of patterns of accent and register loss and retention. They differ from each other in terms of the lengths of their components and accent locations. Examples of each are presented in (84), with their proposed prosodic structures.

(84) Word compounds and their prosodic structures

a. Foot-foot

ω
f f

^{H}*tuyu-kusa*
'Asiatic dayflower'
^{L}*waru-mono*
'villain'

b. Word-foot

ω
ω f

^{H}*makura'-moto*
'bedside'
^{L}*ongaku'-kai*
'concert'

c. Foot-word

ω
f ω

^{H}*yama-no'bori*
'mountain climbing'
^{L}*asa-go'han*
'breakfast'

d. Word-word

ω
ω ω

^{H}*denki-ko'nro*
'electric heater'
^{L}*kasai-ho'ken*
'fire insurance'

The components of each word are given in (85) below.

(85) Components of the compound words in (84)

Foot-foot

a. ^{H}*tuyu* 'dew' + ^{H}*ku'sa* 'grass' = ^{H}*tuyu-kusa* 'Asiatic dayflower'

b. ^{L}*waru'* 'bad person, thing' + ^{H}*mo'no* 'person' = ^{L}*waru-mono* 'villain'

Word-foot

c. ^{H}*ma'kura* 'pillow' + ^{H}*mo'to* 'base' = ^{H}*makura'-moto* 'bedside, near one's pillow'

d. ^{L}*on'gaku* 'music' + ^{L}*kai* 'meeting' = ^{L}*ongaku'-kai* 'concert'

Foot-word

e. ^{H}*ya'ma* 'mountain' + ^{H}*nobori* 'climbing' = ^{H}*yama-no'bori* 'mountain climbing'

f. ^{L}*asa'* 'morning' + ^{H}*go'han* 'meal' = ^{L}*asa-go'han* 'breakfast'

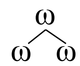
Word-word

g. ^{H}*de'nki* 'electricity' + ^{H}*ko'nro* 'heater' = ^{H}*denki-ko'nro* 'electric heater'

h. ^{L}*kasai* 'fire' + ^{H}*hoken* 'insurance' = ^{L}*kasai-ho'ken* 'fire insurance'

Although these compounds differ in accent location, they are all alike in that N1 and N2 lose any input accents they may have had in isolation, and N2 loses its register. The result of these losses is that word compounds have only one register and only one accent, if present. Crucially, this means that these compounds are similar to simplex words, as can be seen from the compounds and their simplex components in (85). Every compound has one register and may have one accent, just as every component word has one register and may have one accent. From this crucial similarity, I propose that these compounds are akin to prosodic words, and, thus, that at least the compounds discussed here are mapped to prosodic words, giving them the collective descriptor of "word compounds." Given that the components of each compound are syntactic terminals which would be mapped to prosodic words by the appropriate Match Theory constraint, these compounds can tentatively be given the structure in (86).

(86) Tentative prosodic structure for word compounds, to be revised



As will be seen, this structure will in the end only be applied to one type of word compound (the word-word compound), and other structures with a maximal prosodic word will be proposed for the other word compound types.

Let us consider the patterns of accent and register loss and retention more closely. Word compounds lose the input accents of both N1 and N2 (if any) and the input register of N2. One type, the foot-foot compound, will not receive a new, compound accent, but the other three types, the word-foot, foot-word, and word-word compounds will gain a new compound accent. The gain of a new compound accent, which falls immediately to either the left or right side of the juncture between components depending on N2 length, is a characteristic unique to word compounds (except foot-foot compounds). Ito and Mester (2021 and previous work) argue for Tokyo Japanese that compound accent is required within a maximal, non-minimal prosodic word, that is, a recursive prosodic word, such as the maximal prosodic word in (86). I extend this analysis to Kansai Japanese. When a compound has a structure with a maximal, non-minimal prosodic word, the compound receives a new compound accent. Thus, the maximal, non-minimal prosodic word is the domain of compound accent. This is most easily observable in the example in (85h), repeated below in (87) with the structure in (86), as the component words of (85h) are both unaccented, but the resulting compound has an accent.

(87) ⓦ ← maximal, non-minimal ω = domain of compound accent

ω ω

^{L}kasai ^{H}hoken → ^{L}kasai-ho'ken 'fire insurance'

Three of the four compound types which I have classified as word compounds gain a compound accent. However, these three can be categorized into two groups, differing by the location of compound accent in the word, with one compound type (word-foot compounds) exhibiting compound accent on the last mora of N1, and the other two compound types (foot-word and word-word compounds) exhibiting compound accent on the first mora of N2, depending on the length of N2 in moras. As discussed previously, if N2 is one to two moras in length, compound accent falls on the last mora of N1, while if N2 is three to four moras in length, compound accent falls on the first mora of N2. Because I argue that different prosodic characteristics reflect different prosodic structures, I mention these accent location differences here in order to separate accented word compounds into classes. However, the grammar responsible for placing accent is treated not in this chapter, but in Chapter 4.

Treating the case of word-foot compounds first, it has been noted for Tokyo Japanese that compounds with short one to two mora N2s often have an N2 which behaves similarly to some suffixes (Kawahara 2015, Ito and Mester 2018a). These suffixes are referred to as "pre-accenting" suffixes, reflecting the fact that when such suffixes are attached to words, an accent is placed on the head mora of the immediately preceding syllable, that is, on the last head mora (the sole mora of a light syllable or the first mora of a heavy syllable) of the suffixed word, causing the loss of any accent the word had in isolation (Kawahara 2015, Ito and Mester 2018a). This can be seen in the following examples. Examples (88a-b) are from Kawahara, (88c) is from Ito and Mester, and (88d) is from Sugito (1995).

(88) Pre-accenting suffixes *-ke* 'family of' and *-syu* '(agent)' in Tokyo Japanese

a. *yosida* 'Yoshida' + *-ke* 'family of' = *yosida'-ke* 'family of Yoshida'

b. *ka'too* 'Kato + *-ke* 'family of' = *kato'o-ke* 'family of Kato'

c. *unten* 'driving' + *-syu* '(agent)' = *unte'n-syu* 'driver'

d. *gaiya* 'outfield' + *-syu* '(agent)' = *gaiya'-syu* 'outfielder'

The behavior of compounds with short one to two mora N2s is the same as that of words suffixed with pre-accenting suffixes, as can be observed in the following examples in (89).

(89) Pre-accenting behavior in compounds with short N2s in Tokyo Japanese

a. *abura* 'oil' + *musi* 'insect' = *abura'-musi* 'cockroach'

b. *te'muzu* 'Thames' + *kawa'* 'river' = *temuzu'-gawa* 'River Thames'

Indeed, Ito and Mester (2018a) say that it may be difficult, if not impossible, to distinguish compound cases like those in (89) from suffixation cases like those in (88). Accordingly, Ito and Mester (2018a, 2021) propose that such short words are mapped to feet, not prosodic words. This, they propose, is due to a WORDBINARITY constraint requiring prosodic words to be longer than a single foot. Constraints will be formally defined in the next section as they are needed for the Optimality Theory analysis.

Pre-accenting behavior in some suffixes is also observed in Kansai Japanese, as shown below. Examples are from Sugito (1995).

(90) Pre-accenting suffix *-syu* ‘(agent)’ in Kansai Japanese

a. ^{H}*unten* ‘driving’ + *-syu* ‘(agent)’ = ^{H}*unten’-syu* ‘driver’

b. ^{H}*syooboo* ‘firefighting’ + *-syu* ‘(agent)’ = ^{H}*syoobo’o-syu* ‘firefighter’

c. ^{L}*gaiya* ‘outfield’ + *-syu* ‘(agent)’ = ^{L}*gaiya’-syu* ‘outfielder’

d. ^{L}*rappa* ‘horn (instrument)’ + *-syu* ‘(agent)’ = ^{L}*rappa’-syu* ‘horn player’

As is the case in Tokyo Japanese, this pre-accenting behavior is also observed in compound words with short N2s, as shown in (91).

(91) Pre-accenting behavior in compounds with short N2s in Kansai Japanese

a. ^{H}*ma’kura* ‘pillow’ + ^{H}*mo’to* ‘base’ = ^{H}*makura’-moto* ‘bedside, near one’s pillow’

b. ^{L}*on’gaku* ‘music’ + ^{L}*kai* ‘meeting’ = ^{L}*ongaku’-kai* ‘concert’

I thus extend Ito and Mester’s proposal that short words are mapped to feet, not prosodic words, to Kansai Japanese, due to the constraint WORDBINARITY. Thus, when a compound component is one to two moras in length, it will be mapped to a foot, resulting in a suffixation-like prosodic structure, as shown in (92). Because word-foot compounds have a maximal, non-minimal word, they will receive a compound accent, which in this case falls on the last mora of N1.

(92) Prosodic structure for word-foot compounds

ω
ω   f
^{H}makura ^{H}mo'to → ^{H}makura'-moto 'bedside, near one's pillow'

In (92), the bimoraic N2 *moto* 'base' is mapped to a foot, as mapping it to a prosodic word would violate WORDBINARITY, which requires a prosodic word to be greater than a foot in length. The trimoraic N1 *makura* 'pillow,' on the other hand, is greater than a foot in length, so mapping it to a prosodic word incurs no violation of WORDBINARITY, allowing the default mapping of a syntactic terminal to a prosodic word to take place. An active WORDBINARITY constraint also means that when it is N1, not N2, which is one to two moras in length, it is also mapped to a foot instead of a word. If N2 is three or four moras in length, then since mapping it to a prosodic word would not violate WORDBINARITY, it is unhindered in being mapped to a prosodic word. The result, then, is the structure in (93), a foot-word compound prosodic structure. Like (92), this structure has a maximal, non-minimal word, and thus receives a compound accent, which in this case is on the first mora of N2.

(93) Prosodic structure for foot-word compounds

ω
f   ω
^{L}asa' ^{H}go'han → ^{L}asa-go'han 'breakfast'

If both N1 and N2 are three to four moras in length, because both words are greater than one foot in length, mapping each terminal to a prosodic word does not violate WordBinarity, and as a result, the default case arises, a word-word compound, with symmetrically recursive prosodic words. The resulting prosodic structure is shown in (94), a word-word compound prosodic structure. Again, because this prosodic structure has a maximal, non-minimal prosodic word, the compound receives a compound accent, which, like in foot-word compounds, is also on the first mora of N2.

(94) Prosodic structure for word-word compounds

ω
ω ω
^{L}kasai ^{H}hoken → ^{L}kasai-ho’ken ‘fire insurance’

This takes care of the prosodic structures for the three word compound types that receive a compound accent. What of the fourth word compound type in which both N1 and N2 are up to two moras in length and which is unaccented? As before, the WordBinarity constraint plays an important role here. Since neither N1 nor N2 are greater than a foot in length, they must both be mapped to feet in order to satisfy WordBinarity. The result is the following structure, in (95), a foot-foot compound.

(95) Prosodic structure for foot-foot compounds

ω
f f
^{L}waru’ ^{H}mo’no → ^{L}warumono ‘villain’

The resulting compound in (95) is unaccented, despite both N1 and N2 having an accent in isolation. Note that the prosodic word in this case is not a maximal, non-minimal prosodic word, but instead a maximal *and* minimal prosodic word. Since a maximal, non-minimal prosodic word is not involved in this case, the compound does not receive a new compound accent. The resulting prosodic structure, in fact, does not even resemble a compound structure, but the structure of a simplex word (Ito and Mester (2021). Compare the structure in (95) with the structures of two simplex words in (96), one three mora native Japanese word and one four mora loanword.

(96) a. Simplex Native Japanese Word

ω

f f

^{H}i'no ti = ^{H}i'noti 'life'

b. Simplex Loanword

ω

f f

^{H}pisu toru = ^{H}pisutoru 'pistol'

Foot-foot compounds, then, are essentially akin to simplex words, and would be subject to the default accentuation rule observed in simplex words, the antepenultimate accent rule, in which accent is placed on the antepenultimate mora in the word (Kubozono 2006, 2008, Ito and Mester 2018a, 2021). Although this rule is not fully productive in native words, it is productive in loanwords, and most accented native words have antepenultimate accent. (Kubozono 2006). That ^{L}*warumono* 'villain' in (95) does not receive any accent is due to the interaction of constraints requiring accent not to fall on the last foot of a word (i.e., *^{L}*(waru)(mo'no)*) but also to fall on the rightmost foot of a word (i.e., *^{L}*(wa'ru)(mono)*). Simply having no accent satisfies both constraints, since having no accent at all means that no accent falls on the last food of a word, nor does any accent fall on a foot too far from the right edge of the word. This analysis was proposed for Tokyo Japanese by Ito and Mester (2016) to account for the overwhelming tendency of four mora words in Tokyo Japanese to be unaccented. This analysis was extended to Kansai Japanese by Tanaka (2018), and I adopt the reasoning of Ito and Mester and Tanaka here as well. Thus, while (95) does not receive a compound accent because it does not have the requisite compound prosodic structure, it also does not receive an accent from the default antepenultimate accent rule, because being unaccented violates the fewest constraints on accent placement.

I have thus proposed four structures for word compounds, split from the original tentative structure in (86), involving every syntactic category being mapped to prosodic words, which is now the prosodic structure for only word-word compounds (97d). These four structures are given again below, repeated from (84).

(97) Word compounds and their prosodic structures

a. Foot-foot

ω
f f

^{H}*tuyu-kusa*
'Asiatic dayflower'
^{L}*waru-mono*
'villain'

b. Word-foot

ω
ω f

^{H}*makura'-moto*
'bedside'
^{L}*ongaku'-kai*
'concert'

c. Foot-word

ω
f ω

^{H}*yama-no'bori*
'mountain climbing'
^{L}*asa-go'han*
'breakfast'

d. Word-word

ω
ω ω

^{H}*denki-ko'nro*
'electric heater'
^{L}*kasai-ho'ken*
'fire insurance'

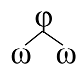
Every compound which has a recursive, maximal, non-minimal prosodic word (97b-d) receives a compound accent, while the one which has only a maximal, minimal prosodic word (97a) does not receive a compound accent and is unaccented if the resulting compound is four moras in length. If it is fewer than four moras in length, it may have a lexical accent or be subject to the antepenultimate accent rule.

Let us now move on to compounds which were said to involve phonological phrases, the mono-phrasal, bi-phrasal, and word-phrase compounds. These compounds, like the word compounds treated above, also have the same syntactic structure (75), and through a default mapping in Match Theory would be expected to have the prosodic structure in (97d). However, as different compound prosodic patterns are associated with different prosodic structures, and the default mapping (97d) has already been associated with word-word compounds, different prosodic structures must again be involved for these compounds.

Consider now the following compounds, which are given with their proposed structures. The prosodic category foot is not displayed in these structures, but the foot categories are present below the minimal prosodic words. Phrasal compounds also usually involve a compound word as their N2, such as *buyoo-kyookai* 'dance association,' which, per the discussion above, would itself be a word-word compound. Exceptions, such as the H-register compound in (98a), usually involve long loanwords, such as *sutokkingu* 'stockings.' In the structures below, only the maximal prosodic word of compound components is displayed.

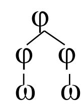
(98) Phrasal compounds and their prosodic structures

a. Mono-phrasal



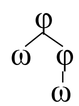
^{H}*nairon-suto'kkingu*
'nylon stockings'
^{L}*keizi-sosyoo'hoo*
'Code of Criminal Procedure'

b. Bi-phrasal



^{H}*ni'hon-*^{L}*buyookyo'okai*
'dance association of Japan'
^{L}*tyuu'oo-*^{H}*koomin'kan*
'central public hall'

c. Word-phrase



^{H}*simin-*^{L}*kaigi'situ*
'citizens' meeting room'
^{L}*tyuuoo-*^{H}*eiga'kan*
'central movie theatre'

The components of each word are given in (99) below.

(99) Components of the compound words in (98)

Mono-phrasal

a. ^{H}*na'iron* 'nylon' + ^{L}*suto'kkingu* 'stocking' = ^{H}*nairon-suto'kkingu* 'nylon stockings'

b. ^{L}*ke'izi* 'criminal matter' + ^{L}*sosyoo'hoo* 'procedural law' = ^{L}*keizi-sosyoo'hoo* 'Code of Criminal Procedure'

Bi-phrasal

c. ^{H}*ni'hon* 'Japan' + ^{L}*buyookyoo'kai* 'dance association' = ^{H}*ni'hon-*^{L}*buyookyo'okai* 'dance association of Japan'

d. ^{L}*tyuu'oo* 'center' + ^{H}*koomin'kan* 'public hall' = ^{L}*tyuu'oo-*^{H}*koomin'kan* 'central public hall'

Word-phrase

e. ^{H}*si'min* 'citizen' + ^{L}*kaigi'situ* 'meeting room' = ^{H}*simin-*^{L}*kaigi'situ* 'citizens' meeting room'

f. ^{L}*tyuu'oo* 'center' + ^{H}*eiga'kan* 'movie theatre' = ^{L}*tyuuoo-*^{H}*eiga'kan* 'central movie theatre'

As the examples above show, phrasal compounds involve retention of one or more input registers (whereas word compounds retained exactly one register) and retention of one or more input accents (whereas word compounds retained no input accents at all). The input accent of N2 is retained in all three cases, and the input accent of N1 is retained in bi-phrasal compounds. The register of N1 is retained across compounds of all types, both word and phrasal. The register of N2 is lost in mono-phrasal compounds, as in word compounds, but is retained in bi-phrasal and word-phrase compounds. Mono-phrasal compounds are crucially different from word-word compounds in that while N2 loses its accent in word-word compounds, N2 retains its accent in mono-phrasal compounds.

These compounds are crucially similar to non-compound sequences. First, let us consider bi-phrasal compounds. Compare the bi-phrasal compound in (100) with the non-compound sequence in (101). Contours with over- and underbars are provided in this illustration for ease of visual comparison. The relevant portion of the sentence is enclosed in a rectangle.

(100) Bi-phrasal Compound: $\underline{\text{tyu}}\overline{\text{u}}'\underline{\text{oo}} - \overline{\text{koomin}}'\underline{\text{kan}}$ ‘central public hall’

(101) Sentence: $\overline{\text{minamida}(-\text{ga})}\ \boxed{\underline{\text{naniwa}} - \overline{\text{mi}}'\underline{\text{yage}} - \underline{\text{o}}\ \overline{\text{niranderu}}' - \underline{\text{wa}}}$
Minamida(-nom) Osaka-souvenir-acc looking-particle
‘Minamida is looking at a souvenir of Osaka!’ (Kori 1987)

The bi-phrasal compound in (100) is similar to the non-compound sequence ^{L}*naniwa-mi’yage-o* ^{H}*niranderu’-wa* ‘is looking at a souvenir of Osaka!’ Both the compound sequence and the non-compound sequence have two words, *tyuuoo* ‘center’ and *koominkan* ‘public hall’ in the compound and *naniwa-miyage-o* ‘souvenir of Osaka (acc.)’ and *niranderu-wa* ‘looking (emphatic particle)’ in the non-compound sequence. Both words in each sequence begin with their own register tone, and both words in each sequence have an accent. Crucially, the accent of each word in both sequences is the accent each word would have in isolation, outside of the context of these sequences.

A well-known feature of Japanese prosody is that content words and following functional material (e.g., particles, case markers) are grouped together into a unit called the *bunsetsu*, which may have at most one accent (Kubozono 2012). In many cases, the *bunsetsu* is equivalent to what, in treatments of the syntax-prosody interface in Japanese, has often been referred to as the “minor phrase” or “accentual phrase” (a lower level phrasal category), which is the domain of accent culminativity. Ito and Mester (2007, 2012, 2013), however, argued that the differentiation between minor/major phrases or accentual/intonational phrases is actually the difference between different levels of recursive phonological phrase, with a minimal phonological phrase φ being the domain of accent culminativity, like the minor phrase. In terms of accent, they argue that accent is a head feature associated with the head of the minimal phonological phrase. I extend their proposal to Kansai Japanese, where, as Kori (1987) observed for Osaka Japanese, a major Kansai Japanese dialect, phrases have at most one high-pitched portion, which may include an accent. Thus, I argue that accent is associated with the head of a minimal phonological phrase in Kansai Japanese as well.

A feature of Kansai Japanese prosody not shared by Tokyo Japanese is that words begin with a register tone. As the examples in (100) and (101) show, register tones are not lost across phrase boundaries, even if the register of one word is different from the final tone of the preceding word, as is the case above. In (100), N2 of the compound has a high tone register, but this is not lost even though the preceding word ends in a low tone. Similarly, the *naniwa-miyage-o* has a low tone register, but it is not lost even though the preceding word ends in a high tone, and *niranderu-wa* has a high tone register, but it is not lost even though the preceding word ends in a low tone. This is similar to the facts in Tokyo Japanese, where a minimal phonological phrase is associated with a rise in pitch from low to high at the beginning of a word (Haraguchi 1999, Ito and Mester 2007, 2012). Thus, from this I conclude that the domain of register retention in Kansai Japanese is also the phonological phrase, though it does not necessarily have to be a minimal phonological phrase. As previously mentioned, N1 retains its register in all compounds regardless of type, including in word-phrase compounds, where the first word is not contained in a minimal phonological phrase.

This means that the domain of register retention is simply a phonological phrase, not the minimal phonological phrase. The register of a word whose left edge corresponds with the left edge of a phonological phrase is retained.

Given this, it can be seen from the comparison in (100) and (101), then, that certain compounds have characteristics that truly are similar to phrases in Kansai Japanese. Since there are three accents and three registers in (101), there are three minimal phonological phrases in the non-compound sequence. Similarly, since there are two accents and two registers in (100), there are two minimal phonological phrases in the compound.

In this discussion, I have proposed that each component of a bi-phrasal compound would be contained in a minimal phonological phrase. Before proposing a structure for bi-phrasal compounds, however, let us first consider what were called mono-phrasal compounds in the preceding discussion, as the argument for their prosodic structure has consequences for the top level prosodic category of the compound.

An important issue is what differentiates compounds with three to four mora N2s from compounds with five or six mora N2s. As discussed previously, compounds with three to four mora N2s have accent on the first mora of N2, while compounds with five or six mora N2s retain the original isolation accent of N2. Let us consider what would happen if a compound with a five or six mora N2 is mapped to the prosodic structure in (102) that arises from the default mapping of X^0s to prosodic word ω. An example word is provided as well.

(102) Compound with five mora N2, to be refined

ω
ω ω

^{H}na'iron ^{L}suto'kkingu → ^{H}nairon-suto'kkingu

Under default mapping, the result is a word-word compound. Maximal, non-minimal words are the domain of compound accent, and the resulting compound is accented. However, there is a problem, as the resulting compound's prosody does not match the prosodic of word-word compounds as discussed above: the accent of the compound does not occur immediately to the left or right of the juncture between the two components. Instead, it occurs medially in N2, in the original position of N2's accent in isolation. If compound accent aligned to the juncture were assigned to the resulting compound as would be expected in other word-word compounds, the result should be *^{H}*nairon-su'tokkingu*, but this is not the case. This suggests, then, that the top level category cannot be a prosodic word, as that would result in the presence of a maximal, non-minimal prosodic word, which would require a compound accent aligned to the juncture.

Ito and Mester (2021) propose for Tokyo Japanese that the top level prosodic category in compounds of this type is a phonological phrase, yielding the following structure.

(103) Compound with five mora N2, with phonological phrase

φ
ω ω

Ito and Mester (2021) propose that this is due to a binarity constraint on the maximum size of the head of a maximal, non-minimal prosodic word, BINMAXHEAD($\omega_{[+max, -min]}$). Specifically, heads of maximal, non-minimal prosodic words (i.e., N2) are maximally binary, having no more than two immediate daughters, in terms of feet or syllables. Compounds with a three to four mora N2 satisfy this constraint, as N2s such as *(nobo)ri* 'climbing' as in *yama-no'bori* 'mountain climbing' and *(en)(pitu)* 'pencil' as in *iro-e'npitu* 'colored pencil' two daughters, one foot and one syllable in the case of *(nobo)ri* and two feet in the case of *(en)(pitu)*. However, a compound with a five to six mora N2 will violate this constraint, as N2 has more than two feet, such as *(ken)(satu)(tyoo)* in *tihoo-kensatu'tyoo* 'local prosecutor's office' and *(so)(syoo)(hoo)* in *keizi-sosyo'ohoo* 'Code of Criminal Procedure.'

The structure in (103) allows for the differentiation between compounds with three to four mora N2s and compounds with five to six mora N2s. In compounds with three to four mora N2s, there is a maximal, non-minimal word, and thus a compound accent before or after the juncture is assigned to the resulting compound. However, in compounds with five to six moras, there is no recursion, and thus, no maximal, non-minimal word. Such compounds, accordingly, do not receive a compound accent, and the accent of N2 is retained instead. If N2 is originally unaccented, then the compound will be unaccented as well, as the unaccentedness of N2 is retained. The accent of N1, however, is lost, as in the word compounds. This is because, as discussed above, accent is a feature of the head of a minimal phonological phrase. With N2 being the head of the minimal phonological phrase, N2's accent is retained. N1 loses its accent because it is not the head of the minimal phonological phrase, and if it retained accent, this would violate culminativity within the minimal phonological phrase. This differentiation between compounds with three to four mora N2s and compounds with five to six mora N2s is also observed in Kansai Japanese, and, thus, I extend Ito and Mester's analysis and apply it to Kansai Japanese.

What of the registers of N1 and N2? N1 is at the beginning of a phonological phrase, so it retains its register. However, the left edge of N2 does not coincide with the left edge of a phonological phrase, and thus, its register is not retained. This is seen clearly in cases such as ^{H}*nairon-suto'kkingu* 'nylon stockings,' where N2 is low register in isolation ^{L}*suto'kkingu*, but this low register is not retained in the compound.

Before proceeding with proposing structures for the phrasal compounds, I summarize the prosodic features discussed here and their associated domains in the chart below.

(104) Summary of Prosodic Features and Domains

Prosodic Features	**Domain**
Accent	Minimal phonological phrase (φ)
Compound Accent	Maximal, non-minimal prosodic word (ω)
Culminativity	Minimal phonological phrase (φ)
Register	Phonological phrase (φ)

With these established, I begin by proposing that mono-phrasal compounds have the structure in (105). This structure serves as the refined version of (102). Foot boundaries are indicated in N2 in (105) to show that it is long enough to violate BINMAXHEAD($\omega_{[+max, -min]}$).

(105) Prosodic structure of mono-phrasal compounds

φ ← Domain of accent, culminativity, and register

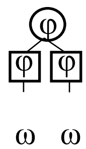
ω ω

^{H}kurisu'masu ^{H}(pure)(ze'n)(to) → ^{H}kurisumasu-pureze'nto 'Christmas present'

Because the top level prosodic category is a phonological phrase, we observe accent in the original location of accent in N2, as the minimal phonological phrase is the domain of accent. The minimal phonological phrase is also the domain of culminativity, so *kurisu'masu* 'Christmas' loses its isolation accent, and an accent remains only on *pureze'nto*, which is the head of the minimal phonological phrase. Finally, the register of N1 is retained because the phonological phrase is the domain of register retention, and only the register of a word whose left edge coincides with the left edge of a phonological phrase is retained.

Let us now return to the question of bi-phrasal compounds. As previously established, bi-phrasal compounds such as ^{L}*tyuu'oo*-^{H}*koomin'kan* 'central public hall' retain the accent and register of both N1 and N2. Since accent is a feature of the head of a phonological phrase, both N1 and N2 must be contained within their own phonological phrases. N2 in such compounds are often greater than three feet in length (though not always, as there are cases when N2 is exactly three feet in length that are bi-phrasal as well). This means that such compounds will have a phonological phrase as their top level prosodic category, resulting in the following structure. With two minimal phonological phrases, these are referred to as bi-phrasal compounds.

(106) Prosodic structure for bi-phrasal compounds



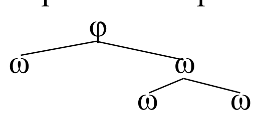
← phonological phrase, domain of register retention
← minimal phonological phrase, domain of accent, culminativity, and register retention

^{H}ni'hon ^{L}buyookyo'okai → ^{H}ni'hon-^{L}buyookyo'okai 'dance association of Japan'

Since the minimal phonological phrase is the domain of accent, and there are two accents in the compound in (106), both N1 and N2 must be mapped to phonological phrases. Also, because both components are contained in a phonological phrase (the fact that it is a minimal phonological phrase in this case is not relevant for this consideration), the registers of both N1 and N2 are retained.

How does a bi-phrasal prosodic structure result from syntax-prosody mapping? I again follow Ito and Mester (2021) in proposing that a binarity constraint is involved, in this case BINMAX-$\varphi_{[+min]}$. This constraint requires that minimal phonological phrases are maximally binary, in terms of (minimal) prosodic words dominated by the minimal phonological phrase. Let us consider what would happen if the compound in (106) were mapped to the mono-phrasal structure in (105), shown below.

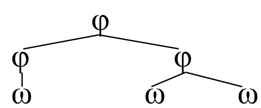
(107) Bi-phrasal compound assigned mono-phrasal prosodic structure



^{H}ni'hon ^{L}buyoo-kyo'okai → ^{H}ni'hon-^{L}buyookyo'okai 'dance association of Japan'

In this case, N2, ^{L}*buyookyo'okai* 'dance association' is actually itself a word-word compound. This is reflected in the structure in (107), with a word-word compound prosodic structure as the second prosodic word in the structure. In this structure, there are three minimal prosodic words, corresponding to *nihon* 'Japan,' *buyoo* 'dance,' and *kyookai* 'association.' This violates BinMax-$\varphi_{[+min]}$, as the minimal phonological phrase at the top of the prosodic structure violates more than two minimal prosodic words. In order to solve this, N1 and N2 are each mapped to their own minimal phonological phrase.

(108) Bi-phrasal compound prosodic structure



^{H}ni'hon ^{L}buyoo-kyo'okai → ^{H}ni'hon-^{L}buyookyo'okai 'dance association of Japan'

In the structure in (108), there are two minimal phonological phrases, and each one dominates at most two minimal prosodic words, satisfying BinMax-$\varphi_{[+min]}$. Why must it be the case that N1 is mapped to a minimal phonological phrase as well instead of staying a prosodic word? As previously discussed, accent is a feature of the head of a minimal phonological phrase. Since N1 has its own accent, it must be the head of a minimal phonological phrase. The only way that this can be the case is if N1 is mapped to its own minimal phonological phrase.

Let us now consider the structure in (109), where N1 is mapped to a prosodic word, while N2 is mapped to a phonological phrase.

(109) Prosodic structure with prosodic word N1 and phonological phrase N2

$$\varphi$$
$$\omega \quad \varphi$$

This is the alternate structure that could be considered for bi-phrasal compounds, but which was ruled out above. What happens if a compound is mapped to this structure? Given the associations between prosodic features and domains given in (104) above, we should expect to see the following characteristics. First, because the whole compound is contained within a phonological phrase, the register of N1 will be retained. N2 is contained within a phonological phrase, so it too will retain its register in isolation. Second, because accent is a feature of the head of the minimal phonological phrase, N2 will maintain its isolation accent, if any, as it is the head of its own minimal phonological phrase. N1, however, will lose its isolation accent, because it is not the head of a minimal phonological phrase, and, indeed, is not contained within a minimal phonological phrase in the first place. No compound accent is assigned because this structure does not involve a maximal, non-minimal word. The projected characteristics, with respect to register loss/retention, accent loss/retention, and location of the accent of a compound with the prosodic structure in (109) are given in (110).

(110) Projected characteristics of a compound with the structure in (109)

N1 accent: Lost

N2 accent: Retained

N2 register: Retained

Accent location: Original accented location of N2

First, these characteristics crucially do not match the characteristics of bi-phrasal compounds, in which the accent of N1 is retained. Thus, it cannot be the case that the bi-phrasal compounds have the prosodic structure in (109). These characteristics match the characteristics listed in the last row of the table in (80), for the group of compounds which I have labeled “word-phrase compounds,” named for the prosodic structure which I propose them to have. (109) is repeated below as (111), with an example.

(111) Prosodic structure of word-phrase compounds

$$\varphi$$
$$\omega \quad \varphi$$

$^{\mathrm{H}}$si’min $^{\mathrm{L}}$kaigi’situ → $^{\mathrm{H}}$simin-$^{\mathrm{L}}$kaigi’situ ‘citizens’ meeting room’

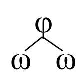
As shown, this example exhibits the same prosodic characteristics predicted in (110) by applying the associations between prosodic features and domains given in (104) above to the structure in (109). Both component words retain their registers, reflecting the fact that the left edges of both component words coincide with the left edges of phonological phrases, and N2 retains its accent, reflecting its containment within a minimal phonological phrase. N1 loses its accent, reflecting the fact that it is not the head of a minimal phonological phrase. Importantly, the structure in (111) is predicted by the theory developed by Ito and Mester (2021) as given in their typology of Japanese compounds, but such a structure was not previously attested because Tokyo Japanese does not exhibit the prosodic phenomena that would allow it to be identified in that dialect. The fact that Kansai Japanese prosody also exhibits register distinctions allows the word-phrase structure to be identified in Kansai Japanese, providing a confirmation of Ito and Mester's theory of prosodic structure, with respect to the word-phrase prosodic structure.

A crucial question for word-phrase compounds is how the compound syntactic structure is mapped to a word-phrase prosodic structure. This mapping is far less straightforward than the other compound types, as it cannot reliably be tied to the length of N2. I discuss this problem more in-depth in the next section, on syntax-prosody mapping, and it is the central subject of discussion in Chapter 5.

This discussion has established the following structures of phrasal compounds, repeated from (98).

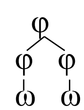
(112) Phrasal compounds and their prosodic structures

a. Mono-phrasal



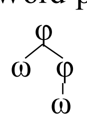
^{H}*nairon-suto'kkingu*
'nylon stockings'
^{L}*keizi-sosyoo'hoo*
'Code of Criminal Procedure'

b. Bi-phrasal



^{H}*ni'hon-*^{L}*buyookyo'okai*
'dance association of Japan
^{L}*tyuu'oo-*^{H}*koomin'kan*
'central public hall'

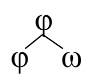
c. Word-phrase



^{H}*simin-*^{L}*kaigi'situ*
'citizens' meeting room'
^{L}*tyuuoo-*^{H}*eiga'kan*
'central movie theatre'

Altogether, the structures proposed give the typology in (79) for compounds in Kansai Japanese. Notably, Ito and Mester (2021)'s theory predicts eight prosodic structures using prosodic words and phonological phrases. Tokyo Japanese exhibits six of them, missing the word-phrase and phrase-word structures. I argue that Kansai Japanese, as discussed above and presented in (79), exhibits seven of them, missing just the phrase-word structure. Let us discuss briefly what we would expect to find in a phrase-word compound, given the prosodic feature to domain correspondences discussed above. The proposed prosodic structure for a phrase-word compound is given in (113).

(113) Phrase-word compound prosodic structure



The entire compound is contained within a phonological phrase, meaning that the compound, as expected, will begin with a retained register. The left edge of N2 does not occur at the left edge of a phonological phrase, so it will lose its register. Being the right-hand component of the compound, N2 can be considered the head of a phonological phrase. Crucially, since it is not contained within a minimal phonological phrase, it is not within the domain of culminativity, and thus does not lose its accent. In summary form, the following characteristics are expected.

(114) Projected characteristics of a compound with the structure in (113)

N1 accent: retained

N2 accent: retained

N2 register: lost

Accent location: Original accented location of N1

I have not been able to find examples of such compounds, so it remains an open question whether they exist in Kansai Japanese. However, the proposal predicts a compound prosodic prosody which differs from the other seven attested prosodic patterns, so further research in Kansai Japanese can investigate the existence of compounds with this prosody. Other dialects with similar prosodic characteristics to Kansai Japanese or those with more distinctions will be useful for further exploration as well. Before moving on to the Optimality Theoretic analysis of the syntax-prosody mapping, I present here what a phrase-word compound might look like, using nonce words.

(115) Projected prosodic pattern of a phrase-word compound (on a nonce word)

^{L}*aka'sata* + ^{H}*naha'maya* = ^{L}*aka'sata-naha'maya*

3.2.3 Syntax-Prosody Mapping

Having discussed the motivations for associating prosodic features such as register retention and accent loss to various prosodic domains, this section presents an Optimality Theoretic analysis of the syntax-prosody mapping, using the constraints mentioned in the discussion above as well as syntax-prosody mapping constraints and prosody-syntax mapping constraints in Match Theory. I consider each of the compound types in turn.

Before proceeding with the analysis, I note several points regarding the parsing of moras. For this analysis, I assume that all moras are parsed into feet by a high-ranked, unviolated PARSE-μ constraint, and thus this constraint and candidates violating it are not shown in the analyses below. I assume this because odd-numbered moras, such as the *ti* in *inoti* may receive accent in certain compounds. Following Tanaka (2018), who proposes that moras bearing a high tone must be parsed into feet, I propose that Kansai Japanese makes use of unary feet in order to correctly place accent on such odd-numbered moras, as I argue for below.

Feet are built from left to right. I follow Tanaka (2018)'s argument for the utility of an HL trochaic foot in Kansai Japanese (see the section on feet in Chapter 1 and Tanaka 2018 for discussion) and propose that an accent must fall on the head mora of a foot, though in the present analysis accent may occur on a non-head mora if higher ranked constraints force this to occur. The building of feet from left to right is motivated by patterns of compound accentuation in word compounds, in which an accent is placed on the last mora of N1 if N2 is one to two moras and on the first mora of N2 if N2 is three to four moras. The crucial illustrative cases involve native Japanese words or loanwords with an odd number of moras. For example, consider the words ^{H}*inoti-bi'roi* 'narrow escape from death' (lit. 'life-picking up') and ^{L}*usiro'-asi* 'hind foot, hind-legs.' Considering only the accented component in each word, there are two ways to foot each word, as shown below.

(116) ^{H}*inoti-bi'roi* 'narrow escape from death'

a. ^{H}inoti-(bi'ro)(i)

b. ^{H}inoti-(bi')(roi)

In this case, either parsing option – building trochees left to right and parsing all moras in (116a) and building trochees right to left and parsing all moras in (116b) – yields a parse which is compatible with N2-initial accent, as the accent must fall on the head mora of a foot. However, when we consider the second word, the better option of the two presents itself.

(117) ^{L}*usiro'-asi* 'hind foot, hind-legs'

a. ^{L}(u)(siro')-asi

b. ^{L}(usi)(ro')-asi

In this case, only the footing in candidate (117b) produces a trochaic foot, where the high tone falls on the head (i.e., only) mora at the end of the word. However, the candidate (117a) creates a foot where the accent is on the non-head mora of the foot. Furthermore, because N1 is a low register word, all moras preceding the accent are low-toned. The foot (siro'), then, is an LH foot, essentially an iambic foot. Accordingly, I propose that Kansai Japanese builds trochaic feet from left to right, with an undominated PARSE-μ constraint to ensure that even singleton moras can be parsed into feet in order to bear accent. In terms of constraints, TROCHEE, requiring feet to be trochaic, dominates low-ranked IAMB, requiring feet to be iambic, and PARSE-μ dominates FOOTBINARITY, requiring feet to be binary.

Finally, it is not always the case that the first two moras of a word will always be footed together, as would be expected from regular left to right footing. Following Kubozono, Ito, and Mester (1997), words of Sino-Japanese origin are footed according to their morphemes, with each morpheme corresponding to one foot. These are represented in the Japanese orthography with *kanji* characters. Thus, *hoken* 保険 'insurance,' for example, which is composed of the morphemes *ho* 保 'protect' and *ken* 険 'precipitous place,' is footed (ho)(ken), not (hoke)(n). *Enpitu* 鉛筆 'pencil,' which is composed of *en* 鉛 'lead' and *hitu* 筆 'writing brush,' is footed as expected as *(en)(pitu)*, because the first morpheme *en* is bimoraic. In the input portions of the tableaux in the following discussion and in Chapter 4, words involving Sino-Japanese morphemes are given in both Japanese in *kanji* with interspersed romanization of every morpheme in order to highlight how feet are assigned. Thus, the word *kasai-hoken* 火災保険 'fire insurance' will be presented in the tableau first as the relevant input, followed by the Japanese with romanization as 火 ka 災 sai 保 ho 険 ken. Feet are assigned to each morpheme, represented in the Japanese as kanji and in romanization as a group of Latin letters which may maximally form a binary foot, resulting, in this case, in the footing (ka)(sai)-(ho)(ken). Native Japanese and loanwords are given in hiragana or katakana as appropriate and grouped into the feet used in each analysis. Thus *waru-mono* 悪者 'villain' will be presented as わる waru もの mono, representing the footing (waru)-(mono).

3.3.1 Foot-Foot Compounds

Foot-foot compounds, such as ^{L}*waru-mono* 悪者 'villain' are characterized by the loss of the isolation accents of both words and the retention of the register of N1. No compound accent is placed on foot-foot compounds. In foot-foot compounds, both N1 and N2 consist of one or two moras – a single foot. In Match Theory, syntactic terminals X0 are by default mapped to prosodic words ω in accordance with the constraint MATCH(X^0, ω).

(118) MATCH (X^0, ω): A terminal node X^0 in the input must be matched with a prosodic word ω in the output, and both must dominate all and only the same elements.

Assign one violation for every terminal node X^0 in the syntax such that the segments belonging to X^0 are not all dominated by the same prosodic word ω in the output.

However, as discussed in the previous section, the constraint WORDBINARITY will not allow single foot components to be mapped to a prosodic word, as a prosodic word must be minimally binary.

(119) WORDBINARITY (WORDBIN): A prosodic word ω must be binary.

Assign one violation for a prosodic word ω which measures no more than a single foot.

This constraint can be expressed in terms of a prosodic tree in the following way.

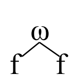
(120) *ω
|
f

Since prosodic well-formedness constraints such as WordBinarity can force non-isomorphisms in syntax-prosody mapping, and, as was discussed in the previous section, compounds are mapped not to a single prosodic structure, but to one of seven different prosodic structures, WordBinarity dominates Match(X^0, ω), allowing for non-isomorphic mappings to arise. With both N1 and N2 being only one foot in length, mapping both components to prosodic words will incur two violations of WordBinarity (121d), and mapping only one to a prosodic word will incur one violation (121b-c). The only way to fully satisfy WordBinarity is to map both components to feet, incurring two violations of the lower ranked Match(X^0, ω) instead (121a). A subscript f is used to indicate feet in the bracket structures.

(121) Syntax-prosody mapping of foot-foot compounds

$[_{x^0}[_{x^0}$ waru$][_{x^0}$ mono$]]$ わる waru もの mono	WordBin	Match (X^0, ω)
→ a. Foot-foot $[_\omega[_f$waru$][_f$mono$]]$		**
b. Word-foot $[_\omega[_\omega$waru$][_f$mono$]]$	*! W	*
c. Foot-word $[_\omega[_f$waru$][_\omega$mono$]]$	*! W	*
d. Word-word $[_\omega[_\omega$waru$][_\omega$mono$]]$	*!* W	L

The result is the foot-foot prosodic structure, in which a prosodic word dominates two feet.

(122)


^{L}waru-mono ‘villain’

3.3.2 Word-Foot and Foot-Word Compounds

Word-foot compounds, such as [H]*nyuugaku'-bi* 入学日 'matriculation day,' are characterized by compound accent on the last mora of N1 and retention of the register of N1. The isolation accents of N1 and N2 and the register of N2 are lost. N2 in word-foot compounds consist of one or two moras – a single foot, while N1 consists of three to four moras – two feet. WORDBINARITY and MATCH(X^0, ω) are the relevant constraints for word-foot compounds as well.

As in the case of foot-foot compounds, WORDBINARITY prevents one foot N2s from projecting a ω level (123b-c), causing them to be eliminated from the competition. MATCH(X^0, ω) prefers candidates that map all terminal nodes X^0 in the syntax to prosodic words ω in the prosodic structure. Once again, the perfectly mapped candidate (123b) with both N1 and N2 mapped to prosodic words is eliminated because it violates WORDBINARITY. The candidate in (123a), in which only one of the component words is mapped to a prosodic word, violates MATCH(X^0, ω) the least between the remaining candidates and emerges as the optimal candidate, eliminating (123d), which performs worse on MATCH(X^0, ω), as none of the terminals have been mapped onto prosodic words in the output.

(123) Syntax-prosody mapping of word-foot compounds

$[_{x^0}[_{x^0}$ nyuugaku]$[_{x^0}$ hi]] 入 nyuu 学 gaku 日 bi	WORDBIN	MATCH (X^0, ω)
→ a. Word-foot $[_\omega[_\omega$ nyuugaku]$[_f$ bi]]		*
b. Word-word $[_\omega[_\omega$ nyuugaku]$[_\omega$ bi]]	*! W	L
c. Foot-foot-word $[_\omega[_f$ nyuu]$[_f$ gaku]$[_\omega$ bi]]	*! W	*
d. Foot-foot-foot $[_\omega[_f$ nyuu]$[_f$ gaku]$[_f$ bi]]		**! W

The result is the word-foot prosodic structure, in which a prosodic word dominates a prosodic word which is sister to a foot.

(124)
ω
ω f
^{H}nyuugaku'-bi 'matriculation day'

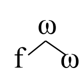
Foot-word compounds such as ^{H}*iro-e'npitu* 色鉛筆 'colored pencil' are characterized by compound accent on the first mora of N2, retention of the register of N1, a one to two mora N1, and a three to four mora N2. The isolation accents of N1 and N2 and the register of N2 are all lost. These are the mirror image of word-foot compounds in terms of prosodic structure. The relevant constraints are again WORDBINARITY and MATCH(X^0, ω). The one foot N1 is mapped to a foot in order to avoid violating

WORDBINARITY, and mapping the two foot N2 to a prosodic word, as demanded by MATCH(X^0, ω) incurs no violation of WORDBINARITY as well. Since foot-word compounds are the mirror image of word-foot compounds, the tableau evaluating candidates is essentially identical to that of word-foot compounds, as shown in (125).

(125) Syntax-prosody mapping of foot-word compounds

[$_{x^0}$ [$_{x^0}$ iro][$_{x^0}$ enpitu]] 色 iro 鉛 en 筆 pitu	WORDBIN	MATCH (X^0, ω)
→ a. Foot-word [$_ω$ [$_f$ iro][$_ω$ enpitu]]		*
b. Word-word [$_ω$ [$_ω$ iro][$_ω$ enpitu]]	*! W	L
c. Word-foot-foot [$_ω$ [$_ω$ iro][$_f$ en][$_f$ pitu]]	*! W	*
d. Foot-foot-foot [$_ω$ [$_f$ iro][$_f$ en][$_f$ pitu]]		**! W

The result is the word-foot prosodic structure, in which a prosodic word dominates a prosodic word which is sister to a foot.

(126)


^{H}iro-e'npitu 'colored pencil'

3.3.3 Word-Word Compounds

Word-word compounds, such as ^{H}*syodoo-kyo'ositu* 書道教室 'calligraphy classroom,' are characterized by compound accent on the first mora of N2, retention of the register of N1, and N2 consists of three to four moras – two feet, as is the case with foot-word compounds. These differ from foot-word compounds only in that N1 in word-word compounds is three to four moras in length, allowing it to be mapped to a prosodic word. As with the previously discussed word compounds, the isolation accents of N1 and N2 and the register of N2 are lost. The competition here is decided by MATCH(X^0, ω) alone, which simply ensures that all syntactic terminals are mapped to prosodic words in the prosodic structure – the default mapping case. (127a), in which both elements project prosodic words, is selected as the winner, as it is the only candidate which does not violate this MATCH constraint. WORDBINARITY does not come into play here, as no prosodic words in the output are less than binary.

(127) Syntax-prosody mapping of word-word compounds

$[_{x^0} [_{x^0}$ syodoo$][_{x^0}$ kyoositu$]]$ 書 syo 道 doo 教 kyoo 室 situ	WORDBIN	MATCH (X^0, ω)
→ a. Word-word $[_ω [_ω$ syodoo$][_ω$ kyoositu$]]$		
b. Word-foot-foot $[_ω [_ω$ syodoo$][_f$ kyoo$][_f$ situ$]]$		*! W
c. Foot-foot-word $[_ω [_f$ syo$][_f$ doo$][_ω$ kyoositu$]]$		*! W
d. Foot-foot-foot-foot $[_ω [_f$ syo$][_f$ doo$][_f$ kyoo$][_f$ situ$]]$		*!* W

The result is a structure in which a prosodic word dominates two prosodic words, the word-word structure.

(128)
ω
ω ω
^{H}syodoo-kyo'ositu 'calligraphy classroom'

3.3.4 Mono-Phrasal Compounds

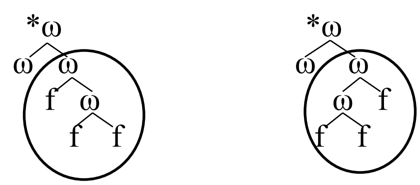
The picture becomes more complicated with the addition of mono-phrasal compounds, as these involve prosodic structures with phonological phrases φ. Mono-phrasal compounds are compounds which retain the accent of N2 and the register of N1. The accent of N1 and the register of N2 are lost. These arise when N2 consists of five or more moras, many of which are themselves compounds, as in ^{L}*keizi-sosyoo'hoo* 刑事訴訟法 'Code of Criminal Procedure,' in which *sosyoohoo* 'procedural law' is a compound consisting of *sosyoo* 'lawsuit' and *hoo* 'law.' In the tableau in (133) below, WORDBINARITY, as before, militates against candidates like the word compounds (133a, c) and the phrasal compound (133e), as they contain a foot, *hoo*, projecting a prosodic word level. The constraint BINMAXHEAD ($\omega_{[+max,\ -min]}$) comes into play here. In this analysis, I use a version of the constraint relativized to leaves (terminals) of prosodic structure in order to count foot projections below the head prosodic word, and not just immediate daughters of the head prosodic, which may themselves be prosodic words.

(129) BINMAXHEAD($\omega_{[+max, -min]}$)-LEAVES: Heads of maximal prosodic words are maximally binary in terms of leaves.

Assign one violation for a head of a maximal prosodic word ω which has more than two terminal daughters (leaves).

This constraint can be expressed in prosodic tree terms as the following. A circle encloses the crucial violating structures in each tree, the head of the compound.

(130)



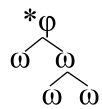
This constraint militates against the word compound candidates (133b, c), which have superbinary heads when counting leaves (terminal daughters), here, feet, because *(so)(syoo)(hoo)* (訴)(訟)(法), the head of the maximal word in these three candidates, contains three feet. (133a, e) incur no violations of this constraint because no head of a maximal word is superbinary. It is because of this constraint that the last remaining word compound, (133b), is eliminated. BINMAX-$\varphi_{[+min]}$ also comes into play.

(131) BINMAX-$\varphi_{[+min]}$ (BINMAX-φ): Minimal φs are maximally binary.

Assign one violation for a minimal phonological phrase φ which dominates more than two (minimal) prosodic word ωs.

This constraint can be expressed in prosodic tree terms as the following.

(132)



This constraint militates against (133e), a phrasal compound with three minimal prosodic words ω. With these eliminated, only (133d) remains, which violates only Match (X^0, ω). A total of 26 candidates were considered, of which the majority are harmonically bounded and excluded from the tableau below. The full candidate set is provided in Appendix B. BinMaxHead ($\omega_{[+max, -min]}$) and BinMax-$\varphi_{[+min]}$ are placed in the same stratum as WordBinarity, and all three dominate Match (X^0, ω).

(133) Syntax-prosody mapping of mono-phrasal compounds

$[_{x^0}[_{x^0}$ keizi$][_{x^0}[_{x^0}$ sosyoo$][_{x^0}$ hoo$]]]$ 刑 kei 事 zi 訴 so 訟 syoo 法 hoo	BinMax-$\varphi_{[+min]}$	Word Bin	BinMax Head ($\omega_{[+max, -min]}$)	Match (X^0, ω)
a. N2 not a ω $[_\omega[_\omega$ keizi$][_\omega$ sosyoo$][_\omega$ hoo$]]$		*! W		* L
b. Word-foot N2 $[_\omega[_\omega$ keizi$][_\omega[_\omega$ sosyoo$][_f$ hoo$]]]$			*! W	* L
c. Perfect match $[_\omega[_\omega$ keizi$][_\omega[_\omega$ sosyoo$][_\omega$ hoo$]]]$		*! W	*! W	L
→ d. Mono-phrasal, with Word-Foot N2 $[_\varphi[_\omega$ keizi$][_\omega[_\omega$ sosyoo$][_f$ hoo$]]]$				**
e. Mono-phrasal with Word-Word N2 $[_\varphi[_\omega$ keizi$][_\omega[_\omega$ sosyoo$][_\omega$ hoo$]]]$	*! W	*! W		* L

The result, then, is a mono-phrasal compound.

(134)　　φ
　　　ω　ω
　　^{L}keizi-sosyoo'hoo 'Code of Criminal Procedure'

A second type of mono-phrasal compound considered in the present investigation is one in which N2 is morphologically simplex, which often arises when N2 is a sufficiently long loanword, as in ^{H}*nairon-suto'kkingu* ナイロンストッキング 'nylon stockings.' It is sometimes observed that long loanwords are treated as if they are compounds, despite their morphologically simplex nature. Such behavior has been observed in Japanese (Kubozono 2002) and Finnish (Karvonen 2005), for example. With a long N2 like *sutokkingu* (6 moras), it might be expected that a parse as a "pseudo-compound," as these compound-like morphologically simplex words have been called, might arise. However, this parse is evidently avoided in the case of *nairon-sutokkingu*, as evidenced by the fact that *sutokkingu* is accented *sutókkingu*, as it is in isolation, and not, for example, *sutok-kíngu*, with accent on *ki*, as would be expected in a word-word compound, if this were divided as a pseudo-compound consisting of two three-mora components. Accordingly, I posit that it must be the case that *sutokkingu* has remained a single prosodic word and resisted pseudo-compound formation despite its long size, and that the whole compound must be mono-phrasal because N2 does not exhibit compound accentuation (i.e., with accent on the first mora of N2), but rather retains the accent of *sutokkingu* in its original location. It is in cases like this where the prosody-syntax mapping constraint MATCH (ω, X^0) comes into play, requiring any prosodic word ω in the output to match an X^0 in the input syntax, as has been the case by default in the compound types discussed above.

(135) MATCH (ω, X^0): A prosodic word ω in the output must be matched with a terminal node X^0 in the input, and both must dominate all and only the same elements.

Assign one violation for every prosodic word ω in the output such that the segments belonging to ω are not all dominated by the same terminal node X^0 in the input.

I also introduce a special head-relativized version of MATCH(X^0, ω) used by Ito and Mester (2021) for their analysis of glottal accent (stød) in Danish compound words, MATCH(X^0_{head}, ω), which assumes right-headedness in the syntactic structure, which is consistent with the overall head-final structure of Japanese.

(136) MATCH (X^0_{head}, ω): A head terminal node X^0 in the input must be matched with a prosodic word ω in the output, and both must dominate all and only the same elements.

Assign one violation for every terminal node X^0 in the syntax that is a head such that the segments belonging to X^0 are not all dominated by the same prosodic word ω in the output.

This constraint ensures that the head of a compound is mapped to a prosodic word. In the case of *nairon-sutokkingu*, a violation of BINMAXHEAD($\omega_{[+max, -min]}$)-LEAVES can be avoided if the superbinary head of the compound, *sutokkingu*, is simply mapped to several feet which are sister to the N1 *nairon*, which is mapped to a prosodic word. With MATCH(X^0_{head}, ω), *sutokkingu* is mapped to a prosodic word.

For *nairon-sutokkingu*, 16 candidates were considered, of which 12 are harmonically bounded and are excluded from the tableau below, with the exception of (137e-f), which are included to demonstrate the necessity of MATCH(ω, X^0) and MATCH(X^0_{head}, ω). The full candidate set is provided in the Appendix. (137a-c), all word compounds, are eliminated by BINMAXHEAD($\omega_{[+max, -min]}$), as the head in each candidate, *sutokkingu*, is superbinary, consisting of four feet, (su)(tok)(kin)(gu), serving as the head of a maximal word. (137b-c, e) are eliminated by MATCH (ω, X^0), as, in these two candidates, *sutokkingu* has been divided into further prosodic words, one prosodic word in the middle in the case of (137b, e) and two prosodic words in the case of (137c), where none of these prosodic words has an X^0 correspondent in the input. The last candidate, (137d), avoids these issues by mapping *sutokkingu* to a single prosodic word, satisfying MATCH(ω, X^0), and by mapping the whole compound to a φ rather than a ω, satisfying BINMAXHEAD($\omega_{[+max, -min]}$).

(137) Syntax-prosody mapping of mono-phrasal compounds with a morphologically simplex N2

$[_{x^0}[_{x^0}$ nairon$][_{x^0}$ sutokkingu$]]$ ナイ nai ロン ron ス su トッ tok キン kin グ gu	MATCH (ω, X^0)	BINMAX-φ	WORDBIN	BINMAXHEAD($\omega_{[+max, -min]}$)	MATCH (X^0_{head}, ω)	MATCH (X^0, ω)
a. $[_\omega[_\omega$ nairon$][_\omega$ sutokkingu$]]$				*! W		L
b. $[_\omega[_\omega$ nairon$]$ $[_\omega[_f$ su$][_\omega$ tokkin$][_f$ gu$]]]$	*! W			*! W		L
c. $[_\omega[_\omega$ nairon$]$ $[_\omega[_\omega$ sutok$][_\omega$ kingu$]]$	*!* W			*! W		L
→ d. $[_\varphi[_\omega$ nairon$][_\omega$ sutokkingu$]]$						*
e. $[_\varphi[_\omega$ nairon$]$ $[_\omega[_f$ su$][_\omega$ tokkin$][_f$ gu$]]]$	*! W					*
f. $[_\omega[_\omega$ nairon$]$ $[_f$ su$][_f$ tok$][_f$ kin$][_f$ gu$]]$					*! W	*

As mono-phrasal compounds, compounds of this sort also have the prosodic structure given in (134).

3.3.5 Bi-Phrasal Compounds

Bi-phrasal compounds, such as ^{H}*nihón-*^{L}*buyookyóokai* 日本舞踊協会 'dance association of Japan,' feature accent and register retention in both N1 and N2. Kubozono, Ito, and Mester (1997) offer one descriptive generalization that this structure becomes available when N2 exceeds three feet in length, though there are exceptions, such as ^{H}*ko'ohaku-*^{H}*utaga'ssen* 紅白歌合戦 'red-white song context,' in which the N2, *utagassen*, consists of exactly three feet. I follow this generalization here but also propose that it requires further investigation.

For now, assuming this generalization, the constraints BINMAX-$\varphi_{[+min]}$ is crucial. In mono-phrasal cases like ^{L}*keizi-sosyoo'hoo*, a BINMAX-φ violation is avoided if the single-foot element of the compound, *hoo*, is given only prosodic foot status. This remedy is not available when N2 consists of greater than three feet, however. ^{L}*buyookyo'okai* 'dance association' must be parsed as a prosodic word compound consisting of two prosodic words, *buyoo* 'dance' and *kyookai* 'association,' as *buyookyookai* cannot be parsed as an exceptionally large quaternary foot. The only available option is to "shrink" the scope of the minimal φ by allowing each member of a compound to project its own minimal φ, each dominated by a larger φ. Thus, whereas a mono-phrasal compound is a minimal φ and can only accommodate a maximum of two minimal words, a bi-phrasal compound is a phrasal compound which consists of two minimal φs, which can each accommodate a maximum of two minimal words.

39 candidates were considered for bi-phrasal compounds, of which, again, the majority are harmonically bounded and not included, with the exception of the two candidates which violate BINMAX-φ, (138b-c), which remain to illustrate the action of this constraint. The full candidate set is included in the Appendix. Many of the candidates which are not included here violate MATCH(X^0_{head}, ω) as they fail to map the compound which constitutes N2 to a prosodic word. (138a) is eliminated due to a violation of BINMAXHEAD($\omega_{[+max, -min]}$), as *buyookyookai*, the head of the compound, consists of four feet. (138b-c) are eliminated due to violating BINMAX-φ, as the φ in both candidates dominates more than two minimal prosodic. MATCH(X^0, ω) violations occur whenever a syntactic X^0 is not mapped to a prosodic word. This occurs whenever an X^0 either does not have a correspondent in the output (as in 138b), where there is not a ω corresponding to the X^0 which contains all of *buyookyookai*, or when X^0 is mapped to something other than ω, such as the maximal φ containing the whole compound in (138b-d). The bi-phrasal parse, in which the only syntactic X^0 which is not mapped to a prosodic word is the maximal X^0, thus violating MATCH(X^0, ω), emerges as the winner.

(138) Syntax-prosody mapping of bi-phrasal compounds

$[_{x^0}\, [_{x^0}$ nihon] $[_{x^0}\, [_{x^0}$ buyoo] $[_{x^0}$ kyookai]]] 日 ni 本 hon 舞 bu 踊 yoo 協 kyoo 会 kai	MATCH (ω, X^0)	BINMAX-φ	WORDBIN	BINMAXHEAD($ω_{[+max, -min]}$)	MATCH (X^0_{head}, ω)	MATCH (X^0, ω)
a. Perfect match $[_ω\, [_ω$ nihon] $[_ω\, [_ω$ buyoo] $[_ω$ kyookai]]]				*! W		L
b. Flat phrasal structure $[_φ\, [_ω$ nihon] $[_ω$ buyoo] $[_ω$ kyookai]]		*! W			* W	** W
c. Mono-phrasal $[_φ\, [_ω$ nihon] $[_ω\, [_ω$ buyoo] $[_ω$ kyookai]]]		*! W				*
→ d. Bi-phrasal $[_φ\, [_φ\, [_ω$ nihon]] $[_φ\, [_ω\, [_ω$ buyoo] $[_ω$ kyookai]]]						*

Finally, it should be noted that if a mono-phrasal compound is presented to the grammar above, an additional constraint is required in order to prevent it from being incorrectly mapped to a bi-phrasal prosodic structure. For this, the prosody-syntax mapping constraint MATCH (φ, XP) is crucial, as proposed by Ito and Mester (2021).

(139) MATCH (φ, XP): A phonological phrase φ in the output must be matched with a syntactic phrase XP in the input, and both must dominate all and only the same elements.

Assign one violation for every phonological phrase φ in the output such that the segments belonging to φ are not all dominated by the same XP in the input.

This constraint ensures that phonological phrases have an XP correspondent in the input, preventing phonological phrases from being projected unless higher ranked prosodic well-formedness constraints, like BINMAX-$\varphi_{[+min]}$, require them. For the following tableau for the inputs *keizi-sosyoohoo*, a mono-phrasal compound, and *nihon-buyookyookai*, a bi-phrasal compound, only BINMAX-$\varphi_{[+min]}$ and MATCH (X^0_{head}, ω) are displayed with only correct mono-phrasal and correct bi-phrasal candidates being considered.

(140) Interaction of BINMAX-$\varphi_{[+min]}$ and MATCH (X^0_{head}, ω)

Mono-phrasal compound $[_{x}{}^{0}\,[_{x}{}^{0}$ keizi$][_{x}{}^{0}\,[_{x}{}^{0}$ sosyoo$][_{x}{}^{0}$ hoo$]]]$ 刑 kei 事 zi 訴 so 訟 syoo 法 hoo	BINMAX-$\varphi_{[+min]}$	MATCH (φ, XP)
→ a. Mono-phrasal $[_{\varphi}\,[_{\omega}$ keizi$][_{\omega}\,[_{\omega}$ sosyoo$][_{f}$ hoo$]]]$		*
b. Bi-phrasal $[_{\varphi}\,[_{\varphi}\,[_{\omega}$ keizi$]]\,[_{\varphi}\,[_{\omega}\,[_{\omega}$ sosyoo$][_{f}$ hoo$]]]]$		**!* W
Bi-phrasal compound $[_{x}{}^{0}\,[_{x}{}^{0}$ nihon$][_{x}{}^{0}\,[_{x}{}^{0}$ buyoo$]\,[_{x}{}^{0}$ kyookai$]]]$ 日 ni 本 hon 舞 bu 踊 yoo 協 kyoo 会 kai		
c. Mono-phrasal $[_{\varphi}\,[_{\omega}$ nihon$][_{\omega}\,[_{\omega}$ buyoo$]\,[_{\omega}$ kyookai$]]]$	*! W	* L
→ d. Bi-phrasal $[_{\varphi}\,[_{\varphi}\,[_{\omega}$ nihon$]][_{\varphi}\,[_{\omega}\,[_{\omega}$ buyoo$]\,[_{\omega}$ kyookai$]]]$		***

As the tableau shows, as long as the head word of a phrasal compound is not a word-word compound (the head word of (140a) is a word-foot compound), the compound can be mapped to a mono-phrasal prosodic structure. However, if the head word is a word-word compound, as in both (140c) and (140d), the candidate containing this head word within a minimal phonological phrase will violate BINMAX-$\varphi_{[+min]}$, and a bi-phrasal structure must be selected instead.

The following Hasse diagram displays the constraint rankings for the grammar presented above.

(141) Syntax-prosody mapping constraint rankings

MATCH (ω, X^0) BINMAX-$\varphi_{[+min]}$ WORDBINARITY BINMAXHEAD($\omega_{[+max, -min]}$)

MATCH (φ, XP) MATCH (X^0_{head}, ω) MATCH (X^0, ω)

The system presented here accounts for six of the seven compound types in Kansai Japanese. Which members of a compound lose, receive, or retain accent and lose or retain register is determined by the system that I present in Chapter 4.

While this system works well for the six compound prosodic structures that are also found in Tokyo Japanese, it encounters difficulty with the word-phrase compound type. This is because, unlike the compounds discussed above, the occurrence of the word-phrase compound is not straightforwardly related to the length of N2, and furthermore, many word-phrase compounds also have a word-word, mono-phrasal, or bi-phrasal realization, consistent with the fact that their N2s exhibit the same lengths that are observed in word-word, mono-phrasal, and bi-phrasal compounds. I discuss this in the next section.

3.3.6 Word-Phrase Compounds

Examining Nakai (2002)'s dictionary reveals 114 entries with accentual patterns consistent with the word-phrase compound type. Most are compounds, though a small amount (less than 5) are non-compound phrases with word-phrase prosody. Importantly, in the dictionary section of the book, the word-phrase parse is the primary parse for only two of these compounds – ^{L}*niwaka-*^{H}*niwa'si* にわか庭師 'bandwagon/fairweather gardener' and にわか鍼師 ^{L}*niwaka-*^{L}*hari'si* 'bandwagon/fairweather acupuncturist,' which both have mono-phrasal parses which are relatively uncommon. Nakai also discusses seven compounds in the explanation section of the dictionary which are only given the word-phrase parse. Because they are not given in the dictionary section, where all patterns that Nakai obtained for a given entry are reported, it is not clear whether these also have non-word-phrase possibilities. The remaining 102 compounds have multiple parses, typically the mono-phrasal or bi-phrasal parse. Nakai writes that word-phrase compounds may appear when a) N2 is itself a compound which consists of three or more moras, b) when N2 is a 5+ mora simplex morpheme, usually a loanword, and c) occasionally when N2 is a four mora L-register loanword noun with accent on the peninitial mora. Notably, none of these descriptions is unique to word-phrase compounds. a) and c) are compatible with word-word compounds, and a) and b) are compatible with mono-phrasal compounds. Indeed, *nairon-sutokkingu*, discussed above, fits the description in b) and has both a mono-phrasal and a word-phrase parse. The non-uniqueness of these descriptions is clearly reflected in the fact that at least 102 of the 114 compounds in Nakai (2002) have variable realizations. A possible explanation for this variability could be that word-phrase compounds are in some sense "unstable" and prefer to be realized symmetrically (for example, as would be enforced by an EQUALSISTERS constraint, proposed by Myrberg 2013) rather than asymmetrically. This would be an interesting conclusion, if evidence can be found in support of it, as it may suggest that recursivity cannot be limited to asymmetrical recursion with prosodic adjunction, as argued by Vigário (2010) and Frota and Vigário (2013), as such a constraint would require symmetrical recursion to occur in some cases, namely, those in which a word-word or bi-phrasal parse would arise. That said, a different explanation would need to be offered to explain the few cases where the word-phrase parse is the preferred parse.

Given the descriptions above, it appears that none of the input conditions previously discussed – based on N2 length – can be relied upon to produce the word-phrase compound parse, as such a system will produce other compound types instead. This is reminiscent of a well-known problem in English compound stress. Although English compounds generally receive primary stress on the first member (the Compound Rule, Chomsky and Halle 1968), many compounds do not adhere to this generalization, e.g., *apple píe, silk shírt*, placing stress on the second member instead, or more accurately, stressing both the first and second members of the compound, despite being of the same type and syntactic structure as left-stressed compounds, e.g., *ápple cake*, *ólive oil*. This and the following discussion on English compound stress are based primarily on Bell and Plag (2012); additional discussion and references can be found therein.

Because the general Compound Rule does not apply to these compounds in English, it has been deemed necessary to investigate other avenues, which have included noting correlations between right-hand compound stress and factors such as a) the specific semantic relation found between members of a compound, b) the specific identity of a given member of the compound, and c) measures of "informativeness." Effects of all of these on compound stress have been reported. Semantic relations include relations such as N2 is "made of" N1, e.g., *olive oil*, N2 is "located at/on" N1, e.g., *table lamp*, N2 "occurs during" N1, e.g., *afternoon tea* (in the sense of the meal rather than the drink), among others. Specific N2s, e.g., *avenue*, *symphony*, often attract stress to N2, yielding compounds like *fifth ávenue* or *Beethoven sýmphony* (Plag 2013). Semantic relations and constituent identity have been found to have robust effects on compound stress location in English.

Bell and Plag (2012) investigate the effect of informativeness, how informative a member of a compound is, on compound stress. Bell and Plag take as measures of informativeness a) the frequency of members of a compound in isolation, e.g., frequency of *apple* in *apple pie* in isolation, b) the likelihood of N1 or N2 of a compound being the first or second member of a compound, e.g., how likely *apple* is to be in a compound (i.e., to have an N2 following it), c) the number of compounds that have a certain word as N1 or N2 (a measure Bell and Plag call "family size"), e.g., how many different compound types is *apple* an N1 of, like *apple pie, apple cake, apple strudel, apple jam*, and d) how specific a member of a compound is in terms of its meaning, i.e., how polysemous that member is, e.g., how many different meanings does *apple* has. Generally, smaller values in these measures are taken as more highly informative, and greater informativeness (or surprisal) is hypothesized to lead to greater likelihood of being stressed. Thus, a more informative N2 is more likely to receive stress than a less informative one. In addition to confirming the effect of semantic relations on compound stress, Bell and Plag present data which they take to suggest an effect of informativeness on compound stress, although the effect of the semantic relations seems to be clearer and stronger than the effect of informativeness.

Despite being reminiscent of the problem of right-hand stress in English, it should be noted that this is not exactly parallel to the Kansai Japanese situation. While English speakers largely agree that right-stressed compounds are right-stressed (Bell and Plag 2012), there is greater variability in Kansai Japanese compounds with a word-phrase parse such that certain compounds may be also produced as mono-phrasal, bi-phrasal, or as a word-phrase compound. Nonetheless, because of the similarity in the sense that the word-phrase parse is possible when other parses would be expected instead (cf. right stress occurs when left stress is expected instead in English), it seems to me to be prudent to investigate the avenues described above in Kansai Japanese as well, especially given the absence of a unique N2 length-based input condition which identifies word-phrase compounds.

The problem of word-phrase compounds in Kansai Japanese is interesting in light of the realization of "right-stressed" compounds in English as double stressed, i.e., stress on both the left and right constituents, as questions can be posed in a similar way for both languages. In English, the relevant question is, given that left-hand stress is a given, what factors condition the appearance of an additional stress on the right-hand member? Bell and Plag (2012) find that when N2 has high informativeness, this high informativeness has a higher chance of being signaled with a right-hand stress. In Kansai Japanese, there are two givens concerning word-phrase compounds, many of which have mono-phrasal or bi-phrasal parses: the left-hand member will retain its register and the right-hand member will retain its accent. Given these, what factors condition the retention of the register of the right-hand member, and what factors condition the loss of accent/failure to retain the accent of the left-hand member, resulting in a word-phrase compound? Thus, while the question in English concerns factors that condition stress in the second member of the compound, the question in Kansai Japanese concerns factors that condition the prosodic characteristics of both members of the compound. This difference allows for the investigation to shed light not only on the factors which condition the word-phrase parse in Kansai Japanese itself but also on the effects of factors such as informativeness on multiple members of a compound more broadly, which here can be investigated within a single language.

Furthermore, while a general compound accent system can be identified for Kansai and Tokyo Japanese which yields the compound parses discussed above, this system is, expectedly and like that of English, not free from exceptions, both of the "a different accent pattern was expected" type and the "there is variation between multiple patterns" type. Bell and Plag suggest that the first is influenced by informativeness and that the latter may also be influenced by informativeness. I investigate the effects of informativeness the conditioning of the word-phrase parse in Kansai Japanese as well, as evidence for these effects in these compounds in Kansai Japanese may suggest that these effects play a role in the larger Kansai Japanese compound system and that of other Japanese dialects as well, adding non-English support for these factors as conditioners of compound accent. I return to the subject of the conditioning factors for word-phrase compounds in Chapter 5.

3.4 Non-Right-Headed Compounds

To conclude this chapter, a few words are in order regarding the other patterns of headedness in Japanese compounds, which have limited utility for the present investigation.

Left-headed compounds are limited to combinations of Sino-Japanese morphemes, which are maximally bimoraic (Ito and Mester 2015), with a verbal element on the left and an internal argument on the right, reflective of Chinese syntax (Kageyama 2009). Because of this restriction on their form, left-headed compounds are inherently limited to four moras (two feet) in size. Additionally, left-headed compounds are never recursive, per Kageyama, and thus they have relatively little utility in the present investigation, which focuses on questions of prosodic recursion, adjunction, and coordination, which require investigation of compounds whose elements, particularly the second element, are often larger than a single foot. It should be noted, however, that left-headed compounds *can* appear as elements in right-headed compounds (Kageyama 2009), e.g., *kikoku-sizyo* 'children of Japanese abroad who have returned to Japan', lit. 'return to one's country-children.' In this compound, the first element, *kikoku* 'return to one's country' is a left-headed compound consisting of the left-hand verbal element *ki* 'return' and a right-hand noun expressing destination *koku* 'country.' In this work, I am only concerned with left-headed compounds when they occur as elements of right-headed compounds in this way. It should also be noted that not all Sino-Japanese compounds are left-headed, e.g., *syo-mei* ‘book name,’ in which *mei* ‘name’ is the head. Many of the compounds under consideration in the present investigation involve non-left-headed Sino-Japanese compounds as their elements, e.g., *keizi-sosyoohoo* ‘Code of Criminal Procedure,’ whose head, *sosyoohoo* ‘procedural law,’ is a right-headed Sino-Japanese compound headed (in syntactic structure) by the Sino-Japanese morpheme *hoo* ‘law.’

Headless compounds, also known as exocentric compounds, are compounds in which neither element can be identified as the primary meaning of the compound, and the meaning of the compound is not a hyponym of either element (Bauer 2017). *Kane-moti*, lit. money-have, for example, means “rich person” and does not specify a type of money or possession. Like left-headed compounds, headless compounds are not recursive (Kageyama 2009), and thus they have little utility in themselves for the present investigation. However, like left-headed compounds, headless compounds can participate in right-headed compounding, e.g., *denki-kamisori* ‘electric razor,’ lit. ‘electricity-hair-shave,’ whose head, *kamisori* ‘razor, lit. hair-shave,’ is exocentric, and the present investigation will be concerned with headless compounds only in these cases.

Double-headed compounds, also called dvandva compounds, are compounds in which the elements have a coordinative relation of the type ‘X and Y’ or ‘X or Y.’ Neither element specifies nor modifies the other, and thus, neither element can be identified as the primary head (Kageyama 2009, Nishimura 2013, Tsujimura 2014). An important characteristic of double-headed compounds is that both elements are syntactically and semantically similar. According to Nishimura (2013), the elements of compounds of this type must both belong to the same lexical category. In addition, the elements must be closely associated in terms of their semantics, as in pairs like “husband and wife” (71c), “brother and sister” or “dog and cat” (Wälchli 2005, Nishimura 2013, Tsujimura 2014).

Unlike left-headed and headless compounds, double-headed compounds are recursive (Kageyama 2009). However, Nishimura (2013) offers several characteristics which distinguish double-headed compounds from the significantly more common right-headed compound type. First, they are morphosyntactically different in terms of their headedness: both elements of a double-headed compounded are heads, while only the right element of a right-headed compound is the head. Second, elements of double-headed compounds are largely restricted to the native lexical stratum. Double-headed compounds cannot generally be formed from Sino-Japanese or loanword elements, although some do have Sino-Japanese elements[25], e.g., *huu-hu* ‘husband and wife,’ which exemplifies a short double-headed compound involving two short Sino-Japanese elements. Third, *rendaku* is unavailable in double-headed compounds, even when conditions for *rendaku* are met (Tsujimura 2014), further limiting the already limited utility of *rendaku* in investigating prosodic structure, as only the presence of *rendaku* can be used to confirm compound status, whereas absence of *rendaku* suggests nothing about compound status. Fourth, double-headed compounds have distinct accentual

[25] See also discussion by Kurisu (2005), who discusses several Sino-Japanese double-headed compounds, in which both elements consist of only one or two moras.

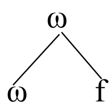
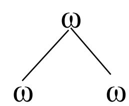
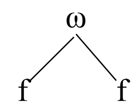
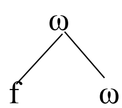
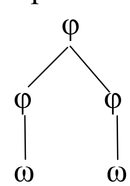
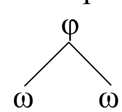
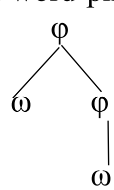
properties; the first element often preserves its isolation accent, even when this accent falls on the first mora (also Kageyama 2009), e.g., Tokyo Japanese *síro-kuro* 'white and black' (cf., *síro*), *úmi-yama* 'sea and mountain' (cf., *úmi*), Kansai Japanese ^{H}*yáma-kawa* 'mountain and river' (cf., ^{H}*yáma*), ^{H}*kúsa-ki* 'plant and tree' (cf., ^{H}*kúsa*) (Kansai Japanese data from Sugito 1995). Accentually, these look like initial-accented non-compound nouns, and furthermore, this is in contrast with the tendency of right-headed compound accent to align with the juncture between the two elements, when N2 is up to 4 moras in length. For these reasons, I set aside double-headed compounds as well in the present investigation to focus on right-headed compounds.

Having discussed the syntax-prosody mapping of Japanese compounds, the next chapter focuses on the system of the grammar which regulates compound accentuation.

Chapter 4: Kansai Japanese Compound Accentuation

Having discussed the grammar which splits a single compound syntactic structure into multiple prosodic structures, in this chapter, I discuss the grammar which produces different accentual patterns based on prosodic structure. This chapter focuses on Kansai Japanese, but also demonstrates that reranking of the constraints used for Kansai Japanese also account for the patterns found in Tokyo Japanese and Kagoshima Japanese. For ease of reference, the table of compounds and the table of compound characteristics for Kansai Japanese given in the previous chapter are given again here.

(142) Prosodic structures of Kansai Japanese compounds

Recursive		Non-Recursive
Adjunction	Coordination	
a. word-foot  ^{H}*nyuugaku'-bi* 'matriculation day' ^{L}*kabuto'-musi* 'beetle (lit. helmet bug)'	b. word-word  ^{H}*syodoo-kyo'ositu* 'calligraphy classroom' ^{L}*otome-go'koro* 'girl's feelings'	c. foot-foot  ^{H}*tori-goya* 'aviary' ^{L}*ai-iro* 'indigo blue'
d. foot-word  ^{H}*oya-go'koro* 'parental love' ^{L}*te-ryo'ori* 'home cooking'	e. bi-phrasal  ^{H}*ni'hon-*^{L}*buyookyo'okai* 'dance association of Japan' ^{L}*tyuu'oo-*^{H}*koomin'kan* 'central public hall'	f. mono-phrasal  ^{H}*nairon-suto'kkingu* 'nylon stockings' ^{L}*keizi-sosyoo'hoo* 'Code of Criminal Procedure'
g. word-phrase  ^{H}*simin-*^{L}*kaigi'situ* 'citizens meeting room' ^{L}*tyuuoo-*^{H}*eiga'kan* 'central movie theatre'		

(143) Summary of prosodic realizations of Kansai Japanese compounds

Word Compounds	Accent Location	Accent Loss	Register Retained
Foot-Foot ω f f	None (unaccented)	N1 and N2	N1
Word-Foot ω ω f	N1 (last mora)	N1 and N2	N1
Foot-Word, Word-Word ω f ω ω ω ω	N2 (first mora)	N1 and N2	N1
Phrasal Compounds	Accent Location	Accent Loss	Register Retained
Mono-phrasal φ ω ω	N2 (original location)	N1 only	N1
Bi-phrasal φ φ φ	N1 and N2 (original locations)	None	N1 and N2
Word-Phrase φ ω φ	N2 (original location)	N1 only	N1 and N2

4.1 Register Inheritance and Accent Loss – Overview and Analysis

As discussed in chapter 3, foot-foot, foot-word, word-foot, word-word, and mono-phrasal compounds retain only the register of N1 and permeate it through the whole compound, a phenomenon which I refer to here as “register inheritance.” This phenomenon occurs in Kagoshima Japanese and Kansai Japanese, which both exhibit register. Examples for Kagoshima Japanese are given below.

(144) Register inheritance in Kagoshima Japanese

a. HL-final N1, H-final N2 = HL-word compound

mizu 'water' + kusuri 'medicine' = mizu – gusuri 'liquid medicine'

b. H-final N1, HL-final N2 = H-word compound

yama 'mountain' + nobori 'climbing' = yama – nobori 'mountain climbing'

In (144a), the HL register of *mizu* is inherited by the entire compound, and the H register of *kusuri* is lost. In (144b), the reverse is true: the H register of *yama* is inherited by the entire compound, and the HL register of *nobori* is lost. Because the register is inherited by the entire compound, the low-toned plateau which precedes a final HL or H in a simplex word is observed in both N1 and N2 preceding the final HL or H. Said alternatively, N1's register surfaces on the N1+N2 complex (i.e., the compound), though the register surfaces superficially on N2, replacing whatever register N2 had in isolation.

In Kansai Japanese, register inheritance is observed in foot-foot, foot-word, word-foot, word-word, and mono-phrasal compounds, all shown in (145). Additionally, compounds of these types in Kansai Japanese lose the input accents of both members in the case of foot-foot, foot-word, word-foot and word-word compounds and of only N1 in the case of mono-phrasal compounds. I refer to this phenomenon as “accent loss.”

(145) Register inheritance and accent loss in Kansai Japanese

a. Foot-foot compound:

ω
f f

waru′ ‘bad person, thing’ + mo′no ‘person’ = waru – mono ‘villain’

shorthand: ^{L}waru’ + ^{H}mo’no = ^{L}waru-mono

b. Foot-word compound:

ω
f ω

kaze ‘a cold’ + kusu′ri ‘medicine’ = kaze – gu′suri ‘cold medicine’

shorthand: ^{H}kaze + ^{L}gusu’ri = ^{H}kaze-gu’suri

c. Word-foot compound:

ω
ω f

yotei ‘schedule’ + hi′ ‘day’ = yotei′ – bi ‘scheduled date’

shorthand: ^{L}yotei + ^{H}hi’ = ^{L}yotei’-bi

d. Word-word compound:

ω
ω ω

oto′me ‘maiden’ + ko′koro ‘heart’ = otome – go′koro ‘girl’s feelings’

shorthand: ^{L}oto’me + ^{H}ko’koro = ^{L}otome-go’koro

e. Mono-phrasal compound:

φ
ω ω

mura′saki ‘Murasaki (name)’ + sikibu′nikki[26] ‘court official’s diary’ = murasaki – sikibuni′kki ‘Diary of Lady Murasaki’[27]

shorthand: ^{L}mura’saki + ^{H}sikibu’nikki = [^{L}murasaki-sikibuni’kki]

As the examples in (145) show, the resulting compounds inherit the register tone of N1, and the register tone of N2 is lost. (145a, c-e) show L-word N1s and H-word N2s, and in each case, the L register of N1 is inherited by the compound, rendering the whole compound an L-word, while the H register of N2 is lost, which is most apparent in (145a) and (145e), where the high toned plateau of N2 has been replaced with a low toned plateau due to the inherited L register. (145b) shows an H-word N1 and an L-word N2, resulting in an H-word compound. In terms of accent loss, (145a) shows

[26] ^{H}sikibuni’kki is itself a compound consisting of ^{H}si'kibu ‘type of court official’ and ^{L}nikki ‘diary.’

[27] According to Nakai (2002), this is an uncommon pronunciation of this compound. In the typology used here, this would be a mono-phrasal compound. The more common pronunciation is murasaki – sikibuni′kki, an example of a word-phrase compound.

accent loss in both N1 and N2. (145b) and (145c) show accent loss in N2, and N1 would lose its accent if it were accented. (145d) shows accent loss in N1, and although it appears that N2 has retained its input accent, due to the predictable placement of compound accent on the first syllable of N2 in word-word compounds, this accent is in fact a newly placed compound accent, which causes the input accent of N2 to be lost. (145e) shows accent loss in N1 only, with the original accent of N2 retained in its original position; it additionally shows register inheritance of N1's L register to the entire compound. Accent loss also occurs in N1 in word-phrase compounds.

As Tokyo Japanese does not distinguish register, register inheritance does not occur in Tokyo Japanese. However, accent loss *does* occur in Tokyo Japanese, as shown below.

(146) Accent loss in Tokyo Japanese

a. Foot-foot compound:

ω
f f

$\underline{\text{i}}\overline{\text{e}}'$ 'house' + $\overline{\text{ha}}'\underline{\text{to}}$ 'pigeon' = $\underline{\text{i}}\overline{\text{e}} - \overline{\text{bato}}$

shorthand: ie' + ha'to = ie-bato

b. Foot-word compound:

ω
f ω

$\overline{\text{ku}}'\underline{\text{ro}}$ 'black' + $\underline{\text{hi}}\overline{\text{kari}}'$ 'light' = $\overline{\text{kuro}} - \overline{\text{bi}}'\underline{\text{kari}}$ 'black luster'

shorthand: ku'ro + hikari' = kuro-bi'kari

c. Word-foot compound:

ω
ω f

kata’kuri ‘dogtooth violet’ + ko’ powder = katakuri’ – ko ‘dogtooth violet starch’

shorthand: kata’kuri + ko’ = katakuri’-ko

d. Word-word compound:

ω
ω ω

a’isu ‘ice’ + koohi’i ‘coffee’ = aisu – ko’ohii ‘iced coffee’

shorthand: a’isu + koohi’i = aisu-ko’ohii

e. Mono-phrasal compound:

φ
ω ω

tiho’o ‘region’ + kensatu’tyoo[28] ‘prosecutor’s office’ = tihoo – kensatu’tyoo ‘local prosecutor’s office’

shorthand: [tihoo-kensatu’tyoo]

As shown in (146a-d), the input accents of both N1 and N2 are lost, making way for a new compound accent predictably placed on the last syllable of N1 or first syllable of

[28] N2 here is itself a compound consisting of *kensatu* ‘prosecution, examination’ and *tyo’o* ‘government office.’

N2. In (146e), only the accent of N1 is lost, with the accent of N2 retained in its original position.

In this and the following three sections, I present an analysis of compound accent, comparing the three dialects, in the framework of Optimality Theory (Prince and Smolensky 1993/2004).

As discussed above, Kagoshima Japanese and Kansai Japanese share the property of register inheritance. Words in Kagoshima Japanese are lexically specified with either HL or H which is aligned to the right edge of the word (Ito and Mester 2018b), and when words are compounded, only the specified tone(s) of N1 are retained (Kubozono 2012, 2016) and aligned to the right edge of the compound. Words in Kansai Japanese are similarly lexically specified with either an H or an L register tone which is associated with the first mora of the word (Pierrehumbert and Beckman 1988), and when words are compounded, only the register tone of N1 is preserved and applied to the whole compound (in all but biphrasal and word-phrase compounds). Accordingly, a parallel can be drawn between Kagoshima Japanese and Kansai Japanese in this respect, as noted by Kubozono (2012). I propose that this phenomenon in both dialects is due to the activity of a positional faithfulness constraint relativized to the phonological phrase that privileges the register tone of N1 over that of N2. This reflects the retention of register at the beginning of phonological phrases in non-compound contexts. As discussed by Pierrehumbert and Beckman (1988), Osaka Japanese (a Kansai Japanese dialect) appears to not have a phrase level equivalent to what has been called the minor/accentual phrase in Tokyo Japanese. Rather, words preserve their own prosodic characteristics, including register, more robustly than words do in Tokyo Japanese, where many words can be joined together in a single phrase. Pierrehumbert and Beckman conclude that this means that Osaka Japanese does not have an accentual phrase level at all, but I argue in the previous chapter that Kansai Japanese does show minimal phonological phrases (which are equivalent to accentual phrases). That words keep their characteristics more readily in utterances in Kansai Japanese suggests that words are generally initial in their own minimal phonological phrase, and this I propose holds for compounds as well.

Secondly, although irrelevant for Kagoshima Japanese, Tokyo Japanese and Kansai Japanese share the property of deleting accent from members of a compound if they have accent in isolation. Under the hypothesis that compound accent is in fact a new accent placed in the course of compound formation and not movement of N1/N2's original accent toward the juncture – which must be the case, since compounds with unaccented members also receive compound accent – I propose that the activity of a culminativity constraint prohibiting a compound from having more than one accent in the minimal phrase level is responsible for the loss of accent. This excludes biphrasal compounds with 5+ mora N2s from its effect, as the members of biphrasal compounds belong to their own minimal phrase levels.

4.1.1 Register Inheritance and Accent Loss in Kansai Japanese Word Compounds

To begin, let us consider the following examples.

(147) Register inheritance and accent loss

a. ^{L}*yotei* 'schedule' + ^{H}*hi'* 'day' = ^{L}*yotei'-bi* 'scheduled date'

b. ^{L}*oto'me* 'maiden' + ^{H}*ko'koro* 'heart' = ^{L}*otome-go'koro* 'girl's feelings'

c. ^{L}*kabu'to* 'helmet' + ^{H}*musi* 'insect' = ^{L}*kabuto'-musi* 'beetle'

d. ^{L}*kasai* 'fire' + ^{H}*hoken* 'insurance' = ^{L}*kasai-ho'ken* 'fire insurance'

As the examples in (147) show, the register of N1 is inherited by the whole compound. These examples also show that only one register tone, the one associated to N1, can survive in a compound. This is due, I propose, to MAX-TONE/PHRASEINITIAL.

(148) MAX-TONE/PHRASEINITIAL (MAX-T/PHRASEINIT): A phrase-initial tone is not deleted. Assign one violation for every phrase-initial tone in the input which is not present in the output

This constraint must be active at the phrase level because register retention is not observed at the word level – N2s in both word-word and monophrasal compounds lose their register. The general version of this constraint is also relevant, preventing tone loss in the default case if all other, higher-ranking constraints are satisfied.

(149) MAX-TONE: Do not delete a tone that was present in the input. Assign one violation for every tone in the input which is not present in the output.

The loss of the register tone of N2 occurs due to ONEREGISTERTONE/MINPHRASE.

(150) ONEREGISTERTONE/MINPHRASE (ONEREGT): A minimal phrase may have at most one register tone. Assign one violation for a minimal phrase which has more than one register tone.

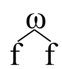
While it seems plausible that the accents in (147a) and (147c) have simply moved from the moras with which they were originally associated, it seems that what has actually happened is not simple movement of the original accent, but rather, placement of an entirely new accent to serve as the compound accent. That this must be the case is demonstrated by (147d) which has a compound accent on the first mora of *hoken*, despite the fact that neither N1 nor N2 have accents in isolation. Thus, I propose that compound accent is prioritized over the lexical accents of N1 and N2, and the action of CULMINATIVITY-MINPHRASE (in conjunction with the part of the grammar which places compound accent) results in the deletion of all accents except for the compound accent.

(151) CULMINATIVITY-MINPHRASE (CULMINATIVITY, CULM): A minimal phrase must not have more than one accent. Assign one violation for every minimal phrase which has more than one accent.

The tableaux below demonstrate the grammar of register inheritance and accent loss in action. For this part of the analysis, I assume that compound accent is placed in its proper location (by the grammar discussed in 4.2 and 4.3) and focus here only on register inheritance and accent loss. Accordingly, candidates lacking compound accent (such as ^{L}*yotei-bi*) or have compound accent in the wrong location (such as ^{L}*yote'i-bi*) are excluded from the tableaux below. In the case of foot-foot compounds, however, the unaccented candidate is included as these compounds become unaccented. Furthermore, only unaccented candidates are included for foot-foot compounds, for the same reason. Accents, marked with apostrophes ('), are counted as two tones for the purposes of counting violations of ONEREGISTERTONE/MINPHRASE and MAX-TONE, as they represent the accentual HL complex. Thus, the loss of a register tone and an accent count as three violations of MAX-TONE. Square brackets at the beginning of each candidate indicate a phrase boundary, required for MAX-T/PHRASEINIT to reference.

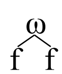
In each case, MAX-T/PHRASEINIT ensures that the phrase-initial register tone is retained in the output. The CULMINATIVITY constraint rules out any candidate which retains a lexical accent in addition to the compound accent and dominates MAX-TONE, as it is better to delete an accent than retain two accents in the compound. Finally, as the tableaux (152) through (158) show, ONEREGT must dominate MAX-TONE, as it is better to have only one register tone than retain both. The crucial generalization here, then, is that a minimal phrase can only have one accent and one register tone. The grammar proposed here accounts for this generalization.

(152) Foot-foot compound ^{L}*waru-mono* ‘villain’ with accented N1 and accented N2 in Kansai Japanese; compound is unaccented



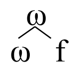
/^{L}waru’#^{H}mo’no/ わる waru もの mono	MAX-T/PHRASEINIT	CULMINATIVITY	ONEREGT	MAX-TONE
☞ a. [^{L}waru-mono				*****
b. [^{L}waru-^{H}mono			*! W	**** L
c. [waru-^{H}mono	*! W			*****
d. [waru-mono	*! W			****** W

(153) Foot-foot compound ^{H}*hako-niwa* ‘miniature garden’ with unaccented N1 and unaccented N2 in Kansai Japanese; compound is unaccented



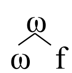
/^{H}hako#^{H}niwa/ はこ hako にわ niwa	MAX-T/PHRASEINIT	CULMINATIVITY	ONEREGT	MAX-TONE
☞ a. [^{H}hako-niwa				*
b. [^{H}hako-^{H}niwa			*! W	L
c. [hako-^{H}niwa	*! W			*
d. [hako-niwa	*! W			** W

(154) Word-foot compound ^{L}*yotei'-bi* with unaccented N1 and accented N2 in Kansai Japanese; compound accent on the last mora of N1



/^{L}yotei#^{H}hi'/ 予 yo 定 tei 日 bi	Max-T/PhraseInit	Culminativity	OneRegT	Max-Tone
a. [^{L}yotei'-^{H}bi			*! W	** L
b. [^{L}yotei'-^{H}bi'		*! W	*! W	L
☞ c. [^{L}yotei'-bi				***
d. [^{L}yotei'-bi'		*! W		* L
e. [yotei'-^{H}bi	*! W			***
f. [yotei'-^{H}bi'	*! W	*! W		* L
g. [yotei'-bi	*! W			**** W
h. [yotei'-bi'	*! W	*! W		** L

(155) Word-foot compound ^{L}*kabuto'-musi* with accented N1 and unaccented N2 in Kansai Japanese; compound accent on last mora of N1



/^{L}kabu'to#^{H}musi/ カブ kabu ト to ムシ musi	Max-T/PhraseInit	Culminativity	OneRegT	Max-Tone
a. [^{L}kabuto'-^{H}musi			*! W	** L
b. [^{L}kabu'to'-^{H}musi		*! W	*! W	L
☞ c. [^{L}kabuto'-musi				***
d. [^{L}kabu'to'-musi		*! W		* L
e. [kabuto'-^{H}musi	*! W			***
f. [kabu'to'-^{H}musi	*! W	*! W		* L
g. [kabuto'-musi	*! W			**** W
h. [kabu'to'-musi	*! W	*! W		** L

(156) Foot-word compound ^{H}*yama-no'bori* 'mountain climbing' with accented N1 and unaccented N2 in Kansai Japanese; compound accent on first mora of N2

ω
f ω

/^{H}ya'ma#^{H}nobori/ やま yama のぼ nobo り ri	MAX-T/PHRASEINIT	CULM	ONEREGT	MAX-TONE
a. [^{H}ya'ma-^{H}nobori			*! W	L
b. [^{H}ya'ma-^{H}no'bori		*! W	*! W	L
☞ c. [^{H}yama-no'bori				***
d. [^{H}ya'ma-no'bori		*! W		* L
e. [yama-^{H}no'bori	*! W			***
f. [ya'ma-^{H}no'bori	*! W	*! W		* L
g. [yama-no'bori	*! W			***
h. [ya'ma-no'bori	*! W	*! W		** L

(157) Word-word compound ^{L}*otome-go'koro* with accented N1 and N2 in Kansai Japanese; compound accent on first mora of N2

ω
ω ω

/^{L}oto'me#^{H}ko'koro/ おと oto め me ごこ goko ろ ro	MAX-T/PHRASEINIT	CULM	ONEREGT	MAX-TONE
a. [^{L}otome-^{H}go'koro			*! W	** L
b. [^{L}oto'me-^{H}go'koro		*! W	*! W	L
☞ c. [^{L}otome-go'koro				***
d. [^{L}oto'me-go'koro		*! W		* L
e. [otome-^{H}go'koro	*! W			***
f. [oto'me-^{H}go'koro	*! W	*! W		* L
g. [otome-go'koro	*! W			**** W
h. [oto'me-go'koro	*! W	*! W		** L

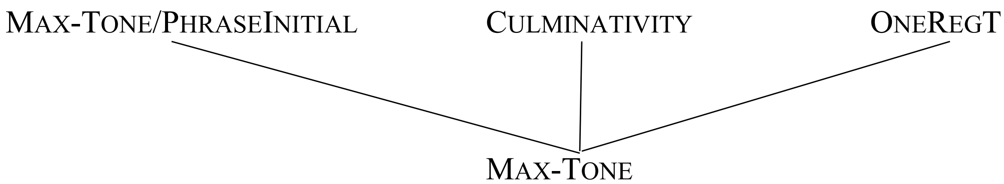
(158) Word-word compound ^{L}*kasai-ho'ken* with unaccented N1 and N2 in Kansai Japanese; compound accent on first mora of N2

ω
ω ω

/^{L}kasai#^{H}hoken/ 火 ka 災 sai 保 ho 険 ken	MAX-T/PHRASEINIT	CULM	ONEREGT	MAX-TONE
a. [^{L}kasai-^{H}ho'ken			*! W	L
☞ b. [^{L}kasai-ho'ken				*
c. [kasai-^{H}ho'ken	*! W			*
d. [kasai-ho'ken	*! W			** W

The constraint hierarchy of this part of the grammar is given in the Hasse diagram below.

(159) Hasse Diagram of Constraints for Register Inheritance and Accent Loss



The case of accent loss in Tokyo Japanese operates similarly, though without the register distinction, with the grammar of compound accent placement ensuring that compound accent is placed appropriately and CULMINATIVITY ensuring that all other accents besides the compound accent are deleted.

4.1.2 Register Inheritance and Accent Loss in Kansai Japanese Mono-Phrasal Compounds

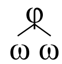
Like word compounds, mono-phrasal compounds are subject to register inheritance, such that the whole compound inherits the register of N1. I propose that this fact of mono-phrasal compounds results from the same register inheritance grammar proposed for word compounds. Mono-phrasal compounds are also subject to accent loss in N1 whenever N1 is originally accented. I propose to adapt the constraint H-TO-HEADWORD (Ito and Mester 2018a) to account for the loss of accent in N1. This constraint is defined below, with "head word" here intended in the phonological sense.

(160) H-TO-HEADWORD (HTOHDWD): An H tone (if present) is linked to the head word. Assign one violation for an H tone which is not linked to the head word.

It must be ranked below MAX-T/PHRASEINIT in order to ensure that a compound-initial register H tone is retained despite not being linked to the head word. While CULMINATIVITY may play a role in monophrasal compounds, a problem arises when N1 is accented and N2 is unaccented. In this case, CULMINATIVITY is unable to remove the accent on N1, as it is the only accent within the word. I propose, therefore, that the reason N1 loses its accent in monophrasal compounds is HTOHDWD rather than CULMINATIVITY.

I demonstrate this grammar in the tableau in (161) below, with CULMINATIVITY not shown. Square brackets are used to indicate phrase boundaries in the output candidates. Apostrophes, being the accentual complexes, are again counted as two tones.

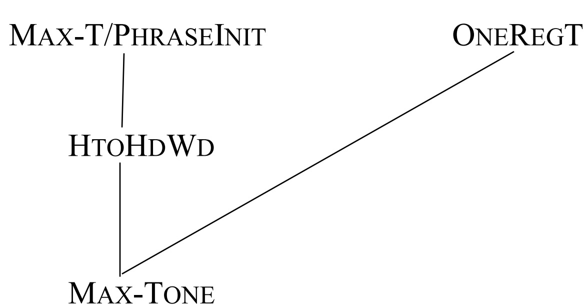
(161) Register inheritance and H-to-Head Word in monophrasal compounds



/^{H}na'iron#^{L}suto'kkingu/ ナイ nai ロン ron ス su トッ tok キン kin グ gu	Max-T/PhraseInit	OneRegT/MinPhrase	HtoHdWd	Max-Tone
☞ a. [^{H}nairon-suto'kkingu]			*	***
b. [^{H}nai'ron-suto'kkingu]			**! W	* L
c. [^{H}nairon-^{L}suto'kkingu]		*! W	*	** L
d. [^{H}na'iron-^{L}suto'kkingu]		*! W	**! W	L
e. [nairon-^{L}suto'kkingu]	*! W		L	***
f. [na'iron-^{L}suto'kkingu]	*! W		*! W	* L
g. [nairon-suto'kkingu]	*! W		L	**** W
h. [na'iron-suto'kkingu]	*! W		*! W	** L

The grammar demonstrated here is shown in the Hasse diagram below.

(162) Hasse diagram for register inheritance in monophrasal compounds



Crucially, note that HTOHDWD is insufficient on its own without CULMINATIVITY to correctly rule out incorrect double-accented word compound forms such as *^{L}*kabu'to'-musi* 'beetle' in which N1 retains both its lexical accent and bears the new compound accent. HTOHDWD will remain unviolated, as both H tones are linked to the head word *kabuto*, as shown in the tableau below. The sad face marks the attested candidate, and the pointing finger marks the selected candidate.

(163) HTOHDWD cannot account for word-foot compounds

/^{L}kabu'to#^{H}musi/ カブ kabu ト to ムシ musi	MAX-T/PHRASEINIT	ONEREGT	HTOHDWD	MAX-TONE
a. [^{L}kabuto'-^{H}musi		*! W	* W	** L
b. [^{L}kabu'to'-^{H}musi		* W	* W	L
☹ c. [^{L}kabuto'-musi				***
☞ d. [^{L}kabu'to'-musi				* L
e. [kabuto'-^{H}musi	*! W		* W	***
f. [kabu'to'-^{H}musi	*! W		* W	* L
g. [kabuto'-musi	*! W			**** W
h. [kabu'to'-musi	*! W			** L

The tableau shows that without CULMINATIVITY, the candidate in (163d), which has both its input accent and the new compound accent, is selected as the optimal candidate. This candidate incurs fewer violations of MAX-TONE than the attested candidate as it retains its input accent. With CULMINATIVITY, (163d) is correctly eliminated due to having two accents, and (163c) is selected as the correct optimal candidate.

Thus, I propose that both HTOHDWD and CULMINATIVITY are active in the grammar, with their effects being observed in different parts – CULMINATIVITY in word compounds and HTOHDWD in monophrasal compounds.

4.1.3 Register Inheritance in Kagoshima Japanese

The lexically specified tones of words in Kagoshima Japanese are inherited by the whole compound in the compounding process, equivalent to the inheritance of register in Kansai Japanese. I speculate here that this too is due to a positional faithfulness constraint similar to MAX-T/PHRASEINIT discussed in the previous section, although it is not immediately clear exactly what position this proposed constraint targets within the phrase-initial word, as the HL/H of Kagoshima Japanese words is mobile and is aligned with the right edge of a phrase (Kubozono 2012, Ito and Mester 2018b). For the time being, for illustrative purposes, I will call this constraint MAX-T/PHRASEINIT-K (K for "Kagoshima") and propose that the constraint ranking is the same as Kansai Japanese. This constraint is violated whenever one or more of the register tones of N1 are deleted. Also active is a Kagoshima version of ONEREGT, ONEREGT-K. In Kagoshima Japanese, because one register involves a tonal complex, HL, this constraint is only violated when the registers of both N1 and N2 are retained.

Two demonstrations of the inheritance grammar of Kagoshima Japanese are given in the tableaux below. In order to distinguish the words to which the tonal melodies originally belonged, the tonal melodies are superscripted following the member with which it is associated. This representation is agnostic to when in the calculation of compound prosody the tones are aligned to the right edge.

(164) HL-final N1, H-final N2 in Kagoshima Japanese

/natu^{HL}#yasumi^{H}/	MAX-T/PHRASEINIT-K	ONEREGT-K	MAX-TONE
☞ a. [natu^{HL}-yasumi			*
b. [natu^{HL}-yasumi^{H}		*! W	L
c. [natu^{H}-yasumi^{H}	*! W	*! W	*
d. [natu-yasumi^{H}	*!* W		** W
e. [natu^{L}-yasumi	*! W		** W
f. [natu^{L}-yasumi^{H}	*! W	*! W	*
g. [natu-yasumi	*!* W		*** W

(165) H-final N1, HL-final N2 in Kagoshima Japanese

/yama^{H}#nobori^{HL}/	MAX-T/PHRASEINIT-K	ONEREGT-K	MAX-TONE
☞ a. [yama^{H}-nobori			**
b. [yama^{H}-nobori^{HL}		*! W	L
c. [yama^{H}-nobori^{H}		*! W	* L
d. [yama-nobori^{HL}	*! W		* L
e. [yama^{H}-nobori^{L}		*! W	* L
f. [yama-nobori^{L}	*! W		**
g. [yama-nobori	*! W		*** W

As the tableaux above show, candidates which delete any number of tones from N1 are ruled out by high-ranked MAX-T/PHRASEINIT-K. The only option available with respect to N1's tones is to keep them. The only candidates which survive are (164a) and (165a), the candidates which violate neither MAX-T/PHRASEINIT-K nor ONEREGT-K. The constraint ranking of the inheritance grammar is thus identical to that of Kansai

Japanese (see the Hasse diagram in (159)), except without CULMINATIVITY, as this constraint is irrelevant in Kagoshima Japanese.

4.2 Word Compounds and the Necessity of Junctural Alignment

In this section, I discuss accent placement in word compounds. I use the term "word compound" to refer to compounds which project a maximal word level, the foot-foot, foot-word, word-foot and word-word compounds, following Ito and Mester (2018a, 2021). I first discuss my proposed analysis for accent placement, followed by a discussion of why the analysis must refer to the juncture in order to derive the correct accent location. This is in contrast to the proposal by Ito and Mester (2021) which argues for derivation of the compound accent location by the competition of NONFINALITY(FT') and RIGHTMOST, without reference to any notion of juncture. I argue here that it is necessary for Kansai Japanese. Because accent is not relevant for Kagoshima Japanese, this dialect is not discussed in the sections on accent placement.

4.2.1 Foot-Foot Compounds

Compounds with bimoraic N1s and N2s do not receive an accent at all, although compounds with a a word as N1 and a foot as N2, i.e., word-foot compounds, treated in the next subsection, usually have compound accent on the last mora of N1. As discussed in Chapter 3, foot-foot compounds, such as ^{L}*waru-mono* 悪者 'villain' are indistinguishable in terms of their prosodic structure from simplex words with two feet, such as ^{H}*amerika* 'America.' As discussed by Ito and Mester (2016, 2021) for Tokyo Japanese and Tanaka (2018) for Kansai Japanese, most four mora words are unaccented and result from a grammar which prefers unaccentedness in four mora words because such a result violates only a constraint requiring accent and not higher ranked constraints on where accent should go. I propose a version of Ito and Mester's analysis here.

The crucial point of my analysis is the interaction of a constraint requiring that the accented foot not be final in the word, NONFINALITY(FOOT') (NONFIN(FT')), a constraint requiring that the accent fall as far to the right as possible ALIGN-RIGHT/HIGH (ALIGN-RH), and a constraint requiring that a word have accent, WORDACCENT. These constraints are defined below.

(166) NONFINALITY(FOOT') (NONFIN(FT')): The accented foot must not be final in the word. Assign one violation for a final foot bearing accent.

(167) ALIGN-RIGHT/HIGH (ALIGN-RH): The right edge of an H tone must be aligned with the right edge of a word. Assign one violation for every mora intervening between the right edge of an H tone and the end of the word.

(168) WORDACCENT (WORDACC): A word must have accent. Assign one violation for every word which does not have accent.

This grammar can first be applied to the simplex four mora word ^{H}*amerika* 'America' to demonstrate how it works for non-compounds. NONFIN(FT') will be ranked above ALIGN-RH in following discussion, so it is displayed with this ranking in the following tableaux.

(169) Unaccentedness in a simplex word ^{H}*amerika* 'America'

/^{H}amerika/ アメameリカrika	NONFIN(FT')	ALIGN-RH	WORDACC
☞ a. ^{H}(ame)(rika) (unaccented)			*
b. ^{H}(a'me)(rika)		*!** W	L
c. ^{H}(ame')(rika)		*!* W	L
d. ^{H}(ame)(ri'ka)	*! W	* W	L
e. ^{H}(ame)(rika')	*! W		L

As the tableau shows, candidates (169d) and (169e) are eliminated due to violating NONFIN(FT'), which disallows an accented final foot. Candidates (169b-d) all violate ALIGN-RH. The only accented candidate that does not violate ALIGN-RH is the candidate (169e), which has a final accent. However, this candidate has already been eliminated by NONFIN(FT'). Both of these constraints dominate WORDACC, as violating these constraints is worse than not having an accent. In the end, candidate (169a) is selected as, although it does not have an accent, it does not violate the higher ranked constraints. It does not violate NONFIN(FT') because it does not have an accented foot in the first place, and it does not violate ALIGN-RH because it does not have an accent in the first place.

The same result is observed in foot-foot compounds, like ^{L}*waru-mono* ‘villain.’

(170) Unaccentedness in foot-foot compound ^{L}*waru-mono* ‘villain’

/^{L}waru’#^{H}mo’no/ わるwaruものmono	NONFIN(FT’)	ALIGN-RH	WORDACC
☞ a. ^{L}(waru)-(mono) (unaccented)			*
b. ^{L}(wa’ru)-(mono)		*!** W	L
c. ^{L}(waru’)-(mono)		*!* W	L
d. ^{L}(waru)-(mo’no)	*! W	* W	L
e. ^{L}(waru)-(mono’)	*! W		L

Once again, the unaccented candidate is selected as the winner, as the candidates in (170d-e) have an accented final foot, and the candidates in (170b-d) have an accented which is not aligned to the right edge of the compound. Candidate (170e) again performs perfectly on ALIGN-RH, but it has already been eliminated by NONFIN(FT’), and thus the unaccented candidate emerges as a winner, despite violating WORDACC.

WORDACC is not included in the discussion of the following compounds, as they receive compound accent.

4.2.1 Word-Foot Compounds

Compounds with trimoraic and monomoraic N1s and monomoraic and bimoraic N2s most commonly place compound accent on the last mora of N1, as in ^{H}*nyuugaku’-bi* 入学日 ‘matriculation day’ (monomoraic N2) and ^{L}*kabuto’-musi* カブトムシ‘beetle (lit. helmet bug)' (bimoraic N2). As discussed in 4.1, word-foot compounds undergo register inheritance.

The pattern of these compounds is consistent with the word-foot structure from Ito and Mester (2018a, 2021), as N2 cannot serve as the phonological head of the compound. Thus, N1 is the only constituent eligible to be the head of the compound and receives the accent. Kansai Japanese is thus exactly like Tokyo Japanese in terms of compound accent placement on N1 when N2 is monomoraic or bimoraic. This behavior comes from an interaction of NONFIN(FT'), WORDMAXACCENT, and ALIGN-RH. WORDMAXACCENT (WORDMAXACC) requires that compounds having a maximal, non-minimal word have an accent and is responsible for placing compound accent, which will either add an accent if neither input component had an isolation accent or replace any original accents that an input component had.

(171) WORDMAXACCENT (WMA): A maximal word [+maximal, -minimal] must have accent. Assign one violation for a maximal word lacking accent.

As discussed for foot-foot compounds above, NONFIN(FT') will prevent the last foot in the word from receiving accent, while ALIGN-RH, which is demonstrated here to be ranked below NONFIN(FT'), prefers candidates with an accent placed as far to the right as possible.

(172) Compound accent on last mora of N1 ^{H}koogaku'-bu

/^{H}koogaku#^{H}bu/ 工koo学gaku部bu	NONFIN(FT')	WORDMAXACC	ALIGN-RH
☞ a. ^{H}(koo)(gaku')+(bu)			*
b. ^{H}(koo)(gaku)+(bu')	*! W		L
c. ^{H}(koo)(ga'ku)+(bu)			**! W
d. ^{H}(koo)(gaku)+(bu) (unaccented)		*! W	L

(173) Compound accent on last mora of N1 ^{L}kabuto'-musi

/^{L}kabu'to#^{H}musi/ カブkabuトtoムシmusi	NONFIN(FT')	WORDMAXACC	ALIGN-RH
☞ a. ^{L}(kabu)(to')+(musi)			**
b. ^{L}(kabu)(to)+(mu'si)	*! W		* L
c. ^{L}(kabu')(to)+(musi)			***! W
d. ^{L}(kabu)(to)+(musi) (unaccented)		*! W	L

As the tableaux above demonstrate, the position of accent in word-foot compounds is derived from the interaction of the constraints NONFIN(FT'), and WORDMAXACC with ALIGN-RH. The (b) candidates are ruled out due to NONFIN(FT'), which requires that the head foot (i.e., the foot in which accent is placed) is non-final in the word. The unaccented (d) candidates are ruled out by WORDMAXACC, which requires that a maximal word (which is non-minimal) have accent. The (a) candidates have accent in the final foot of the component (crucially, not the entire compound, thus not violating NONFIN(FT')). ALIGN-RH decides between the (a) and (c) candidates by selecting the candidate which has the rightmost accent.

Although Kansai Japanese resembles Tokyo Japanese in placing compound accent on N1 in word-foot compounds, where Kansai Japanese differs from Tokyo Japanese is in the fact that Tokyo Japanese only allows the accentual H to fall on the head mora of a syllable, while Kansai Japanese allows the accentual H to fall on either the head mora or non-head mora of a syllable. It should be noted that this characteristic of Kansai Japanese is not limited to compounds but is rather a general characteristic for words. Observe the difference between the dialects in the simplex word *indo* 'India.'

(174) Differences in accent-bearing units in Tokyo and Kansai Japanese (Kubozono 2012)

a. Tokyo Japanese: i'ndo
b. Kansai Japanese: in'do

In Tokyo Japanese (174a), the accent falls on the head mora of the syllable *in*, which is *i*. However, in Kansai Japanese (174b), the accent falls on the non-head mora of the syllable, *n*. Tokyo Japanese and Kansai Japanese thus differ on what serves as the accent-bearing unit. The accent-bearing unit of Tokyo Japanese is the syllable, and accent must fall on the head (first) mora of a syllable, while the accent-bearing unit of Kansai Japanese is the mora, and accent may fall on either mora in a heavy syllable (see Kubozono 2012).

For compounds with monomoraic or bimoraic N2s in Kansai Japanese, this means that accent will fall on the non-head mora of the final syllable of N1 if it is heavy. These differences are shown in (175). In Tokyo Japanese, the accent falls on the head mora of the last foot, not immediately aligned with the juncture between components.

However, in Kansai Japanese, the accent falls on the non-head mora of a heavy syllable, resulting in alignment to the juncture.

(175) a. Tokyo Japanese: yote'i-bi 'scheduled date', unte'n-seki 'driver's seat'

b. Kansai Japanese: ^{L}yotei'-bi, ^{H}unten'-seki

Because this difference concerns whether the H of an accent can fall on a non-head mora or not, the constraint rankings of Tokyo Japanese and Kansai Japanese differ with respect to the ranking of HIGH-TO-SYLLABLEHEAD, which requires that an H tone must fall on the head mora of a syllable.

(176) HIGH-TO-SYLLABLEHEAD (HTOSHD): H is linked to the head (first) mora of a syllable. Assign one violation for every H linked to a non-head (non-initial mora of a syllable).

While this constraint is undominated in Tokyo Japanese, it is ranked below ALIGN-JUNCTURE/HIGH, the constraint that I propose is responsible for enforcing junctural alignment of compound accent, in Kansai Japanese, as the opposite ranking or ranking the two constraints in the same stratum would lead to an incorrect result. It is somewhat awkward to have the disjunctive "left or right edge" requirement here; it may work to split the constraint into two constraints, such as ALIGN-JUNCTURELEFT-HIGH and

ALIGN-JUNCTURERIGHT-HIGH, and will be explored in future work, but the disjunctive constraint is used here to simplify the analysis.

(177) ALIGN-JUNCTURE/HIGH (ALIGN-JH): Either the left or right edge of an H tone must be aligned with the juncture. Assign one violation for an H tone which is not aligned to a juncture.

These rankings are demonstrated in (178) for Kansai Japanese and (179) for Tokyo Japanese.

(178) Kansai Japanese; Align-JH >> HtoSHd

/^{L}yotei#^{H}hi'/ 予 yo 定 tei 日 bi	ALIGN-JH	NONFIN(FT')	WORDMAXACC	ALIGN-RH	HTOSHD
☞ a. (^{L}yo)(tei')-(bi)				*	*
b. (^{L}yo)(tei)-(bi')		*! W		L	L
c. (^{L}yo)(te'i)-(bi)	*! W			** W	L
d. (^{L}yo)(tei)-(bi) (unaccented)			*! W	L	L
/^{H}unten#^{H}seki/ 運 un 転 ten 席 seki					
☞ e. (^{H}un)(ten')-(seki)				**	*
f. (^{H}un)(ten)-(se'ki)		*! W		* L	L
g. (^{H}un)(te'n)-(seki)	*! W			*** W	L
h. (^{H}un)(ten)-(seki) (unaccented)			*! W	L	L

Compound accent is once again placed on the head of the compound, N1, in the winning candidate, as the other candidates are ruled out by ALIGN-JH, NONFIN(FT'), and WORDMAXACC. As a result of this ranking, the placement of the accentual H aligned with the juncture is preferred to placement of the accentual H on the head mora of its syllable.

The placement of accent on N1 in Tokyo Japanese falls out for the same reasons as in Kansai Japanese. However, as (179c, g), the winners in Tokyo Japanese, demonstrate, compound accent must be placed on the head mora of the syllables *tei* and *ten*. This is due to the HTOSHD's ranking above ALIGN-JH, the ranking opposite that of Kansai Japanese. The ranking of ALIGN-JH above ALIGN-RH in Kansai Japanese will be shown in the analysis of word-word compounds in the next subsection.

(179) Tokyo Japanese; HtoSHd >> Align-JH

/yotei#hi'/ 予 yo 定 tei 日 bi	HTOSHD	NONFIN(FT')	WORDMAXACC	ALIGN-JH	ALIGN-RH
a. (yo)(tei')-(bi)	*! W			L	* L
b. (yo)(tei)-(bi')		*! W		L	L
☞ c. (yo)(te'i)-(bi)				*	**
d. (yo)(tei)-(bi) (unaccented)			*! W	L	L
/unten#seki/ 運 un 転 ten 席 seki					
e. (un)(ten')-(seki)	*! W			L	** L
f. (un)(ten)-(se'ki)		*! W		L	* L
☞ g. (un)(te'n)-(seki)				*	***
h. (un)(ten)-(seki) (unaccented)			*! W	L	L

4.2.2 Foot-Word and Word-Word Compounds

Compound accent in compounds with trimoraic and quadrimoraic N2s falls on the first mora of N2, regardless of whether N1 is a foot (one to two moras) as in a foot-word compound or a word (three to four moras) as in a word-word compound. This is identical to the pattern of accentuation found in Tokyo Japanese, and accordingly, the prosodic structure of compounds involving 3-4 mora N2s is the foot-word or word-word compound structure. Analyses for the compounds in (180) are presented in (181) through (184) below for Kansai Japanese.

(180) a. Tokyo Japanese: yama-za'kura 'mountain cherry', kasai-ho'ken 'fire insurance', minami-a'merika 'South America', siritu-da'igaku 'private university'

b. Kansai Japanese: ^{H}yama-za'kura, ^{L}kasai-ho'ken, ^{H}minami-a'merika, ^{L}siritu-da'igaku

As the tableaux below show, the placement of accent in word-word compounds falls out from the same constraint hierarchy which correctly places accent in word-foot compounds. Importantly, each contest also shows that it is the ranking of ALIGN-JH over ALIGN-RH that ensures that the accent does not align so far to the right that it no longer aligns with the juncture. Furthermore, it is the action of ALIGN-RH that prevents the accent from aligning to the left side of the juncture on N1, as seen in the contests between the (a) candidates and the (e) candidates. While the (e) candidates satisfy ALIGN-JH, these candidates with compound accent on the last mora of N1 violate ALIGN-RH one more time than the winner of each contest does, with compound accent on the first mora of N2.

(181)

/^{H}ya’ma#^{H}sakura / やまyamaざくsakuらra	ALIGN-JH	NONFIN(FT’)	WORDMAXACC	ALIGN-RH	HTOSHD
☞ a. ^{H}(yama)-(za’ku)(ra)				**	
b. ^{H}(yama)-(zaku’)(ra)	*! W			* L	
c. ^{H}(yama)-(zaku)(ra’)	*! W	*! W		L	
d. ^{H}(yama)-(zaku)(ra) (unaccented)			*! W	L	
e. ^{H}(yama’)-(zaku)(ra)				***! W	
f. ^{H}(ya’ma)-(zaku)(ra)	*! W			**** W	

(182)

/^{L}kasai#^{H}hoken/ 火ka災sai保ho険ken	ALIGN-JH	NONFIN(FT’)	WORDMAXACC	ALIGN-RH	HTOSHD
☞ a. ^{L}(ka)(sai)-(ho)(’ken)				**	
b. ^{L}(ka)(sai)-(ho)(ke’n)	*! W	*! W		* L	
c. ^{L}(ka)(sai)-(ho)(ken’)	*! W	*! W		L	* W
d. ^{L}(ka)(sai)-(ho)(ken) (unaccented)			*! W	L	
e. ^{L}(ka)(sai’)-(ho)(ken)				***! W	*! W
f. ^{L}(ka)(sa’i)-(ho)(ken)	*! W			**** W	

(183)

/^{H}mi'nami#^{H}amerika/ みなminaみmi アメameリカrika	ALIGN-JH	NONFIN(FT')	WORDMAXACC	ALIGN-RH	HTOSHD
☞ a. ^{H}(mina)(mi)-(a'me)(rika)				***	
b. ^{H}(mina)(mi)-(ame')(rika)	*! W			** L	
c. ^{H}(mina)(mi)-(ame)(ri'ka)	*! W	*! W		* L	
d. ^{H}(mina)(mi)-(ame)(rika')	*! W	*! W		L	
e. ^{H}(mina)(mi')-(ame)(rika)				****! W	
f. ^{H}(mina)(mi)-(ame)(rika) (unaccented)			*! W	L	
g. ^{H}(mina')(mi)-(ame)(rika)	*! W			***** W	

(184)

/^{L}siritu#^{H}daigaku / 私si立ritu大dai学gaku	ALIGN-JH	NONFIN(FT')	WORDMAXACC	ALIGN-RH	HTOSHD
☞ a. ^{L}(si)(ritu)-(da'i)(gaku)				***	
b. ^{L}(si)(ritu)-(dai')(gaku)	*! W			** L	* W
d. ^{L}(si)(ritu)-(dai)(ga'ku)	*! W	*! W		* L	
e. ^{L}(si)(ritu)-(dai)(gaku')	*! W	*! W		L	
f. ^{L}(si)(ritu)-(dai)(gaku) (unaccented)			*! W	L	
f. ^{L}(si)(ritu')-(dai)(gaku)				****! W	
g. ^{L}(si)(ri'tu)-(dai)(gaku)	*! W			***** W	

The interplay between ALIGN-JH, ALIGN-RH, and, as demonstrated in the previous subsection, NONFIN(FT') is an important one, as it is this interaction which results in the effect that compound accent is placed on the head word, which is N1 in word-foot compounds and N2 in word-word compounds. The ranking of NONFIN(FT') over ALIGN-RH in word-foot compounds causes N2 to be unable to bear accent, as doing so would place accent on the final foot, as discussed above. In word-foot compounds, ALIGN-JH and ALIGN-RH place compound accent on the final mora of N1. Meanwhile, as explained above, the ranking of ALIGN-JH over ALIGN-RH along with ALIGN-RH's solo effects lead to the placement of compound accent on the first mora of N2 rather than on the last mora of N1 in word-word compounds.

The grammar of Tokyo Japanese differs slightly in that the ranking of ALIGN-JH and HTOSHD is reversed. However, essentially the same core grammar as in Kansai Japanese is responsible for the selection of winning candidates. ALIGN-JH will ensure that accent is aligned to the juncture, and ALIGN-RH will ensure that accent will not stray too far to the left onto N1. NONFIN(FT') ensures that a candidate with final foot accent is eliminated, and WORDMAXACC ensures that the winner has compound accent. This is demonstrated in the tableaux in (185) to (188) below.

(185)

/yama'#sakura/ やまyamaざくzakuらra	HTOSHD	NONFIN (FT')	WMA	ALIGN-JH	ALIGN-RH
☞ a. ^{H}(yama)-(za'ku)(ra)					**
b. ^{H}(yama)-(zaku')(ra)				*! W	* L
c. ^{H}(yama)-(zaku)(ra')		*! W		* W	L
d. ^{H}(yama)-(zaku)(ra) (unaccented)			*! W		L
e. ^{H}(yama')-(zaku)(ra)					***! W
f. ^{H}(ya'ma)-(zaku)(ra)				*! W	**** W

(186)

/kasai#hoken/ 火ka災sai保ho険ken	HtoSHd	NonFin(Ft’)	WordMaxAcc	Align-JH	Align-RH
☞ a. (ka)(sai)-(ho’)(ken)					**
b. (ka)(sai)-(ho)(ke’n)		*! W		* W	* L
c. (ka)(sai)-(ho)(ken’)	*! W	*! W		* W	L
d. (ka)(sai)-(ho)(ken) (unaccented)			*! W		L
e. (ka)(sai’)-(ho)(ken)	*! W				*** W
f. (ka)(sa’i)-(ho)(ken)				*! W	**** W

(187)

/minami#amerika/ みなminaみmi アメameリカrika	HtoSHd	NonFin(Ft’)	WordMaxAcc	Align-JH	Align-RH
☞ a. (mina)(mi)-(a’me)(rika)					***
b. (mina)(mi)-(ame’)(rika)				*! W	** L
c. (mina)(mi)-(ame)(ri’ka)		*! W		* W	* L
d. (mina)(mi)-(ame)(rika’)		*! W		* W	L
e. (mina)(mi)-(ame)(rika) (unaccented)			*! W		L
f. (mina)(mi’)-(ame)(rika)					****! W
g. (mina’)(mi)-(ame)(rika)				*! W	***** W

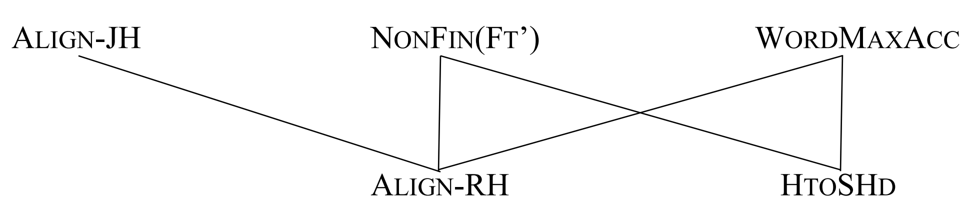
(188)

/siritu#daigaku / 私si立ritu大dai学gaku	HtoSHd	NonFin(Ft')	WordMaxAcc	Align-JH	Align-RH
☞ a. (si)(ritu)-(da'i)(gaku)					***
b. (si)(ritu)-(dai')(gaku)	*! W			* W	** L
d. (si)(ritu)-(dai)(ga'ku)		*! W		* W	* L
e. (si)(ritu)-(dai)(gaku')		*! W		* W	L
f. (si)(ritu)-(dai)(gaku) (unaccented)			*! W		L
f. (si)(ritu')-(dai)(gaku)					****! W
g. (si)(ri'tu)-(dai)(gaku)				*! W	***** W

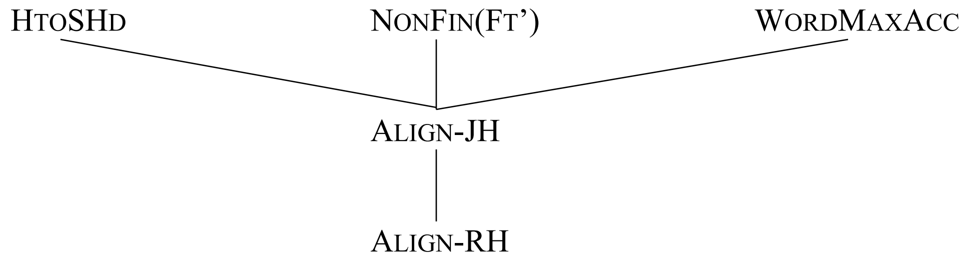
Thus, the tableaux in (181) through (188) above show that an analysis using Align-JH accounts for the facts of accent placement in word compounds in both Kansai Japanese and Tokyo Japanese. The analysis proposed here returns to a Kubozono (1995)-like analysis using juncture (though differs from it in execution) and departs from the juncture-less analyses of Ito and Mester (2018a, 2019, 2021), discussed in the next subsection.

The following Hasse diagrams summarize the grammars proposed above for Kansai and Tokyo Japanese.

(189) Hasse diagram for Kansai Japanese



(190) HASSE DIAGRAM FOR TOKYO JAPANESE



4.2.3 Why Is Reference to the Juncture Necessary?

Ito and Mester (2018a, 2019, 2021) propose that the location of accent in word-word compounds can be derived without reference to a constraint which requires that accent be aligned with the juncture. In these analyses, the location of compound accent is proposed to be attributed to the interaction of NONFIN(FT'), WORDMAXACC, and RIGHTMOST, as shown in (191) below. INITFT ensures that all components in the compound begin with a foot.

(191) Ito and Mester (2021) analysis of minami-a'merika in Tokyo Japanese

/minami#amerika/ みなminaみmi アメameリカrika	INITFT	NONFIN(FT')	WORDMAXACC	RIGHTMOST	WDACC
☞ a. (mina)mi-(a'me)(rika)				*! W	*
b. (mina)mi-(ame)(rika) (unaccented)			*! W		*** W
c. (mina)mi-(ame)(ri'ka)		*! W			*
d. (mina)mi-a(me'ri)ka	*! W				*

As the tableau shows, all feet with accent have accent on the first mora of the foot, in compliance with the constraint H-TO-FOOTHEAD (see Ito and Mester 2016, 2018a for discussion). Such a constraint allows for the selection of (mina)mi-(a'me)(rika) over *(mina)mi-(ame')(rika) (a candidate not included above). H-TO-FOOTHEAD and the previously discussed HTOSHD would ensure that if accent falls on a final heavy syllable in N1 in word-foot compounds, the accent will always be placed on the head of that foot/syllable, e.g., *yote'i-bi* but **yotei'-bi*.

However, as discussed above, in Kansai Japanese, compound accent does in fact fall on the non-head mora of a final heavy syllable in N1, yielding ^{L}*yotei'-bi* rather than **yote'i-bi*. This suggests that HTOSHD (and H-TO-FOOTHEAD, which is not adopted in the present analysis) is violable in Kansai Japanese and thus ranked relatively low. This is problematic, however, because the relatively low ranking of HTOSHD will cause the incorrect candidate to be selected in word-word compounds. This is demonstrated in the tableau in (192) below, featuring a word-word compound with an N2 beginning with a heavy syllable, with a juncture-less analysis using the constraints from my analysis proposed above. A sad face is used to indicate the attested candidate, while the pointing hand indicates the candidate chosen by this grammar.

(192) Incorrect winning candidate for Kansai Japanese *siritu-da'igaku* 'private university'

/^{H}siritu#^{H}daigaku/ 私 si 立 ritu 大 dai 学 gaku	NonFin(Ft')	WordMaxAcc	Align-RH	HtoSHd
☹ a. ^{H}(si)(ritu)-(da'i)(gaku)			***	
☞ b. ^{H}(si)(ritu)-(dai')(gaku)			** L	* W
c. ^{H}(si)(ritu)-(dai)(ga'ku)	*! W		* L	
d. ^{H}(si)(ritu)-(dai)(gaku')	*! W		L	
e. ^{H}(si)(ritu)-(dai)(gaku) (unaccented)		*! W	L	

Similarly, such a juncture-less analysis cannot account for word-word compounds not involving a heavy syllable at the beginning of N2, such as *minami-amerika*. This is shown in (193) below.

(193) Incorrect winning candidate for Kansai Japanese *minami-a'merika* 'South America'

/^{H}minami#^{H}amerika/ みな mina み mi アメ ame リカ rika	NONFIN(FT')	WORDMAXACC	ALIGN-RH	HTOSHD
☹ a. ^{H}(mina)(mi)-(a'me)(rika)			***	
☞ b. ^{H}(mina)(mi)-(ame')(rika)			** L	
c. ^{H}(mina)(mi)-(ame)(ri'ka)	*! W		* L	
d. ^{H}(mina)(mi)-(ame)(rika')	*! W		L	
e. ^{H}(mina)(mi)-(ame)(rika) (unaccented)		*! W	L	

The most readily apparent solution to the problem in (192) is to reverse the ranking of ALIGN-RH and HTOSHD. Doing so would place compound accent on the head of the syllable *dai*, producing ^{H}*siritu-da'igaku*. However, doing so would also cause ^{L}*yotei-bi* to incorrectly place compound accent on the syllable *te*, producing *^{L}*yote'i-bi*, so this cannot be a solution. Furthermore, switching the ranking of these constraints would do nothing to solve the problem of (193).

Another imaginable solution would be to propose a high-ranking HIGH-TO-FOOTHEAD constraint as proposed in Ito and Mester (2018a)'s analysis of Tokyo Japanese. Placement of H on the head of a foot (assuming trochaic feet as in Tanaka (2018)'s analysis of Kansai Japanese) would correctly place compound accent on the first mora of N2 in ^{H}*siritu-da'igaku* and ^{H}*minami-a'merika*. The constraint is defined in (194) below, and a tableau for ^{H}*siritu-da'igaku* is given in (195).

(194) HIGH-TO-FOOTHEAD (HTOFTHD): H is linked to the head (first) mora of a foot. Assign one violation for every H linked to a non-head mora of a foot.

(195) Kansai Japanese ^{H}*siritu* 'private' + ^{H}*daigaku* 'university' = ^{H}*siritu-da'igaku* 'private university' with HtoFtHd

/^{H}siritu#^{H}daigaku/ 私 si 立 ritu 大 dai 学 gaku	HTOFTHD	NONFIN(FT')	WORDMAXACC	ALIGN-RH	HTOSHD
☞ a. ^{H}(siri)(tu)-(da'i)(gaku)				***	
b. ^{H}(siri)(tu)-(dai')(gaku)	*! W			** L	* W
c. ^{H}(siri)(tu)-(dai)(ga'ku)		*! W		* L	
d. ^{H}(siri)(tu)-(dai)(gaku')		*! W		L	
e. ^{H}(siri)(tu)-(dai)(gaku) (unaccented)			*! W	L	

However, this will again fail to place accent on the correct location in ^{L}*yotei-bi*, as demonstrated in (196) below.

(196) Kansai Japanese ^{L}*yotei* + ^{H}*hi'* = ^{L}*yotei'-bi*

/^{L}yotei#^{H}hi'/ 予 yo 定 tei 日 bi	HTOFTHD	NONFIN(FT')	WORDMAXACC	ALIGN-RH	HTOSHD
☹ a. ^{L}(yo)(tei')-(bi)	*!			*	*
b. ^{L}(yo)(tei)-(bi')	L	*! W		L	L
☞ c. ^{L}(yo)(te'i)-(bi)	L			** W	L
d. ^{L}(yo)(tei)-(bi) (unaccented)	L		*! W	L	L

Furthermore, this solution also fails when considering a different subset of compounds. Word-foot compounds with even-parity N1s – regardless of whether the last syllable of N1 is heavy or not – will incorrectly place compound accent two moras before the juncture, instead of the attested one mora before the juncture. This issue is shown in (197) and (198).

(197) N1 with final heavy syllable, ^{H}*unten* 'driving + ^{H}*seki* 'seat' = ^{H}*unten'-seki* 'driver's seat'

/^{H}unten#^{H}seki/ 運 un 転 ten 席 seki	HtoFtHd	NonFin(Ft')	WordMaxAcc	Align-RH	HtoSHd
☹ a. ^{H}(un)(ten')-(seki)	*!			**	*
b. ^{H}(un)(ten)-(se'ki)	L	*! W		* L	L
☞ c. ^{H}(un)(te'n)-(seki)	L			***! W	L
d. ^{H}(un)(ten)-(seki')	*!	*! W		L	L
e. ^{H}(un)(ten)-(seki) (unaccented)	L		*! W	L	L

(198) N1 with final light syllable, ^{H}*no'oberu* 'Nobel' + ^{H}*syo'o* 'prize' = ^{H}*nooberu'-syoo* 'Nobel prize'

/^{H}no'oberu#^{H}syo'o/ ノーnoo ベル beru 賞 syoo	HTOFTHD	NONFIN(FT')	WORDMAXACC	ALIGN-RH	HTOSHD
☹ a. ^{H}(noo)(beru')-(syoo)	*!			**	
b. ^{H}(noo)(beru)-(syo'o)	L	*! W		* L	
☞ c. ^{H}(noo)(be'ru)-(syoo)	L			***! W	* W
d. ^{H}(noo)(beru)-(syoo')	*!	*! W		L	* W
e. ^{H}(noo)(beru)-(syoo) (unaccented)	L		*! W	L	

In more general terms, then, the issue with the juncture-less analyses considered here is that either juncture-less grammar will cause a certain subset of compounds to place compound accent two moras away from the juncture. With ALIGN-RH >> HTOSHD (needed to account for ^{L}*yotei'-bi*), the result is that word-word compounds place compound accent two moras after the juncture, and with high-ranked HTOFTHD, the result is that word-foot compounds place compound accent two moras before the juncture. Neither result is correct, as compound accent must align (i.e., fall on the mora immediately before or after) the juncture in Kansai Japanese.

Therefore, I propose that Kansai Japanese in fact requires the constraint ALIGN-JH, requiring alignment of an H tone with the juncture. Although a similar constraint ALIGN-CA was proposed by Kubozono (1995) for Tokyo Japanese, Ito and Mester (2018a, 2019, 2021) are able to derive the Tokyo Japanese accent placement facts without it. Thus, in order to unify the Tokyo Japanese and Kansai Japanese analyses, I propose that it is in fact the action of ALIGN-JH which forces compound accent to be aligned with the juncture in compounds in both dialects, with the exact position (before or after the juncture) being determined by its interactions with the other constraints proposed for this analysis above in the previous two subsections.

4.2.4 Investigating an Alternative to Junctural Alignment

A natural alternative to this proposal which maintains avoidance of reference to "juncture" would be to say that what I call "junctural alignment" in the present proposal is in fact a more standard left or right alignment constraint that aligns the accentual high to the left or right edge of a prosodic word, interacting with another alignment constraint that attempts to align the same tone to the opposite edge. At least two versions of this analysis seem plausible. In the first version, compound accent must fall as far to the right as possible in a position that is aligned to the left edge of the prosodic word in which it occurs. In this case, the "default" position for compound accent is the first mora of N2. It can be prevented from falling on the default position by constraints such as NONFIN(FT'), causing it to fall on the last mora of N1 instead, if placing accent on the first mora of N2 would cause the head foot of the compound to be final. In the second version, compound accent must fall as far to the left as possible in a position that is aligned to the right edge of the prosodic word in which it occurs. In this case, the "default" position is the last mora of N1. Compound accent may be prevented from falling on the default position with a constraint such as a non-finality constraint relativized to the minimal word.

Neither version of this analysis appears to be sufficient, however. Investigation of several versions of either analysis using OTWorkplace (Prince, Tesar, and Merchant 2018), differing by whether alignment references minimal, maximal, or any projection of a prosodic word, only derive the correct accent location for either – but not both – word-foot compounds or foot-word and word-word compounds, an issue parallel to the issue I invoke junctural alignment above to solve (Angeles 2021). I discuss the details of this investigation and the results below. The analysis and discussion given below is slightly modified from Angeles (2021), which was initially published in the Annual Meetings on Phonology Supplementary Proceedings.

In this investigation, I used three types of ALIGN-LEFTHIGH and ALIGN-RIGHTHIGH constraints, each relativized to different levels of prosodic word: 1) the maximal prosodic word, 2) the minimal prosodic word, and 3) any prosodic word, regardless of level. The constraints are defined below.

(199) a. ALIGN-LEFTHIGH (ANYWORD): Align a high tone to the left edge of **any** prosodic word.

Assign one violation for every mora which intervenes between the left edge of a high tone and the left edge of **any** prosodic word.

b. ALIGN-LEFTHIGH (MAXWORD): Align a high tone to the left edge of a **maximal** prosodic word.

Assign one violation for every mora which intervenes between the left edge of a high tone and the left edge of a **maximal** prosodic word.

c. ALIGN-LEFTHIGH (MINWORD): Align a high tone to the left edge of a **minimal** prosodic word.

Assign one violation for every mora which intervenes between the left edge of a high tone and the left edge of a **minimal** prosodic word.

d. ALIGN-RIGHTHIGH (ANYWORD): Align a high tone to the right edge of **any** prosodic word.

Assign one violation for every mora which intervenes between the right edge of a high tone and the right edge of **any** prosodic word.

e. ALIGN-RIGHTHIGH (MAXWORD): Align a high tone to the right edge of a **maximal** prosodic word.

Assign one violation for every mora which intervenes between the right edge of a high tone and the right edge of a **maximal** prosodic word.

f. ALIGN-RIGHTHIGH (MINWORD): Align a high tone to the right edge of a **minimal** prosodic word.

Assign one violation for every mora which intervenes between the right edge of a high tone and the right edge of a **minimal** prosodic word.

As discussed in the previous subsection, given the importance of the ranking of HIGH-TO-SYLLABLEHEAD (HTOSHD) in the Tokyo Japanese and Kansai Japanese, it would seem that the difference in which mora of a final heavy syllable in N1 receives the compound accent lies in the ranking of HTOSHD relative to some combination of the constraints in (199). These constraints and four constraints used above – NONFINALITY(FOOT'), ALIGN-RIGHTHIGH, HIGH-TO-SYLLABLEHEAD, and WORDMAXACCENT – were tested in OTWorkplace with the following candidates. Kansai Japanese optima are marked with (K), Tokyo Japanese optima are marked with (T), and optima which are shared by both Tokyo and Kansai Japanese are marked with (KT).

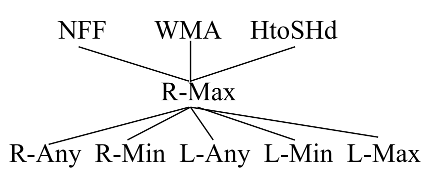
(200) OTWorkplace candidates

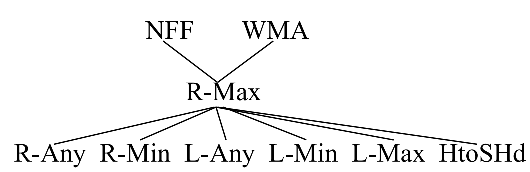
'engineering department'	'scheduled date'	'driver's seat'	'Japanese spirit'
ko'ogaku-bu	*yo'tee-bi*	*u'nten-seki*	*ya'mato-gokoro*
kooga'ku-bu	*yote'e-bi* (T)	*unte'n-seki* (T)	*yama'to-gokoro*
koogaku'-bu (KT)	*yotee'-bi* (K)	*unten'-seki* (K)	*yamato'-gokoro*
koogaku-bu'	*yotee-bi'*	*unten-se'ki*	*yamato-go'koro* (KT)
koogaku-bu	*yotee-bi*	*unten-seki'*	*yamato-gokoro'*
		unten-seki	*yamato-gokoro*
'private university'	'electricity cut-off day'	'Ministry of Construction'	'South America'
si'ritu-daigaku	*kyu'uden-bi*	*ke'nsetu-syoo*	*mi'nami-amerika*
siri'tu-daigaku	*kyuude'n-bi* (T)	*kense'tu-syoo*	*mina'mi-amerika*
siritu'-daigaku	*kyuuden'-bi* (K)	*kensetu'-syoo* (KT)	*minami'-amerika*
siritu-da'igaku (KT)	*kyuuden-bi'*	*kensetu-syo'o*	*minami-a'merika* (KT)
siritu-dai'gaku	*kyuuden-bi*	*kensetu-syoo'*	*minami-ame'rika*
siritu-daigaku'		*kensetu-syoo*	*minami-amerika'*
siritu-daigaku			*minami-amerika*

Violation counts for each candidate on each constraint were calculated and entered into OTWorkplace manually. Violation profiles for each candidate are given in the Appendix. With this, a factorial typology was calculated using OTWorkplace, yielding 31 languages. Among the 31 languages, no language is exactly like Tokyo Japanese or Kansai Japanese. However, two languages are of interest for this discussion, one like Tokyo Japanese in selecting all but one correct optimum, and one like Kansai Japanese in selecting all but two correct optima. I refer to these languages as Pseudo-Tokyo and Pseudo-Kansai respectively. The remaining 29 languages were more distant from Tokyo and Kansai Japanese than Pseudo-Tokyo and Pseudo-Kansai.

The grammars for Pseudo-Tokyo and Pseudo-Kansai produced by OTWorkplace are presented in the Hasse diagrams below. The names of the alignment constraints are shortened to L-Any/MaxMin for the ALIGN-LEFTHIGH constraints and R-Any/Max/Min for the ALIGN-RIGHTHIGH constraints.

(201) Pseudo-Tokyo Grammar   Pseudo-Kansai Grammar





In the Pseudo-Tokyo grammar, NONFINALITY(FOOT') and HIGH-TO-SYLLABLEHEAD are, as expected, undominated. Both dominate ALIGN-RIGHTHIGH (MAXWORD), which dominates all other alignment constraints. This preserves the hierarchical relationships between the three constraints given in the Hasse diagram in (190) above for Tokyo

Japanese. This grammar accounts for all T and KT forms in (200) except for *minami-a'merika*, for which it incorrectly selects the candidate **minami-ame'rika*. From the grammar above, it is easy to see why: *me* is the rightmost mora in the maximal word which is neither in a final foot (i.e., satisfies NONFINALITY(FOOT')) nor a non-head mora (i.e., satisfies HTOSHD). None of the ALIGN-LEFTHIGH constraints, which are all in the lowest stratum of the grammar, are able to place the accent on *a*, where it belongs in Tokyo Japanese.

The Pseudo-Kansai grammar is somewhat like the grammar of Kansai Japanese given in the Hasse diagram in (189) above, with the exception that while HTOSHD is not dominated by ALIGN-RIGHTHIGH in (189), it is dominated by ALIGN-RIGHTHIGH (MAXWORD) in the grammar of Pseudo-Kansai. NONFINALITY(FOOT') dominates ALIGN-RIGHTHIGH (MAX WORD) in Pseudo-Kansai, just as it does in Kansai Japanese. This grammar accounts for all K and KT forms in (200), except for *siritu-da'igaku* and *minami-a'merika*, which are produced as **siritu-dai'gaku* and **minami-ame'rika* instead. The reason for *minami-ame'rika* is similar to Pseudo-Tokyo – *me* is the rightmost mora in the maximal word which is not in a final foot; it also does not violate HTOSHD, but this constraint is low in the grammar of Pseudo-Kansai. The position of HTOSHD in the lowest stratum of the grammar is crucial for the selection of the incorrect **siritu-dai'gaku*. Like **minami-ame'rika*, **siritu-dai'gaku* places accent on the rightmost non-final mora *i*, the non-head mora of the syllable *dai*. This is because HTOSHD is not high-ranked enough to ensure that the head mora *da* is accented instead, as this constraint is able to do in Pseudo-Tokyo (and actual Tokyo Japanese). As plausible as deriving the location of accent with general alignment constraints seems to be, I argue that this investigation demonstrates that alignment to the juncture really is necessary.

If derivation through general alignment constraints is untenable, as it seems to be, further investigation is required to determine what exactly defines the notion of "juncture" – morphological structure, prosodic structure, or a combination of both? One possible avenue for investigation is the treatment of long loanwords, which give rise to so-called "pseudo-compounds" in which splits in prosodification occur, indicating that junctures may arise even when there is no internal morphological structure. Such pseudo-compounds are attested in Japanese (as discussed in, e.g., Kubozono 2002), in which a long loanword such as *irasutoreesyon* 'illustration' has a compound accent in a location that makes it appear to be a word-word compound: *irasuto+reesyon* = *irasuto-re'esyon*. Pseudo-compounds also occur in Finnish (Karvonen 2005), in which long loanwords behave like morphological compounds, resisting stress shift when case endings are added, unlike morphologically simplex words of the same length, which *do* undergo stress shift under suffixation of case endings. Further investigation of pseudo-compounds may shed light on the identity and necessity of "juncture."

In the next section, I consider symmetrical phrasal compounds: monophrasal and biphrasal compounds.

4.3 Symmetrical Phrasal Compounds

Phrasal compounds differ from their word compound counterparts in that while the members of word compounds are daughters to a word level, the daughters of phrasal compounds are daughters to a phrasal level. This difference has consequences for compound prosody, as discussed below.

4.3.1 Mono-Phrasal Compounds

As in Tokyo Japanese, compounds involving "overlong" N2s (5+ moras) in Kansai Japanese retain the accent of N2 in its original position, making them mono-phrasal compounds in the typology of Ito and Mester (2007, 2018a, 2021). In Tokyo Japanese, mono-phrasal compounds, unlike word-word compounds, exhibit neither rendaku nor compound accent near the juncture between N1 and N2. Like word-word compounds, they do not retain the accent of N1. This is also the case in Kansai Japanese.

The fact that the accent of N2 is retained in its original location suggests that the accent in mono-phrasal compounds is not in fact "compound accent," which, as discussed above, is a new accent placed on word compounds in the process of calculation of compound prosody. Instead, the accent in mono-phrasal compounds is merely the original accent of N2. The fact that a new accent is not placed on mono-phrasal compounds results from the fact that the constraint that places accent in word compounds in the first place is WORDMAXACCENT, a constraint that requires maximal (but non-minimal) words to have accent, which is then aligned with the juncture as a result of constraints as discussed in the previous section. However, there is no word level dominating both elements of a mono-phrasal compound, i.e., there is no maximal, non-minimal word that requires accent as a result of this constraint. As a result, WORDMAXACCENT has no say over the accentedness of the compound.

Furthermore, the alignment constraints which required accent to be aligned as far to the right as possible while still being aligned with the juncture also have no say in mono-phrasal compounds. I propose that this is due to a high-ranked NOFLOP-ACCENT constraint, which prevents lexical accents from moving from their input positions, defined below.

(202) NOFLOP-ACCENT: An accent must not be moved from its input position. Assign one violation for an accent in the output (if present) which is not linked to its corresponding input position.

Returning to word compounds momentarily, I repeat that the placement of accent at the juncture in word compounds is crucially the placement of a new accent, not simply the movement of an existing accent (as compounds with unaccented components also receive a new compound accent). Thus, the appearance of an accent at the juncture, potentially at a location different from a word's isolation accent in word compounds does not in my analysis constitute a violation of NOFLOP-ACCENT.

The role of high-ranking NoFlop-Accent is demonstrated in the tableau below. Register inheritance and loss of N1's accent are assumed here to be enforced by the grammar discussed in section 4.1, and this tableau focuses only on deriving the location of accent.

(203) Retention of N2's accent in its input position

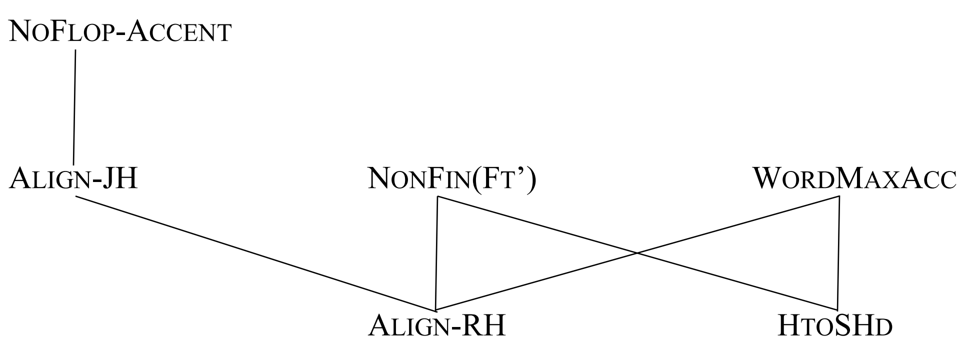
/^{H}na'iron#^{L}suto'kkingu/ ナイnaiロンron スsuトッtok キンkinグgu	NoFlop-Accent	Align-JH	NonFin(Ft')	WordMaxAcc	Align-RH	HtoSHd
☞ a. [(^{H}nai)(ron)-(suto')(kki)(ngu)]		*			****	
b. [(^{H}nai)(ron)-(su'to)(kki)(ngu)]	*! W	L			***** W	
c. [(^{H}nai)(ron')-(suto)(kki)(ngu)]	*! W	L			****** W	* W

(204) Retention of N2's accent in its input position

/^{L}ke'izi#^{L}sosyoo'hoo/ 刑kei事zi 訴so訟syoo法hoo	NoFlop-Accent	Align-JH	NonFin(Ft')	WordMaxAcc	Align-RH	HtoSHd
☞ a. [(^{L}kei)(zi)-(so)(syoo')(hoo)]		*			**	*
b. [(^{L}kei)(zi)-(so)(syo'o)(hoo)]	*! W	*			*** W	L
c. [(^{L}kei)(zi)-(so')(syoo)(hoo)]	*! W	L			**** W	L
d. [(^{L}kei)(zi')-(so)(syoo)(hoo)]	*! W	L			***** W	L

Thus, the constraint ranking proposed above can be modified to account for accent placement in monophrasal compounds with the addition of NoFlop-Accent, yielding the following Hasse diagram.

(205) Hasse diagram for Kansai Japanese monophrasal compound accent location



4.3.2 Bi-Phrasal Compounds

According to Nakai (2002), Kansai Japanese exhibits compounds in which both N1 and N2 retain both their accent locations and register. This is similar to Tokyo Japanese, where some compounds retain accent in both N1 and N2. Following Ito and Mester 2018a, 2021), I propose that these are bi-phrasal compounds. Examples are given in (206) below.

(206)

a. ^{H}*tyo'o* 'super' + ^{H}*itiryuuga'isya* 'first rate company' = ^{H}*tyo'o*-^{H}*itiryuuga'isya* super first rate company'

b. ^{H}*ni'hon* 'Japan' + ^{L}*buyookyo'okai* 'dance association' = ^{H}*ni'hon*-^{L}*buyookyo'okai* 'dance association of Japan'[29]

c. ^{L}*sen* 'one thousand' + ^{H}*itiya-monoga'tari* 'one night + legend' = ^{L}*sen*-^{H}*itiya-monoga'tari* 'Tale of One Thousand and One Nights'

d. ^{L}*tyuu'oo* 'center' + ^{H}*koomin'kan* 'public hall' = ^{H}*tyuu'oo*-^{L}*koomin'kan* 'central public hall'

e. ^{L}*yoyaku* 'reservation' + ^{H}*moosikomi* 'application' = ^{L}*yoyaku*-^{H}*moosikomi* 'reservation application'

[29] This contrasts with ^{H}*nihonbuyoo*-^{H}*kyo'okai*, a word-word compound with typical compound accent for a 4 mora N2. This compound means 'association for Japanese dance.'

These differ from mono-phrasal compounds, in which N1 is deaccented. In Kansai Japanese, not only are the accents of N1 and N2 retained, the registers of each noun are retained as well. This follows from MAX-T/PHRASEINIT, which was discussed in the analysis of register retention in the previous section. Deleting either register tone would incur violations of this constraint, as both members of the compound are initial in their own minimal phonological phrases.

As for accent, issues of accent placement and which word bears accent or does not bear accent are trivial for bi-phrasal compounds. The members of a bi-phrasal compound bear accent if they were accented in the input and do not bear accent if they were unaccented in the input, which is consistent with Ito and Mester's proposal that accent is a property of the minimal phonological phrase, allowing either no accent or one accent within its boundaries. Since bi-phrasal compounds are composed of two minimal phonological phrases, a bi-phrasal compound may have up to two accents, as shown in (206a, b, d) above. In the account developed here, the fact that no accent loss occurs when both members of a bi-phrasal compound have accent is because culminativity holds only at the minimal phrase level, and no minimal phrase in a bi-phrasal compound has more than one accent. Similarly, because each member of the compound projects its own phrase level, each member is the head of its own minimal phrase, preventing accent loss due to HTOHDWD.

4.4 A Deeper Look at the Word-Phrase Compound

This section discusses the word-phrase compound, a prosodic adjunction structure which I argue to be present in Kansai Japanese but not in Tokyo Japanese. As mentioned in previous chapters, I argue that this kind of compound emerges because of the fact that Kansai Japanese uses register distinctions in addition to accent distinctions. As a result, differences in patterns of register retention/loss and accent retention/loss can be used as a diagnostic to distinguish word-phrase compounds from their symmetrical phrasal counterparts, the mono-phrasal and bi-phrasal compounds.

4.4.1 Description

As mentioned above, these compounds are referred to as 不完全複合語 *hukanzen-hukugoogo* ‘incomplete/imperfect compounds’ in Nakai (2002). I call these compounds “word-phrase compounds,” after their proposed prosodic structure.

Descriptively, the prosodic characteristics of word-phrase compounds appear to be a combination of mono-phrasal and bi-phrasal compounds. N1 loses its original accent (if any), while N2 retains its original accent (if any), which is the same pattern observed in mono-phrasal compounds. However, both N1 and N2 retain their registers, as observed in bi-phrasal compounds. Note that loss of accent in N1 causes it to become an unaccented word in form, with a final H occurring on its last mora. This is clearest in (207c), in which N2 is low beginning.

(207) Incomplete compounds in Kansai Japanese:

a. H-word N1 and N2

$\overline{\text{si}}$′$\underline{\text{min}}$ ‘citizen’ + $\overline{\text{eiga}}$′$\underline{\text{kan}}$[30] ‘movie theatre’ = $\overline{\text{simin}}$ – $\overline{\text{eiga}}$′$\underline{\text{kan}}$ ‘citizens’ movie theatre’

shorthand: [^{H}simin-[^{H}eiga’kan]]

b. H-word N1, L-word N2

$\overline{\text{o}}$′$\underline{\text{nna}}$ ‘woman’ + $\underline{\text{ha}}\overline{\text{ri}}$′$\underline{\text{si}}$[31] ‘acupuncturist’ = $\overline{\text{onna}}$ – $\underline{\text{ha}}\overline{\text{ri}}$′$\underline{\text{si}}$ ‘female acupuncturist’

shorthand: [^{H}onna-[^{L}hari’si]]

c. L-word N1 and N2

$\underline{\text{tyu}}\overline{\text{u}}$′$\underline{\text{oo}}$ ‘center’ + $\underline{\text{kai}}\overline{\text{gi}}$′$\underline{\text{situ}}$[32] ‘meeting room’ = $\underline{\text{tyuuo}}\overline{\text{o}}$ – $\underline{\text{kai}}\overline{\text{gi}}$′$\underline{\text{situ}}$ ‘central meeting room’

shorthand: [^{L}tyuuoo-[^{L}kaigi’situ]]

---

[30] ^{H}*e’iga* ‘movie’ + ^{H}*ka’n* ‘hall.’
[31] ^{L}*hari* ‘acupuncture needle’ + ^{H}*si* ‘specialist.’
[32] ^{L}*kaigi* ‘meeting’ + ^{H}*si’tu* ‘room’

d. L-word N1, H-word N2

niwa'ka 'jumping on the bandwagon' + niwa'si[33] 'gardener' =

niwaka – niwa'si 'bandwagon gardener'

shorthand: [^{L}niwaka-[^{H}niwa'si]]

That these compounds are of a separate category from bi-phrasal compounds is most clearly observed by comparing (207c) with the bi-phrasal example below.

(208) A Kansai Japanese bi-phrasal compound

tyuu'oo 'center' + koomin'kan[34] 'public hall' = tyuu'oo – koomin'kan

'central public hall'

In (208), both N1 and N2 clearly retain their accents as well as their registers. However, in (207c), while N2 has retained its accent and register, N1 has retained only its register, surfacing as tyuuoo and not as tyuu'oo, as would be expected if it were to retain its accent in the compound. Example (207b) clearly demonstrates that the compounds in (207) are distinct from mono-phrasal compounds such as the following.

[33] ^{H}*niwa* 'garden' + ^{H}*si* 'specialist.'
[34] ^{H}*koomin* 'citizen' + ^{H}*ka'n* 'hall.'

(209) A Kansai Japanese mono-phrasal compound

na′iron 'nylon' + suto′kkingu 'stocking' = nairon – suto′kkingu 'nylon stockings'

While N2s in mono-phrasal compounds retain their original accents, they lose their register and instead inherit the register of N1, as shown in (209). In (207b), it is clear that N2 has not lost its register as would be expected if it were a mono-phrasal compound but rather has retained its low-beginning register. Because word-phrase compounds fully exhibit neither of the patterns of mono-phrasal and bi-phrasal compounds, I argue that they constitute a distinct compound type in Kansai Japanese.

An interesting characteristic of compounds of this type arises when N1 is an L-word. If N2 is also an L-word, then the final rise (from a final boundary high tone from FINAL-H as discussed in a previous chapter) associated with unaccented L-words in isolation appears. This is shown in (207c) above. However, if N2 is an H-word, then final rise appears not to surface. This can be readily observed in the comparison in (210) below from Nakai (2002), featuring two compounds with the same N1, but an L-word N2 in (210a) and an H-word N2 in (210b).

(210) Presence or lack of final rise in L-word N1 in word-phrase compounds

a. L-word N1 and N2

tyuū′oo ‘center’ + kaigi′situ ‘meeting room’ = tyuuoō – kaigi′situ ‘central meeting room’

shorthand: [^{L}tyuuoo-[^{L}kaigi’situ]]

b. L-word N1, H-word N2

tyuū′oo ‘center’ + eiga′kan ‘movie theatre’ = tyuuoo – eiga′kan ‘central movie theatre’

shorthand: [^{L}tyuuoo-[^{H}eiga’kan]]

Lack of a final rise in front of H-words is also observed in non-compounds, as in the phrase meganeya – o nozoiteru – wa ‘is window shopping at an optician’s shop,’ which features the L-word phrase *meganeya-o* ‘optician’s shop (acc.)’ followed by the H-word phrase *nozoiteru-wa* ‘is window shopping’ (Kori 1987). If *meganeya-o* were in isolation, a final H would be expected on the final *-o* accusative particle. It is also observed in biphrasal compounds, such as katei – saiban′syo ‘family court,’ which is classified as a “two-word compound” in Nakai (2002), which I have taken to be a bi-phrasal compound in the present analysis. In this case, N1 is unaccented in isolation, showing the pattern kateī with final rise, though no final rise is present in ^{L}*katei* before an H-word N2 (Sugito 1995).

According to Nakai (2002), when an unaccented L Register word is followed by a *bunsetsu* (that is, a syntactic unit consisting of a content word, e.g., a noun or a verb, on its own or with one or more bound morphemes; definition from Kubozono 2012) that begins with a high tone, the final rise is not observed. This disappearance of the final high in L Register words is interpreted by Pierrehumbert and Beckman (1988) as a delay in the appearance of the boundary high, wherein it is realized on the first mora of N2 when N2 is an H Register word, but when N2 is an L Register word, it is realized on the last mora of N1.[35] I follow this analysis here.

4.4.2 The Prosodic Structure of Word-Phrase Compounds

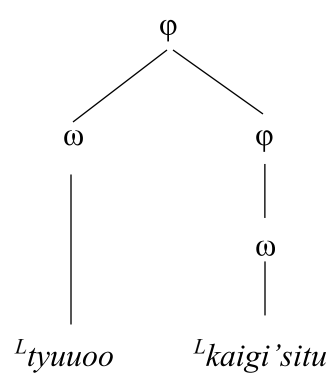
I attribute the fact that N1 loses its input accent to N1 projecting a word level, as it does in word-foot, word-word, and mono-phrasal compounds, the three other compound types which display accent loss in N1. Further evidence supporting the conclusion that N1 projects only a word-level is found in the fact that input accent loss makes way for a final H tone to appear on N1, parallel to final H in unaccented words in isolation. The fact that N2 retains its input register I attribute to N2 projecting a phrase level, as it

[35] Kori (1987) notes that, in H-word/H-word sequences when the first word is out of focus, the two words "fuse into one and have one common continuous declination," perhaps lending support to the idea that the boundary H tone at the end of words (which Pierrehumbert and Beckman propose is also present in H-words) is delayed into the second word. If the first word is pre-focal, then a fall-rise at the boundary between the two words is sometimes observed.

does in bi-phrasal compounds, the only other compound type which displays N2 register retention.

Thus, I propose the following prosodic structure in (211), which utilizes only the phonological word and phonological phrase categories argued for in Ito and Mester (2007, 2018a, 2021). This structure is proposed as part of the typology in the theory developed by Ito and Mester (2021), and I propose that Kansai Japanese gives evidence for this structure, confirming the theory.

(211) Word-Phrase Compound



The structure given above shows N1 in its own simultaneously minimal and maximal prosodic word. Additionally, the structure above shows both prosodic recursion (the two phonological phrase levels) as well as prosodic adjunction (of the word level to the phrase level), similar to the structure of word-foot compounds but in higher levels of the prosodic hierarchy. This reflects the characteristics which incomplete compounds share with mono-phrasal and bi-phrasal compounds. Since N2 retains *both* its register and accent in its input location, N2 must be the head of its own phrase level, as in bi-phrasal compounds. Since N1 retains *only* its register and loses its accent, it cannot be the head of its own phrase level as in bi-phrasal compounds, so I argue that it can only project a word level, similar to N1 in mono-phrasal compounds, which retains its register but loses its accent.

4.4.3 Analysis of Word-Phrase Compounds

Four aspects of word-phrase compounds must be accounted for here. These are 1) retention of register in N1, 2) loss of accent in N1, 3) retention of register in N2, and 4) retention of accent in its original location in N2.

Because the proposed structure places N1 in a word which is prosodically adjoined to a phrase and thus not part of the same minimal phrase, the CULMINATIVITY-MINPHRASE constraint proposed for word compounds does not apply here. I propose that, like mono-phrasal compounds, word-phrase compounds rely on HTOHDWD to remove accent from N1. The retention of the input registers of N1 and N2 are accounted for by MAX-TONE/PHRASEINITIAL. Both N1 and N2 are initial in some phrase – the maximal phrase for N1, and a minimal phrase for N2 – so this positional faithfulness constraint will ensure that both register tones are retained. Finally, the retention of N2's accent in its original location (rather than moving to align with the juncture between the two members of the compound) is due to the same ranking of NOFLOP-ACCENT over ALIGN-JH, as proposed for mono-phrasal compounds.

Accordingly, the prosodic facts of word-phrase compounds fall out from the grammars proposed above, and no further changes to the grammar are needed. This is demonstrated below, beginning first with register inheritance in (212) and (213). Brackets denote the edges of phonological phrases.

(212) Register Retention in ^{L}*tyuuoo-*^{H}*eiga'kan*

/^{L}tyuu'oo#^{H}eiga'kan/ 中 tyuu 央 oo 映 ei 画 ga 館 kan	MAX-T/PHRASEINIT	ONEREGT/MINPHRASE	HTOHDWD	MAX-TONE
☞ a. [^{L}tyuuoo-[^{H}eiga'kan]]				**
b. [^{L}tyuu'oo-[^{H}eiga'kan]]			*! W	L
c. [^{L}tyuuoo-[eiga'kan]]	*! W			*** W
d. [^{L} tyuu'oo-[eiga'kan]]	*! W		* W	* L
e. [tyuuoo-[^{H}eiga'kan]]	*! W			*** W
f. [tyuu'oo-[^{H}eiga'kan]]	*! W		* W	* L
g. [tyuuoo-[eiga'kan]]	*!* W			**** W
h. [tyuu'oo-[eiga'kan]]	*!*W		* W	**

(213) Register Retention in ^{H}*onna-*^{L}*hari'si*

/^{H}o'nna#^{L}hari'si/ おん on な na は ha り ri し si	MAX-T/PHRASEINIT	ONEREGT/MINPHRASE	HTOHDWD	MAX-TONE
☞ a. [^{H}onna-[^{L}hari'si]]			*	**
b. [^{H}o'nna-[^{L}hari'si]]			**! W	L
c. [^{H}onna-[hari'si]]	*! W		*	*** W
d. [^{H}o'nna-[hari'si]]	*! W		** W	* L
e. [onna-[^{L}hari'si]]	*! W		L	*** W
f. [o'nna-[^{L}hari'si]]	*! W		*	* L
g. [onna-[hari'si]]	*!* W		L	**** W
h. [o'nna-[hari'si]]	*!* W		*	**

MAX-T/PHRASEINIT works to eliminate any candidates which have not retained their register tones, since each register tone is phrase-initial. What is left after those candidates have been eliminated are two candidates (212a-b) and (212a-b) which differ only on whether N1 retains its accent or not. HTOHDWD selects the (a) candidate in each tableau, the one where N1 loses its accent, as it is not the head of the compound.

The tableaux in (214) and (215) demonstrate retention of N2's accent in its original position. In these tableaux, register inheritance and loss of N1's accent are enforced by the grammar discussed above in order to focus on accent location.

(214) Retention of N2 accent in original position in *^{L}tyuuoo-^{H}eiga'kan*

/^{L}tyuu'oo#^{H}eiga'kan/ 中tyuu央oo 映ei画ga館kan	NOFLOP-ACCENT	ALIGN-JH	NONFIN(FT')	WORDMAXACC	ALIGN-RH	HTOSHD
☞ a. [^{L}(tyuu)(oo)-[^{H}(ei)(ga'ka)(n)]]		*			**	
b. [^{L}(tyuu)(oo)-[^{H}(e'i)(gaka)(n)]]	*! W	L			**** W	
c. [^{L}(tyuu)(oo')-[^{H}(ei)(gaka)(n)]]	*! W	L			***** W	* W

(215) Retention of N2 accent in original position in ^{H}*onna-*^{L}*hari'si*

/^{H}o'nna#^{L}hari'si/ おんonなnaはhaりriしsi	NoFlop-Accent	Align-JH	NonFin(ft')	WordMaxAcc	Align-RH	HtoSHd
☞ a. [^{H}(on)(na)-[^{L}(hari')(si)]]		*			*	
b. [^{H}(on)(na)-[^{L}(ha'ri)(si)]]	*! W	L			** W	
c. [^{H}(on)(na')-[^{L}(hari)(si)]]	*! W	L			*** W	

As in monophrasal compounds, the high-ranked NoFlop-Accent eliminates any candidate whose N2 accent has moved from its input position.

Word-phrase compounds thus do not exhibit any actual exceptional behavior in terms of register retention and accent location; their behavior results from the same grammar governing word compounds and symmetrical phrasal compounds. All that differs between word-phrase compounds and the other types of compounds is their structure, suggesting the existence of the prosodic adjunction word-phrase compounds in Kansai Japanese as distinct from the coordinative recursive bi-phrasal compounds.

4.5 Implications for a Theory of the Syntax-Prosody Interface

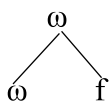
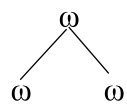
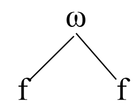
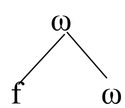
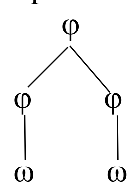
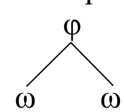
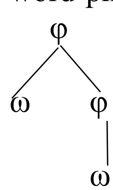
The present work contributes to research on prosodic recursion and adjunction in suggesting the availability of recursion in higher levels of the prosodic hierarchy (φ), both symmetrical coordinative and asymmetrical adjunctive.

As discussed earlier in the dissertation, early work in the syntax-prosody interface such as Nespor and Vogel (1986/2007) assumed the Strict Layer Hypothesis, which states that prosodic categories may not be nested below prosodic categories of the same type in prosodic structure. Accordingly, structures such as the following are not permitted. The structures in (216a) and (216d) exhibit symmetrical recursion, wherein the top level node dominates two instances of the same prosodic category, meaning that they violate the Strict Layer Hypothesis on both branches of the structure. The structures in (216b), (216c), and (216e) exhibit asymmetrical recursion, wherein the top level node dominates one instance of the same prosodic category and another, lower, prosodic category, meaning that they violate the Strict Layer Hypothesis only on one branch of the structure.

(216) Violations of the Strict Layer Hypothesis

Crucially, these are precisely the structures that I have proposed above for the word-word, word-foot, foot-word, bi-phrasal, and word-phrase compounds respectively, the five compound types in Kansai Japanese which I propose show recursive prosodic structure, as shown in the summary of compound prosodic structures below.

(217) Prosodic structures of Kansai Japanese compounds

Recursive		Non-Recursive
Adjunction	Coordination	
a. word-foot  ^{H}*nyuugaku'-bi* 'matriculation day' ^{L}*kabuto'-musi* 'beetle (lit. helmet bug)'	b. word-word  ^{H}*syodoo-kyo'ositu* 'calligraphy classroom' ^{L}*otome-go'koro* 'girl's feelings'	c. foot-foot  ^{H}*tori-goya* 'aviary' ^{L}*ai-iro* 'indigo blue'
d. foot-word  ^{H}*oya-go'koro* 'parental love' ^{L}*te-ryo'ori* 'home cooking'	e. bi-phrasal  ^{H}*ni'hon-*^{L}*buyookyo'okai* 'dance association of Japan' ^{L}*tyuu'oo-*^{H}*koomin'kan* 'central public hall'	f. mono-phrasal  ^{H}*nairon-suto'kkingu* 'nylon stockings' ^{L}*keizi-sosyoo'hoo* 'Code of Criminal Procedure'
g. word-phrase  ^{H}*simin-*^{L}*kaigi'situ* 'citizens meeting room' ^{L}*tyuuoo-*^{H}*eiga'kan* 'central movie theatre'		

Here, I discuss why recursive structure is needed to account for Kansai Japanese compounds, some non-recursive alternatives, and why these alternatives do not satisfactorily account for the diversity in compound prosodies in Kansai Japanese.

First, an important principle of work in the syntax-prosody interface is that prosodic categories are associated with phonological phenomena. For example, Nespor and Vogel (1986/2007) demonstrate that, in Greek, 1) a nasal assimilation rule, by which a nasal assimilates to a following non-continuant consonant in place of articulation, e.g., /tempelis/ 'lazy' → [tembelis], /sin+pono/ → [simbono], and 2) a stop voicing rule, by which a stop is voiced if it is preceded by a nasal, e.g., /kantila/ 'small lamp' → [kandila], /en+timos/ → [endimos], both occur within prosodic words ω, which may be composed of a monomorphemic form, as in the first of each pair of examples, or between an affix and a stem, as in the second of each pair of examples. Similarly, Selkirk (2011) shows that vowel length in ChiMwiini may only surface at the right edge of a phonological phrase φ, and thus a long vowel surfacing indicates the right edge of a phonological phrase. If an underlying long vowel does not surface, this indicates that a right edge of a phonological phrase does not occur in the position where the underlying long vowel would have been.

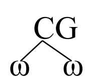
Keeping this in mind, a look at simplex words in Kansai Japanese, under the default assumption in Match Theory that these, being syntactic terminals, are mapped to prosodic words, suggests that the prosodic word is the domain of accent and register tone, which are generally lexical in nature, as in ^{H}*i'noti* 'life,' ^{L}*kitune* 'fox,' ^{L}*usi'ro* ‘back, rear.’ Accent may be assigned, in certain cases, such as in loanwords, by an antepenultimate accent rule, so it may also be said that the prosodic word is the domain of the antepenultimate accent rule. However, compound words show a different picture. Word-foot, foot-word, and word-word compounds all place a new accent on the compound, and the register of the second word is lost. Crucially, this accent replaces all of the original accents of the input words, and the placement of this accent does not proceed according to the antepenultimate accent rule, but rather according to a different placement rule which results in the compound accent being placed at the juncture between components: on the last mora of N1 or the first mora of N2. Neither of these phenomena are observed in simplex words.

If categorically different phenomena are taken as indicative of different prosodic categories, then we must posit that, while simplex words in Kansai Japanese may be mapped to prosodic words, compound words in Kansai Japanese must be mapped to some other prosodic category, which, under the Strict Layer Hypothesis, must be higher than the prosodic word. One such higher category is the phonological phrase φ, but an issue for positing that compound words are phonological phrases is that sentences in Kansai Japanese also do not exhibit the input accent removal found in compound words, nor do they exhibit new accent placement of any kind. Rather, as the data from Kori (1987) shows, words in sentences do not lose their accent or register when placed next to other words, as is the case when words are compounded.

Accordingly, with neither the prosodic word nor the phonological phrase being appropriate for labeling the constituent of the compound word, it must be posited that an intermediate prosodic category, which is ranked above the prosodic word and below the phonological phrase, is the category to which the top node of a compound is mapped. Examples of such intermediate categories include the clitic group (Nespor and Vogel 1986/2007), the composite group (Vogel 2009), and the prosodic word group (Vigário 2010). For the purposes of the present discussion and illustration, in the interest of treating this intermediate category relatively independently of the prosodic categories just mentioned, I will refer to this intermediate prosodic category as the "compound group (CG)."

With an intermediate prosodic category, we can thus posit that compound words have the prosodic structure below. Each component of the compound word is labeled with the prosodic category one level down, the prosodic word.

(218)



Such a structure allows us to treat compound words differently from both prosodic words and phonological phrases. Since compound words have their own unique characteristics, relativizing these unique characteristics to the compound group domain allows us to maintain that different prosodic categories display different phonological phenomena. However, this proposal runs into a problem. The structure above would be appropriate for a language in which compound words behave differently from simplex words and phrases, but this behavior is uniform across all compound words. As I have shown in this dissertation, however, Kansai Japanese compounds do not behave uniformly. Below, I repeat the structure above, with an example of each of the seven compound types. Each compound type is labeled here using the names given in Chapter 3 reflecting their structure, but for this part of the discussion, they can be treated merely as labels which do not imply a particular prosodic structure.

(219) CG

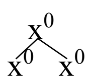
ω ω

Foot-foot:	^{L}waru' ^{H}mo'no	→	^{L}waru-mono
Word-foot:	^{L}kabu'to ^{H}musi	→	^{L}kabuto'-musi
Foot-word:	^{H}ya'ma ^{H}sakura	→	^{H}yama-za'kura
Word-word	^{L}oto'me ^{H}ko'koro	→	^{L}otome-go'koro
Mono-phrasal:	^{L}kei'zi ^{L}sosyoo'hoo	→	^{L}keizi-sosyoo'hoo
Bi-phrasal:	^{H}ni'hon ^{L}buyookyo'okai	→	^{H}ni'hon-^{L}buyookyo'okai
Word-phrase:	^{H}si'min ^{L}kaigi'situ	→	^{H}simin-^{L}kaigi'situ

Comparing the compound prosodies of these compounds while considering if they arise from the same compound group-dominated prosodic structure reveals the issue. With the exception of the foot-word and word-word compounds, which both show deletion of input accents, deletion of N2 register, and placement of an accent on the first mora of N2 and can thus be argued to have the same prosodic structure, the other five compound types show a wide range of phenomena. In no way, then, can it be said that these compounds show uniform behavior. Again, if the criterion for distinguishing prosodic categories is different phonological phenomena, then it must be necessary to distinguish different prosodic categories in order to account for Kansai Japanese compounds. The solution of using a single prosodic structure for Kansai Japanese is untenable.

If different prosodic structures must be done, then how? The compounds presented above differ so much from each other, that six different categories can be established. One potential solution is to simply posit a new category to account for each cluster of accent loss, register loss, and accent placement characteristics. This would lead to a very large proliferation of prosodic categories between the prosodic word and the phonological phrase, e.g., compound group-foot-foot (CG-FF), compound group-foot/word-word (CG-FWW), compound group-word-foot (CG-WF), compound group-mono-phrasal (CG-MP), compound group-bi-phrasal (CG-BP), and compound group-word-phrase (CG-WP). A more reasonable solution may reduce the hypothetical set of prosodic categories to four, if we collapse foot-foot, foot-word, word-foot, and word-word into one category with similar characteristics: loss of accent on N1 and N2, loss of register on N2, and placement of accent somewhere in the word (except in the foot-foot case, where the grammar responsible for unaccentedness will force the compound to be unaccented). This would leave a CG for all of the word compounds (CG-W), and the three CGs for phrasal compounds. In either case, the desirability of such a solution is questionable, however. First, if prosodic constituents are hypothesized to be universal (Bennett and Elfner 2019), then should we expect to find more languages using such a large set of prosodic categories between the prosodic word and phonological phrase categories, or otherwise, should we assume that all such intermediate categories are present across languages? This also seems suspect within Kansai Japanese prosody as well, as all six/four of these categories are used precisely when compound words are involved. Outside of compound words, prosodic words and phonological phrases are used instead. Finally, as discussed by Ito and Mester (2013), the over-proliferation of prosodic categories runs counter to the hypothesis that categories reflect syntactic structure. Whereas prosodic words and phonological phrases reflect syntactic terminals and syntactic phrases, the hypothetical large set of intermediate prosodic categories given here would not have a stable syntactic correspondent, clearly seen from considering the syntactic structure of compounds, as discussed in Chapter 3, and repeated below.

(220)



The six/four hypothetical intermediate prosodic categories above would have to be mapped from the same x^0 mother node.

Even if we admit the possibility of six/four different intermediate prosodic categories, associating the constellation of patterns of accent loss, register loss, and accent placement to the different prosodic categories seems stipulative at best, especially if both component words (which are also x^0s in the syntactic structure) are mapped to prosodic words. For example, assuming the smaller set of hypothetical compound groups, in the case of the compound group for word compounds (CG-W), this prosodic category requires both of its daughter nodes to lose accent, requires the second daughter node to lose register, and requires an accent to be placed somewhere in the word. However, in the case of the compound group of word-phrase compounds (CG-WP), this prosodic category requires both of its daughter nodes to keep their registers, requires the first daughter to lose its accent, and requires its second daughter to keep its original accent in place. These categories would have to differ in this way despite the daughters being otherwise the same, in terms of prosodic category, as both are prosodic words, as shown below.

(221) a. CG-W b. CG-WP

ω ω ω ω

Another problem with this proposal is that it is not clear how these different prosodic categories are hierarchically arranged, as all of them are located somewhere between the prosodic word and the phonological phrase, but they never interact with each other, as they represent different compound types.

A more reasonable solution would be to attempt to recategorize all of the previously identified compound types with non-recursive structure, according to the prosodic category to domain correspondence discussed in the previous chapter. Let us consider this possibility in Tokyo Japanese. First, I repeat the six structures found in Tokyo Japanese below.

(222) Typology of prosodic structures in Tokyo Japanese (Ito and Mester 2021)

a. Foot-foot

ω
f f

kome-gura
'rice warehouse'

b. Word-foot

ω
ω f

temuzu'-gawa
'River Thames'

c. Foot-word

ω
f ω

kuti-ge'nka
'oral quarrel'

d. Word-word

ω
ω ω

takusii-ga'isya
'taxi company'

e. Mono-phrasal

φ
ω ω

tihoo-kensatu'tyoo
'local prosecutor's office'

f. Bi-phrasal

φ
φ φ

tiho'o-kookyooda'ntai
'local public organization'

As discussed in the previous chapter, the domain of accent and culminativity was determined to be the minimal phonological phrase, and the domain of compound accent was determined to be the maximal, non-minimal prosodic word. Since this discussion disallows recursion, the structure in (222d) is not allowed and a compound group (CG) must be used for the top node instead. In that case, since (222d) is a word-word compound, which receives compound accent, the domain of compound accent must be the compound group. Accordingly, the compounds in (222b) and (222c) must also involve a compound group, as recursion is not allowed, and both compound types place a new compound accent. The foot-foot compound type in (222a) does not show compound accentuation and does not violate any potential restriction on recursion, so I leave this structure as-is. Drawing from earlier treatments of Japanese involving the minor/accentual phrase as discussed in the previous chapter in order to avoid recursive phonological phrases, all “word compounds” are assumed to be contained within a minor phrase, ensuring accent culminativity and the ability to have an accent.

Moving on to phrasal compounds, (222e) shows only one accent, as the accent of *tiho’o* ‘land’ has been dropped. However, the accent of N2 *kensatu’tyoo* ‘prosecutor’s office’ remains in place, meaning that we are no longer dealing with compound accent. The compound group must not be the relevant top level node here. Since the compound’s features coincide with the features of the minor phrase (MiP) as the domain of accent culminativity and accent (excluding the fact that minor phrases do not otherwise remove accent from material contained within them), I treat these compounds as having MiP as the top level node. Alternatively, they could be mapped to another prosodic category, such as DG, in order to reflect this non-MiP characteristic. Finally, compounds of the (222f) type clearly have minor phrases as their constituents, as both words keep their original accents, just as non-compound minor phrases do. The top level node can be the major phrase (MaP), which is the prosodic category proposed to exist above the minor phrase in earlier treatments of Japanese prosody. In this respect, they look very much like non-compound major phrases, which are strings of minor phrases. With this, the following typology, without recursion can be proposed.

(223) Typology of prosodic structures in Tokyo Japanese without recursion

a. Foot-foot

ω
f f

kome-gura
'rice warehouse'

b. Word-foot

CG
ω f

temuzu'-gawa
'River Thames'

c. Foot-word

CG
f ω

kuti-ge'nka
'oral quarrel'

d. Word-word

CG
ω ω

takusii-ga'isya
'taxi company'

e. Mono-phrasal

MiP (or DG)
ω ω

tihoo-kensatu'tyoo
'local prosecutor's office'

f. Bi-phrasal

MaP
MiP MiP

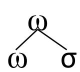
tiho'o-kookyooda'ntai
'local public organization'

This seems at first like a plausible way to account for Tokyo Japanese. This proposal completely eliminates recursion from consideration, and the different behaviors of the different compounds are associated with different prosodic categories. Since the position of accent in (223b) through (223d) can be determined by constraints placing accent as far to the right as possible, while not being in a final foot, accent location does not have to depend on which prosodic category is used – all of these compounds can have a compound group as their top level node. (223a)-type compounds do not have a CG, and so they do not receive compound accent at all. Since accent is a feature of the head of a minor phrase, (223e)-type compounds only retain the accent of their rightmost member. Finally, (223f)-type compounds keep all of the features of their members because both are contained with minor phrases.

One major problem for this analysis is that (223f)-type compounds have their own MaP as the top level node. When words are grouped together in a sentence, their top level node is also a MaP. If a (223f)-type compound is grouped together with other words, then the result will be a recursive MaP, which is not permitted without recursion. Another issue, which was mentioned above the typology, is that other than the use of the MiP for compounds as proposed above, words within MiPs in non-compound sequence do not lose accent. Instead, in normal sequences, two MiP levels are projected instead, and both accents are kept intact, which would result in a structure like the (223f) compound type. If we are to hold to the standard that the same phenomena must be observed in the same prosodic categories, then what must be involved in (223e) is another prosodic category such as DG. Third, we are left with the same problem that there is a proliferation of prosodic categories without a stable syntactic correspondent, and, if DG is used instead of MiP, two intermediate prosodic categories whose hierarchical arrangement in the prosodic hierarchy is unclear.

Given the issues with proposals that maintain the Strict Layer Hypothesis, it seems that loosening this restriction and allowing at least some recursion is reasonable. Indeed, as mentioned earlier in this dissertation, work on the syntax-prosody interface such as Ito and Mester (2007), Selkirk (2011), and Elfner (2015) has suggested that the Strict Layer Hypothesis as originally formulated is too strong. There are two major ways forward from this conclusion. The first way is the complete abandonment of the Strict Layer Hypothesis, which would allow for recursion to occur with any prosodic category and to any degree. The second way is simply a weakening of the Strict Layer

Hypothesis, as in e.g., Vigário (2010). For example, recursion may be allowed if the recursion is asymmetrical, such as when accounting for cliticization, where the addition of a clitic only adds material to a previously existing prosodic word, with the result being another prosodic word, where processes which occur in the prosodic word domain still hold. An acceptable structure in this scenario might be the following, an asymmetrical recursion structure for a word with a one-syllable enclitic.

(224) 

A version of the re-analysis of Tokyo Japanese above could be done with only asymmetrical recursion, but because of the distinction between word-word compounds (which place a compound accent) and mono-phrasal compounds (which do not), an intermediate prosodic category, such as the compound group, will still be needed. Symmetrical recursion is not admitted in approaches which admit asymmetrical recursion (as discussed e.g., in Vigário 2010, and Frota and Vigário 2013), so bi-phrasal compounds will need a still-higher prosodic category as the top level node. It might be proposed that the components of bi-phrasal compounds are instances of some level lower than the phonological phrase, but this runs into trouble because their characteristics are otherwise identical to non-compound phrases in Tokyo Japanese sentences, showing a retained accent and initial rise. This is a problem in Kansai Japanese as well, as the components of bi-phrasal compounds and sequences of words in non-compound sentences retain their accent and register.

Vigário (2010) and Frota and Vigário (2013) argue that some recursion should be permitted but that all recursion is asymmetrical and may only involve adjunction, not coordination. In the proposal of Vigário (2010), a category called the prosodic word group is argued for, a level intermediate between a prosodic word and a phonological phrase. Kansai Japanese prosody can serve as important evidence for recursion. For example, the prosody of both bi-phrasal compounds and non-compounds in Osaka Japanese, a Kansai Japanese dialect, are very similar. Consider again the following examples, comparing the compound in (225a) with the verb phrase in brackets in (225b), which were first presented in Chapter 3.

(225) Compound vs. non-compound prosody in Osaka Japanese

a. Compound (bi-phrasal) (Nakai 2002): $\underline{\text{tyu}}\text{u}\overline{\text{u}}{'}\underline{\text{oo}} - \overline{\text{koomin}}{'}\underline{\text{kan}}$ ‘central public hall’

b. Non-compound (Kori 1987):

$\overline{\text{Minamida}} - \text{ga}\ [\underline{\text{naniwa}}\overline{\text{mi}}{'}\underline{\text{yage}}\underline{-\text{o}}\ \overline{\text{miteru}}{'}] - \underline{\text{wa}}$. ‘Minamida is looking at a souvenir of Osaka!’

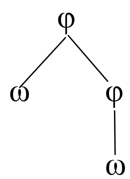
Crucial in this comparison is that the compound in (225a) and the last two words (the verb phrase) of the non-compound verb phrase in (225b) (^{L}*naniwami'yage-o* ‘souvenir of Osaka (acc.)[36]’ and ^{H}*miteru'-wa* ‘looking-emphatic particle’) have essentially the

[36] Note that the object in this verb phrase is a word-word compound, ^{L}*naniwa-mi'yage* ‘souvenir of Osaka.’

same prosodic profile. This pattern suggests that the two words in each expression actually belong to the same prosodic category, despite the former being a compound word and the latter being the verb phrase in a full intonational phrase. I suggest here that this category is the phonological phrase (φ) in both cases. If this is in fact the case, then when bi-phrasal compounds are included in larger phrases, e.g., ^{H}*minamida-ga* ^{L}*tyuu'oo-*^{H}*koomin'kan-o* ^{H}*miteru'-wa* 'Minamida is looking at the central public hall!,' recursive structure involving symmetrical recursion of φ would be expected to result. Such a finding would be compatible with theories that allow for both symmetrical and asymmetrical recursion, but it is not clear how theories that do not allow both would account for it. This is because there does not seem to be an intermediate category that could be at play here, given that bi-phrasal compound prosody and non-compound prosody have the same characteristics. Given that they are identical, they must both be phonological phrases, which necessitates either that the top level node also be a phonological phrase (a case of the as yet unadmitted symmetrically recursive phonological phrase in limited recursion approaches) or some higher category.

A counterargument to this proposal is to say that so-called "bi-phrasal compounds" are actually not compounds at all, in terms of prosodic structure, but simply sequences of two phonological phrases that happened to come from a compound syntactic structure. Such a proposal would in the first place violate a mapping constraint requiring that syntactic nodes (in this case, the one connecting the two components together as a compound) be mapped to prosodic structure nodes. However, assuming that bi-phrasal compounds are simply sequences of phonological phrases not within a compound prosodic structure and thus avoiding recursive phonological phrases creates an issue when word-phrase compounds are considered.

(226) Word-phrase compounds



^{H}*simin-*^{L}*kaigi'situ* ← ^{H}si'min + ^{L}kaigi'situ
'citizens meeting room'
^{L}*tyuuoo-*^{H}*eiga'kan* ← ^{L}tyuu'oo + ^{H}eiga'kan
'central movie theatre'

As in the case of bi-phrasal compounds, N2 is mapped to a phonological phrase, as its characteristics – a retained accent and a retained register – are identical to non-compound phonological phrases. However, the fact that N1 loses its accent signals that N1 and N2 are truly bound together as a compound. If N2 were simply an independent phonological phrase, it would have no influence on N1, and N1 should be expected to retain its accent and be mapped to its own independent phonological phrase, making it identical to bi-phrasal compounds. However, this is not the case. Instead, N1 is dependent on being joined with N2, causing N1 to lose its accent, as it is not the head of a minimal phonological phrase. The consequence of allowing recursive structure in this case is that recursion will occur when the compound is placed in the context of non-compound sequences. However, this is not an undesirable consequence in a theory that allows recursion, and in fact allows for the unification of the prosody of some compound components (namely, those that appear in phasal compounds) with the prosody of non-compound phrases. In this way, Kansai Japanese can provide evidence that suggests recursive structure, both symmetrical and asymmetrical, in itself, further supporting the previous application of recursion in Tokyo Japanese.

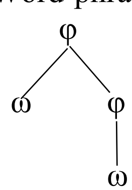
Typologically speaking, the word-phrase compound also adds to the body of evidence for prosodic adjunction structures, providing a confirmation of the theory developed by Ito and Mester (2003, 2007, 2018a, 2021). Since Kansai Japanese instantiates seven of the eight possibilities predicted by Ito and Mester, the question of whether the eighth structure, the phrase-word structure, can be found arises as well.

The next chapter turns to an even deeper look at the word-phrase parse and what conditions its availability to compounds.

Chapter 5: Where Do Word-Phrase Compounds Come From?

As I have shown in the preceding discussion, it is clear that the word-phrase compound must be treated as a separate class of compound. Its prosodic signature is different from the other six types of compounds, seeming to be a mix of characteristics from the other types. Word-phrase compounds have in common the characteristic of losing the lexical accent of N1 with the non-recursive word-word, foot-word, word-foot, word-word, and mono-phrasal compounds. The lexical accent of N2, however, is not lost and replaced by compound accent, as it is in word-foot and word-word compounds, but rather, it is retained, as it is in mono-phrasal compounds. Finally, the register tones of N1 and N2 are both retained, as they are in bi-phrasal compounds. Word-phrase compounds are shown in the examples below, given with the proposed word-phrase structure.

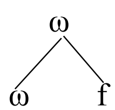
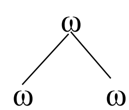
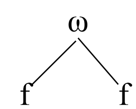
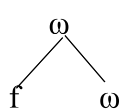
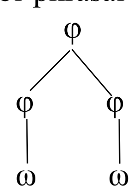
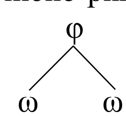
(227) Word-phrase compounds



^{H}*simin-*^{L}*kaigi'situ*	← ^{H}si'min + ^{L}kaigi'situ
'citizens meeting room'	
^{L}*tyuuoo-*^{H}*eiga'kan*	← ^{L}tyuu'oo + ^{H}eiga'kan
'central movie theatre'	

The difference among the other six types of compounds is attributed to differences in the results of syntax-prosody mapping, where the word-word compound is the result of a perfect match enforced by relevant MATCH constraints, and foot-foot, foot-word word-foot, mono-phrasal, and bi-phrasal compounds arise due to phonological well-formedness constraints being ranked higher than the MATCH constraints, resulting in non-isomorphisms between their syntactic and prosodic structures.

(228) Prosodic structures of the other six Kansai Japanese compounds

Recursive		Non-Recursive
Adjunction	Coordination	
a. word-foot  ^{H}*nyuugaku'-bi* ‘matriculation day’ ^{L}*kabuto'-musi* ‘beetle (lit. helmet bug)’	b. word-word  ^{H}*syodoo-kyo'ositu* ‘calligraphy classroom’ ^{L}*otome-go'koro* ‘girl’s feelings’	c. foot-foot  ^{H}*tori-goya* ‘aviary’ ^{L}*ai-iro* ‘indigo blue’
d. foot-word  ^{H}*oya-go'koro* ‘parental love’ ^{L}*te-ryo'ori* ‘home cooking’	e. bi-phrasal  ^{H}*ni'hon-*^{L}*buyookyo'okai* ‘dance association of Japan’ ^{L}*tyuu'oo-*^{H}*koomin'kan* ‘central public hall’	f. mono-phrasal  ^{H}*nairon-suto'kkingu* ‘nylon stockings’ ^{L}*keizi-sosyoo'hoo* ‘Code of Criminal Procedure’

(229) Summary of prosodic realizations of Kansai Japanese compounds

Word Compounds	Accent Location	Accent Loss	Register Retained
Foot-Foot ω f f	None (unaccented)	N1 and N2	N1
Word-Foot ω f f	N1 (last mora)	N1 and N2	N1
Foot-Word, Word-Word ω f ω ω ω f	N2 (first mora)	N1 and N2	N1

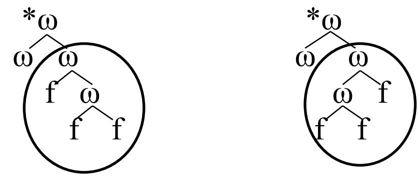
Phrasal Compounds	Accent Location	Accent Loss	Register Retained
Mono-phrasal φ ω ω	N2 (original location)	N1 only	N1
Bi-phrasal φ φ φ	N1 and N2 (original locations)	None	N1 and N2
Word-Phrase φ ω φ	N2 (original location)	N1 only	N1 and N2

The following are schematics of the phonological well-formedness constraints which prevent perfect matching and the compounds they are crucial in producing. Recall that the word-word compound results from a perfect match from syntactic structure.

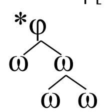
(230) WORDBINARITY → Foot-foot, word-foot, foot-word

*ω
|
f

(231) BINMAXHEAD($\omega_{[+max, -min]}$)-LEAVES → Mono-phrasal



(232) BINMAX-$\varphi_{[+min]}$ (BINMAX-φ) → Bi-phrasal



Word-phrase compounds are not so straightforwardly derived from this competition. As discussed previously, the prosodic structure I propose for word-phrase compounds involves a non-isomorphic mapping from the syntactic structure, where the maximal N terminal is mapped to a φ, the first component N is mapped to a ω which is an immediate daughter to φ, and the second component N is mapped to a ω which is contained within a φ which is daughter to the maximal (in the compound) φ, resulting in an asymmetrically recursive structure. However, this non-isomorphism does not seem to be correlated with the well-formedness constraints that force the non-isomorphisms found in the other compounds, as the primary factor behind the competitions involving those well-formedness constraints is the length of N2, and word-phrase compounds have N2s which show the range of lengths found in compounds which are mapped to other compound prosodic structures. I refer to this issue as the "N2 length problem."

The issue is compounded by the fact that, in Nakai's dictionary, the word-phrase parse is almost never the sole prosodic possibility for a compound, which I refer to as the "no unique word-phrase parse problem." Nakai (2002) offers several generalizations for what kinds of N2s, in terms of morphological composition and word origin (namely, foreign loanwords), may allow a word-phrase compound, but these generalizations are only descriptive, are subsets of criteria which predict other compound types, and are nonetheless still related to N2 length. As might be expected from an understanding of Kansai Japanese compound typology based heavily on N2 length, even with the morphological structure of N2 and its loanword status taken into account, this results in non-word-phrase parses being possible for word-phrase parse candidate words as well. Some other factor or set of factors seems to be involved.

The N2 length problem and the no unique word-phrase parse problem are discussed in more detail below. This chapter also explores and argues for possible explanations which are not entirely syntactic or phonological in nature but are rather also gradient and usage-based. Some discussion of semantic factors is also offered, though an implementation of this is not pursued in the present analysis due to the limited data sample.

5.1 The N2 Length Problem and the No Unique Word-Phrase Parse Problem

In Chapter 3, I presented a syntax-prosody mapping account for the six compound types whose prosodic structures could be predicted based on the length of their second members, using constraints requiring minimal binarity for prosodic words, maximal binarity for heads of maximal prosodic words, and maximal binarity for minimal phonological phrases.

A problem arises when attempting to account for word-phrase compounds in the same way: no N2 length-based criterion can be formulated which can be attributed uniquely to the word-phrase structure, as all length based criteria already describe other compound prosodic structures. Foot-foot and word-foot compounds arise when N2 is one to two moras in length, foot-word and word-word compounds arise when N2 is three to four moras in length, mono-phrasal compounds arise when N2 is five moras or longer, and bi-phrasal compounds arise when N2 is longer than three feet (six moras) in length. Given this, the only remaining length-based criterion which could describe word-phrase compounds uniquely is one in which N2 is longer than some number of feet greater than three and/or some number of moras greater than six, at some length longer than what already describes bi-phrasal compounds, if not the same criterion as bi-phrasal compounds.

However, this criterion has limited, if any, use as a predictor for when word-phrase compounds occur. The longest words which Nakai records in his dictionary are ten moras long in total, all compound words. Ten mora words are fewer in number than nine mora words, and significantly fewer in number than seven or eight mora words. This is supported by a cross-linguistic generalization that long words are uncommon. In a survey of word lengths observed in translations of the Book of Mark in the Bible into 102 languages, Stanton (2016) finds first that 94% of the 19,239 Japanese words surveyed cluster around 1, 2, and 3 syllables in length (where each vowel is counted as a syllable), and 5% of the remaining words are 4 to 5 syllables in length. Words 6 syllables and longer together account for the remaining 1% of words. Second, taking the data from the 102 languages together and assuming based on Stanton's discussion that the median percentage of each word length represents the average percentage of words of that length in the corpus of these languages, words of six or more syllables constitute only 1% of the corpus across 102 languages. Of course, because Stanton's survey is based on syllables, where every vowel counts as a syllable, this means that six-mora words like *sinkansen* 'Shinkansen,' which has three vowels (syllables) but six moras due to the moraic nasals at the end of each syllable, are grouped with three-syllable, three-mora words like *sakura* 'cherry blossom.' But, if such longer words up to six moras are represented as the variable x, their number can be no greater than (16 – x)% of Stanton's corpus, as she reports 16% of the Japanese words surveyed are three syllables in length. Words seven moras or greater will be included in the remaining 6% of words four syllables or longer. To supplement this in more concrete moraic terms, of the 56,812 words in Sugito (1995)'s Osaka-Tokyo dictionary, only 5.7% are 7 moras or longer, corresponding well to the estimate from Stanton's corpus. Given this, the relevant test cases for a particularly long N2 length criterion are quite uncommon, though it does not exclude the possibility of such a criterion.

The greater issue for such a length-based criterion concerns what N2 lengths are *actually* observed in word-phrase compounds. This is presented in the table in (233) below, ordered from longest to shortest by the second column, N2 length, along with their accompanying N1 lengths and total lengths, all in moras, and the number of occurrences of each type.

(233) Lengths in moras in entries with word-phrase prosody in Nakai (2002)

N1 Length	**N2 Length**	**Total Length**	**Count**
1	9	10	0
2	8	10	0
3	7	10	2
2	7	9	4
4	6	10	8
3	6	9	4
2	6	8	10
5	5	10	3
4	5	9	7
3	5	8	22
2	5	7	2
6	4	10	1
5	4	9	1
4	4	8	24
3	4	7	17
5	3	8	1
4	3	7	1
3	3	6	2
4	2	6	1
2	3	5	2
3	2	5	2
			Total: 114

An examination of the 114 entries that fit the word-phrase parse in Nakai's dictionary (which are mostly, though not entirely, compounds; less than 5 are non-compounds) reveals only five compound words with an N2 seven moras in length and no compound words with an N2 eight or more moras in length (which would require an N1 one or two moras in length in order to be included in Nakai's dictionary, due to the longest entries being ten moras in total). Furthermore, of the 114 words, the majority (93) are seven, eight, or nine moras total in length, with 20 seven mora words, 57 eight mora words, and 16 nine mora words. Of the 57 eight mora words, 24 have four mora N2s, 22 have five mora N2s, 10 have six mora N2s, and one has a three mora N2. Among the 20 seven mora words, 17 have four mora N2s, and among the 16 nine mora words, 7 have five mora N2s, 4 have six mora N2s, and 4 have seven mora N2s. Again, if the distribution in Nakai's dictionary is reflective of the distribution of compounds which may have the word-phrase parse in Kansai Japanese more broadly, then this distribution suggests that word-phrase compounds do not tend to have particularly long N2s. Indeed, they tend to have four to six mora N2s (99 out of the 114, 86.8%, of the entries in Nakai's dictionary), which places them in the same territory in terms of N2 length as longer word-word compounds and mono-phrasal compounds. Interestingly, it seems that there is some clustering around 8 mora compound words, which have 4, 5, or 6 mora N2s, further suggesting some role of N2 length in the word-phrase compound.

Given the tendencies shown above, it can be seen that N2 length in word-phrase compounds generally overlaps with N2 lengths found in other compound types. It is clear, therefore, that although length is likely to be an important factor in determining when a compound can be a word-phrase compound (for example, it seems to be possible for an N2 to be *too short* to yield a word-phrase compound, based on the counts above, though there are cases with short N2s, though these include non-compound sequences such as *uti-no hito* 'my husband, family member'), N2 length is not by itself a sufficient criterion in the same way that N2 length predicts prosodic structure for other compound types. It seems that there must be some other factor or factors at play that opens up the possibility for the word-phrase compound.

As a starting point for identifying the relevant factor or factors, let us consider Nakai (2002)'s descriptive generalizations of some of the characteristics of the word-phrase compounds in his dictionary. Examples from Nakai are given below each criterion. To aid in distinguishing the parses, for these and following examples in the chapter, a parenthetical is added to each compound with the following abbreviations: WP for word-phrase, M for mono-phrasal, B for bi-phrasal, and WW for word-word. The word-phrase parse is listed first in each example, followed by the mono-phrasal and/or bi-phrasal parses, and, in the one example where a word-word parse is also available, the word-word parse is given last.

(234) Nakai (2002)'s descriptive generalizations for word-phrase compounds

a. When N2 is itself a compound, where either of the elements of N2 is three moras or longer

   i. ^{L}*tyuuoo-*^{H}*eiga'kan* 'central movie theatre' (WP)

   ii. ^{H}*simin-*^{L}*kaigi'situ* 'citizens' conference room' (WP)

b. When N2 is a monomorphemic word five moras in length or longer; N2 is usually a loanword in this case.

   i. ^{L}*howaito-*^{H}*kurisu'masu* 'White Christmas' (WP)

   ii. ^{H}*syodai-*^{L}*tyanpi'on* 'first generation champion' (WP)

c. Sometimes, when N2 is a four mora loanword which is a low register word and has accent on the second mora

   i. ^{L}*gasorin-*^{H}*suta'ndo* 'gas station' (WP)

   ii. ^{L}*singata-*^{H}*misa'iru* 'new missile model' (WP)

Given that criteria (234b-c) refer to length and are usually loanwords, their corresponding examples have English loanword N2s which are five and four moras in length respectively. The examples under (234a) also have N2s which are five moras in length, but unlike the N2s in the examples under (234b-c), which are monomorphemic, the N2s in the examples under (234a) are both compounds. The N2 of (234ai) is the compound *eiga-kan*, 'movie theatre' and, following the analysis of Kubozono, Ito, and Mester (1997) of each kanji in a Sino-Japanese compound being a separate Sino-Japanese morpheme, has three morphemes, *ei* 'project (verb),' *ga* 'picture,' and *kan* 'building.' The N2 of (234bi) is the compound *kaigi-situ* 'conference room' and has three morphemes, *kai* 'meeting,' *gi* 'deliberation,' and *situ* 'room.'

These generalizations are helpful in suggesting that words can indeed be too short to participate in word-phrase compound mapping, in at least two ways that interact with each other. First, words may be too short in terms of mora count, as generalizations (234b-c) concern four to five mora loanword N2s, while generalization (234a) concerns compound word N2s, which are often four moras or longer. If a compound word has an N2 which is three moras in length or shorter, then, it is likely to not have a word-phrase parse. Second, words may be too short in terms of morpheme count, interacting with word length in moras. Thus, a monomorphemic five-mora N2 may be long enough mora-wise to trigger the availability of the word-phrase parse, but a monomorphemic three-mora word may be too short to trigger word-phrase compounds, expectedly on moraic length grounds, but also because it is too small on morphemic length grounds. Even a bimorphemic three or four-mora compound word may be too short, such as *daigaku* 'university,' which is composed of the morphemes *dai* 'large' and *gaku* 'study' or *idoo* 'moving,' which is composed of the morphemes *i* 'shift' and *doo* 'move.'

However, there are limitations to the ability of these generalizations to predict whether the word-phrase parse is available. Nakai himself notes one: although many word-phrase compounds have an N2 which is a compound in which either element is three moras long or longer, there are also word-phrase compounds in which neither element in N2 is three moras long, such as the following examples, given by Nakai.

(235)

a. ^{H}*onna-*^{H}*niwa'si* 'female gardener' (WP)

b. ^{H}*onna-*^{L}*hari'si* 'female acupuncturist' (WP)

c. ^{L}*niwaka-*^{H}*niwa'si* 'bandwagon/fairweather gardener' (WP)

d. ^{L}*niwaka-*^{L}*hari'si* 'bandwagon/fairweather acupuncturist' (WP)

These four examples have the N2s *niwasi* 'gardener' and *harisi* 'acupuncturist.' The second element in both compounds is the monomoraic Sino-Japanese morpheme *si* 'master.' In *niwasi*, the first element is the bimoraic native morpheme *niwa* 'garden,' while in *harisi*, the first element is the bimoraic native morpheme *hari* ‘acupuncture needle.’ Such cases are relatively few in number in Nakai’s dictionary – only 9 of the 114 word-phrase entries have an N2 three moras in length, of which 6 have a polymorphemic N2. It is possible that a lexeme-specific effect is involved here, which may be like analogy effects described by Plag (2013), wherein compounds with the same N2 in English are more likely to have the same stress patterns. Here, (235a-b) both have *onna* ‘woman’ as their N1, and (235c-d) both have *niwaka* ‘bandwagon/fairweather’ as their N1.

The greater limitation, however, is that it is not possible to use any of the generalizations to reliably predict when a compound will have the word-phrase parse available to it, at least in terms of whether a word-phrase parse is recorded by Nakai, suggesting that these generalizations may point to factors which are necessary, but not sufficient for the word-phrase parse. The following are examples of compound words which fit Nakai’s descriptive generalizations but which are not recorded to have word-phrase parses. Examples (236a-b) fit the description of generalization (234a), examples (236c-d) fit the description of generalization (234b), and examples (236e-f) fit the description of generalization (234c), but none have recorded word-phrase parses.

(236)

a. ^{H}*tennen-kinen’butu* or ^{H}*tennen-kine’nbutu* ‘natural monument; protected species’ (M)

b. ^{H}*rentai-hosyoo’nin* or ^{H}*rentai-hosyoonin* ‘joint surety’ (M)

c. ^{H}*happoo-sutiro'oru* 'styrofoam' (M)

d. ^{H}*gyakuten-hoomuran* 'unexpected comeback' (M)

e. ^{H}*rooraa-suke'eto* 'rollerskates' (M)

f. ^{H}*dokutaa-suto'ppu* 'doctor's orders (to refrain from something)' (M)

First, let us consider (236a-b), which have N2s which are themselves compounds, as described in generalization (234a), (236a) has a five mora, three morpheme N2, *kinenbutu*, made up of the morphemes *ki* 'account,' *nen* 'wish,' and *butu* 'thing,' while (236b) has a five mora, three morpheme N2, *hosyoonin* 'guarantor,' made up of the morphemes *ho* 'preserve,' *syoo* 'proof,' and *nin* 'person.' Both have the same characteristics as (234ai) and (234aii), which also have five mora, three morpheme N2s. The N2 of (234ai) is *eiga-kan* 'movie theatre,' consisting of the morphemes *ei* 'project (verb),' *ga* 'picture,' and *kan* 'building,' while the N2 of (234aii) is *kaigi-situ* 'conference room,' consisting of the morphemes *kai* 'meeting,' *gi* 'deliberation,' and *situ* 'room.' Despite this, neither (236a) nor (236b) have a recorded word-phrase parse in Nakai's dictionary. Instead, (236a) has two mono-phrasal parses, one with the accent on the third mora of N2 and one with the accent on the second mora of N2, while (236b) has one accented mono-phrasal parse and one unaccented mono-phrasal parse. The fact that these have multiple reported mono-phrasal parses may be due to variation in the pronunciation of N2 in the speakers surveyed.

Turning to examples which have loanword N2s, (236c) and (236d) have the five mora loanword N2s *sutirooru* 'styrene (from German *styrol*)' and *hoomuran* 'home run" but do not have recorded word-phrase parses. (236c) has a mono-phrasal accented parse, while (236d) has a mono-phrasal unaccented parse. This is unlike the two compounds in (234bi) and (234bii), which also have five mora loanword N2s and have word-phrase parses, namely *kurisumasu* 'Christmas' in (234bi) and *tyanpion* 'champion' in (234bii).

Finally, (236e) and (236f) have four mora loanword N2s that are low-register and accented on the second mora when in isolation, ^{L}*suke'eto* 'skate(s)' and ^{L}*suto'ppu* 'stop,' but, again, neither compound has a word-phrase parse; instead both have mono-phrasal parses. This is unlike (234ci) and (234cii), which have the low-register, peninitial accented N2s *sutando* 'stand' and *misairu* 'missile' and which both have word-phrase parses. Thus, as the examples in (236) demonstrate, simply having an N2 which has the characteristics of as described in Nakai's generalizations for N2s in word-phrase compounds is not sufficient for a compound to have the word-phrase parse available to it.

A final complication for identifying a criterion that can predict word-phrase compounds is the no unique word-phrase parse problem. Whatever criteria are involved in influencing the availability of the word-phrase parse, such criteria cannot in general uniquely categorize a compound as a word-phrase compound. Whereas compounds are generally reliably mapped to word-foot, word-word, mono-phrasal and (to some extent) bi-phrasal compounds based on the length-based criteria previously discussed (with some compounds able to be parsed as either mono-phrasal or bi-phrasal), the word-phrase parse is never recorded to be the sole parse available to a compound. Rather, it is always one of several parses, usually alongside a mono-phrasal or bi-phrasal parse or both, but in shorter compounds, sometimes also alongside a word-word parse. Observe in the following examples. Note that, in some cases, a compound may have multiple instantiations of the word-phrase parse, as Nakai's data is based on multiple speakers. This can be seen in (237d), where examples (i-iii), all show N1 *tihoo* 'region' losing its lexical accent, the compound N2 *koohuzei* 'delivery' with its compound accent, and different registers on N1 and N2. Note that there is a parse ^{H}*tihoo-koohu'zei* which is listed here as mono-phrasal, as this is how Nakai (2002) reported it. There is a possibility that it is another type of word-phrase parse, but this is not clear just from the dictionary.

(237)

a. *mokei-hikooki* 'model airplane'

i. ^{L}*mokei-*^{H}*hiko'oki* (WP)

ii. ^{L}*mokei-hiko'oki* (M)

b. *nama-konkuriito* 'liquid concrete'

i. ^{L}*nama-*^{H}*konkuri'ito* (WP)

ii. ^{L}*nama-konkuri'ito* (M)

c. *sutoppu-wotti* 'stopwatch'

i. ^{L}*sutoppu-*^{H}*wot'ti* (WP)

ii. ^{L}*sutoppu-wot'ti* (M)

iii. ^{H}*sutoppu-wot'ti* (M)

iv. *^{H}sutoppu-wo'tti* (WW)

d. *tihoo-koohuzei* 'tax allocated to local governments'

i. *^{H}tihoo-^{L}koohu'zei* (WP)

ii. *^{L}tihoo-^{H}koohu'zei* (WP)

iii. *^{L}tihoo-^{L}koohu'zei* (WP)

iv. *^{H}tihoo-koohu'zei* (M)

v. *^{H}ti'hoo-^{L}koohu'zei* (B)

vi. *^{L}tiho'o-^{L}koohu'zei* (B)

Furthermore, in some cases, Nakai marks whether a prosodic pattern is uncommon compared to the other recorded patterns. Of the 114 entries with word-phrase parses, there are 30 cases in which the word-phrase parses are listed as uncommon patterns compared to the other, non-word-phrase patterns. There are several additional cases in which a compound has multiple word-phrase parses, where one word-phrase pattern is marked as uncommon, but the others are not – these cases are not included in the count of 30. An example of this is *yagai-konsaato* 'outdoor concert,' which has a common word-phrase parse *^{L}yagai-^{H}konsa'ato* as well as an uncommon word-phrase parse *^{H}yagai-^{L}konsa'ato*. In contrast, the word-phrase parse is listed as equal to the other parses in the remaining 75 cases. The word-phrase parses in the compounds in (237) above are among these 75. In only three cases is the word-phrase parse listed as the most common pattern. Two are *^{L}niwaka-^{H}niwa'si* 'bandwagon/fairweather gardener,' *^{L}niwaka-^{H}hari'si* 'bandwagon/fairweather acupuncturist,' which both have the word-phrase pattern as their most common pattern, alongside the uncommon mono-phrasal parse ^{L}*niwaka-niwa'si* for the former and the two uncommon mono-phrasal parses ^{L}*niwaka-hari'si* and ^{L}*niwaka-ha'risi* for the latter. The third is *nikai-tyuugaeri* 'double somersault,' which has the word-phrase pattern ^{H}*nikai-*^{L}*tyuuga'eri* as its most common pattern, and as its less common patterns, another (unaccented) word-phrase parse ^{H}*nikai-*^{L}*tyuugaeri*, a mono-phrasal parse ^{H}*nikai-tyuuga'eri*, and two bi-phrasal parses, ^{H}*ni'kai-*^{L}*tyuugaeri* and ^{H}*ni'kai-*^{L}*tyuuga'eri*. Accordingly, it seems that the norm is for the word-phrase parse to be co-available with other parses. Observe in the following examples. Using an English equivalent of Nakai's notation of a lowercase 's' (for the first letter of *sukunai* 'few'), I mark compounds which are less common compared to the others with "LC" following the compound type, within the parentheses.

(238)

a. *utyuu-hikoosi* 'astronaut'

   i. ^{L}*utyuu-*^{H}*hiko'osi* (WP-LC)

   ii. ^{L}*utyuu-hiko'osi* (M)

b. *ningyoo-gekidan* 'puppet theatre'

   i. ^{L}*ningyoo-*^{H}*geki'dan* (WP-LC)

   ii. ^{L}*ningyoo-geki'dan* (M)

c. *bizin-kontesuto* 'beauty contest'

   i. ^{L}*bizin-*^{H}*konte'suto* (WP-LC)

   ii. ^{H}*bizin-*^{L}*konte'suto* (WP-LC)

iii. ^{H}*bizin-konte'suto* (M)

iv. ^{H}*bizin-ko'ntesuto* (WW)

d. *han-seihukatudoo* 'anti-government activities'

i. ^{L}*han-*^{H}*seihuka'tudoo* (WP-LC)

ii. ^{H}*han-seihuka'tudoo* (M)

iii. ^{H}*ha'n-*^{H}*seihuka'tudoo* (B)

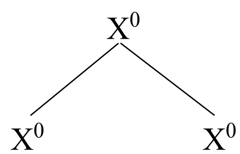
iv. ^{H}*ha'n-*^{L}*seihuka'tudoo* (B-LC)

This is perhaps unsurprising given that the characteristics of compounds which have the word-phrase parse available are shared with other compound types, but it is a complicating factor nonetheless. For the purposes of the present analysis, word-phrase parses will be treated equally regardless of how common it is or whether it is the main parse for a given word. The present analysis aims to identify factors which may lead to the occurrence of the word-phrase parse in any case.

5.2 Discovering Additional Conditioning Factors on the Word-Phrase Parse

Having discussed the N2 length problem and the problem of uniqueness of the word-phrase parse, I turn to factors which may be relevant for the availability of the word-phrase parse. As discussed previously, I treat all compounds as having the same basic syntactic structure of two or more noun syntactic terminals combining to form a new noun syntactic terminal (structure from Chapter 3 repeated in (239) below), and thus, it cannot be special syntactic factors which result in the availability of the word-phrase parse.

(239) Syntactic structure of Japanese compounds



The discussion above argued that although there seems to be a lower limit on phonological or morphological length for whether a compound may have a word-phrase parse or not, no other phonological or morphological length factor can be identified. Given this, I look to non-syntactic, non-phonological, non-morphological factors for potential answers.

The issue of whether a word-phrase parse is available to a Kansai Japanese compound resembles in some respects a well-known issue in English compound prosody. English two-word compounds can be divided into two categories based on their prosody. In one category, compound words have what has been considered (for example by Chomsky and Halle 1968) special compound prosody, with the first element receiving stress, such as in the following compounds, where the compound stress is marked with an acute diacritic: *ápple cake*, *télevision stand*, *ólive oil,* and *dógwalker*. In the second category, compounds are stressed on their second element (or more precisely, are stressed on their second elements in addition to having a stress on the first element, per Bell and Plag (2012)), such as *apple píe, winter sýmphony,* and *main ávenue*. Analyses have long encountered difficulty accounting for these differences in a unified fashion, as it is clear that compounds in both groups share the same syntactic structure, which is especially evidenced in compounds that involve very similar elements, such as the dessert words *apple cake* and *apple pie*, which both have the same first element and which have semantically related, monosyllabic, heavy syllable second elements, but which nonetheless have different prosodic patterns. Accounts often have to invoke exceptions to the rules posited.

This is similar to the case of compound prosody in Kansai Japanese because Kansai Japanese compounds also clearly share the same syntactic structure despite having different prosodic structures, such as in the words *tihoo-kan* 'regional administrator' (word-foot), *tihoo-gikai* 'regional congress' (WW), and *tihoo-koomuin* 'regional government worker' (WP, M, B), which all have the same N1, *tihoo* 'region,' and different N2s of related semantic classes, *kan* 'official,' *gikai* 'congress,' and *koomuin* 'government worker.' An important aspect in which the Kansai Japanese and English cases differ is the level of variation found in how compounds can be pronounced. Whereas Kansai Japanese compounds that have a word-phrase parse available to them always have a non-word phrase parse, usually mono-phrasal or bi-phrasal or both, available to them as well, there is generally less variation in how compound words are pronounced in English. In general, most speakers agree that compounds with the first element stressed have the first element stressed and that compounds with the second element stressed have the second element stressed. This is not to say that there is no variation, even of the sort commonly found in Kansai Japanese compounds. Bell and Plag (2012) briefly discuss that variation is observed in both production and perception. For example, on the production side, they refer to the cases of *boy scout* being pronounced either with left prominence as in *bóy scout* (common in American English) or with right prominence as in *boy scóut* (common in British English) and of *ice cream* having the pronunciations *íce* cream and *ice créam* in free variation. Anecdotally, I observe variation in my own pronunciation of *Santa Cruz*, sometimes with right prominence as *Santa Crúz*, and sometimes with left prominence as *Sánta Cruz*. On the perception side, Kunter (2010), conducting a prominence rating study in English noun-noun compounds, finds that less proficient raters have less reliable ratings when rating compounds with right prominence, which may suggest some variability in the perception of where compound stress occurs as well.

Possible factors that have been proposed for accounting for the variation in English compound prosody which are neither syntactic nor phonological nor morphological include informativeness and the semantic relationship between compound members. Taking into account these factors represents a departure from syntax-prosody mapping accomplished primarily by the interaction of constraints requiring constituent alignment or match, along with surface well-formedness constraints, but as the preceding discussion demonstrates, there seems to be no factor(s) in the syntax, morphology, or phonology which are sufficient to explain the availability of the word-phrase parse. I thus turn to these non-syntactic, non-phonological, non-morphological factors that have previously been proposed to account for compound prosody variation in English and examine their utility for Kansai Japanese. As discussed below, there has been some success in accounting for the differences in English compound prosody (Bell and Plag (2012)) using these factors. After discussing informativeness and the semantic relationship between compound members, I discuss informativeness in terms of Kansai Japanese and develop hypotheses connecting informativeness with the availability of the word-phrase parse.

5.2.1 Informativeness

In this discussion, I use the term "informativeness" following Bell and Plag (2012). This is a statistical/probabilistic measure, related to the notion of "information content" as defined for information theory by Shannon (1948). Bell and Plag use three measures of informativeness: absolute predictability, relative predictability, and semantic specificity. These terms are discussed below for their application in Bell and Plag's study on English compounds.

For Bell and Plag, absolute predictability is measured as the raw frequency of N2 in a corpus, in which greater frequency indicates lower informativeness, and lower informativeness is hypothesized to result in lower likelihood of being stressed. "The raw frequency of N2" is a token-based measure and includes all occurrences of the N2 of a given compound being considered (such as *pie* in *apple pie*) in a corpus, regardless of whether it occurs alone or as the second member of a compound.

Relative predictability is the predictability of a member of a compound occurring with respect to another element. Bell and Plag use three conditional probability measures for relative predictability. The first is the conditional probability of N2 with respect to N1, obtained by dividing the frequency of the whole compound by the frequency of N1, where a higher conditional probability indicates lower informativeness, indicating a lower likelihood of being stressed. This measure, too, is a token-based measure. The second measure is the conditional probability of N2 occurring as the second member of a compound, which they refer to as the family size of N2, and is obtained by dividing 1 by the amount of compound types that have a given N2. The third measure is the conditional probability of N2 given the family size of N1 (that is, the conditional probability of N1 occurring as the first member of a compound). These two measures are both type-based measures. An N1 having a larger family size means that the occurrence of a particular N2 is less probable, as a compound containing both N1 and N2 is only one of a large number of compounds containing N1. Lesser probability of that N1-N2 compound indicates greater informativeness of N2 and a greater likelihood of that N2 being stressed. Bell and Plag briefly discuss that it would also be possible to use a token-based family size measure, in which instead of counting compound types with a given N1 or N2, the sum of all compounds with a given N1 or N2 would be used as the family size measure. However, citing Schreuder and Baayen (1997), who report that type frequency is the more psychologically salient measure in compounds, Bell and Plag use only the type-based family size measure.

Finally, semantic specificity refers to how specific a word is, based on synsets, which are groups of words with similar meanings. The fewer synsets an N2 belongs to, the more specific it is, and the more informative it is, making it more likely to be stressed. A table summarizing these factors is given below.

(240)

Measure	Calculation	Interpretation
Raw frequency of N2 (tokens)	Number of occurrences of N2 in the corpus	Higher value = lower informativeness → lower probability of second stress
Conditional probability of N2 given N1 (tokens)	Frequency of compound / frequency of N1	
Conditional probability of N2 as N2 (types)	1 / family size of N2	
Conditional probability of N1 as N1 (types)	1 / family size of N1	
N2 synsets	The number of synsets N2 belongs to	Fewer synsets = higher informativeness → greater probability of second stress

Bell and Plag conducted an experiment testing these hypotheses (and hypotheses related to other, semantic factors, to be discussed in following subsection) with 17 adult native speakers of British English. Participants were asked to read aloud compounds presented in the carrier sentence *'She told me about the (compound).'* Items included 1,000 experimental item sentences containing noun-noun compounds and 2,000 fillers, consisting of 1,000 filler sentences containing simplex nouns and 1,000 filler sentences containing adjective-noun combinations. The compounds were taken from the demographic section of the British National Corpus (BNC), which consists of 4.23 million words of spontaneous conversation, meaning that any compounds present in this section are compounds that are actually used in daily conversation. The items were then reproduced four times yielding 12,000 tokens, which were then split into lists of 300 sentences with 100 experimental items and no repeated items. Lists were assigned to participants such that no speaker would repeat an item. Each participant read one to five lists, with most participants reading two or three lists, one list per session, with sessions separated by at least one day. 4,000 acceptable tokens were elicited, four tokens for each type, each token spoken by a different participant.

The tokens were also rated by two raters in terms of where they perceived the compound prominence to be – on the left or right word. Both raters had participated in a previous study by Kunter (2010, 2011) on the perception of compound prominence and had been identified in that study as being reliable raters, a group of listeners whose ratings agreed to a statistically significant extent. One rater gave prominence ratings both on-line during reading sessions and at a later time, while the other rater gave ratings only at a later time. Items were included for further analysis if the three ratings were unanimous, resulting in a total of 3,764 tokens. The remaining 236 tokens were excluded. An extra 512 tokens were excluded, as they had estimated family sizes that were disproportionately large compared to actual, manually calculated family sizes, due to a large portion of noun-noun collocations involving them either not being actual compounds, being homonyms, being part of high-frequency formulas (such as *morning*, meaning *good morning*), being likely to be mis-tagged, or which had very small family sizes. This exclusion resulted in 3,252 remaining tokens (representing 864 of the 1,000 original types) for analysis, for which it could be assumed that the estimated family sizes would be highly correlated with the actual family sizes.

Each measure of informativeness for the compounds that were tested was obtained or calculated from the BNC, which consists of 100 million words, in the case of absolute and relative predictability, and from the Wordnet lexical database, in the case of semantic specificity. Lemmatized frequencies of N2 (tokens) were collected and the family size of each N2 (types) calculated from the whole BNC. The conditional probability of N2 based on N1 frequency (a token-based measure) was calculated by collecting lemmatized frequencies for N1 from the BNC, then dividing compound frequencies by frequencies of N1. The conditional probability of N2 based on N1 family size (a type-based measure) was calculated by estimating the family size of N1 from the BNC and dividing 1 by the family size of N1. Synset counts for all N1s and N2s were obtained from either the Wordnet index file for nouns or the online version of the *Oxford English Dictionary*. Synset counts were extracted from the Wordnet for all words in the index file. Synset counts were obtained from the online version of the *Oxford English Dictionary* for nouns which did not occur in Wordnet. Finally, three proper nouns did not occur in either, and these were assumed to have one sense each.

Bell and Plag conducted both a token-based analysis and a type-based analysis. In the token-based analysis, they find significant roles for informativeness in predicting compound stress type, for all three types of measures for informativeness – absolute and relative predictability and semantic specificity – in accordance with their hypotheses. That is, that less informative N2s are less likely to receive stress. In more concrete terms, if *stand* in *television stand* has low informativeness, then this compound is more likely to be pronounced with left stress as *télevision stand*. However, if *stand* has high informativeness, then this compound is more likely to be pronounced with both left and right stress as *télevision stánd*. This is the expected outcome, given the relationship between informativeness and compound prosody location hypothesized by Bell and Plag. In addition to this, there is also an intuitional sense in which less informative N2s are less likely to receive stress. This can be thought of in terms of surprisal. In terms of token frequencies, a word with a larger frequency (and lower informativeness) is more likely to be the N2 of a compound with a given N1 than a word with smaller frequency (and higher informativeness). If likelihood of a word being the N2 in a compound with a given N1 is higher, then when such an N1-N2 compound occurs, this has low surprisal, and the expected "default" left compound prominence arises. On the other hand, if the likelihood of a word being the N2 in a compound with a given N1 is lower, then when such an N1-N2 compound occurs, this has higher surprisal, which is then signaled by N2 receiving stress.

For the type-based analysis, only 541 of the 864 types were analyzed, as these were the types for which there was no inter-speaker variation in stress. This analysis yields "very similar" results as the token-based analysis, and they again find significant roles for informativeness that were found in the token-based analysis. Considering surprisal in terms of types, a less informative, more frequent N2a (for example, one that is one of a small N1 family size of 5 types) is more likely to be an N2 of a compound with an N1a with a small family size than a more informative, less frequent N2b (for example, one that is one of a large N1 family size of 500 types) is to be the N2 of a compound with an N1b with a large family size. Thus, when N1a is the N1 of a compound, there is a high probability that N2 is N2a, because the sequence N1a-N2a is one of 5 possibilities in N1a's small family. In this case, there is low surprisal, so the expected "default" left compound prominence arises. However, when N1b is the N1 of a compound, there is a lower probability that N2 is N2b, because the sequence N1b-N2b is one of 500 possibilities in N2b's large family. In this case, there is higher surprisal than in the case of N1a-N2a and a higher likelihood of N2a receiving stress. We can conceive of right prominence, that is, stress occurring on N2 in English, then, as a prosodic signature of surprisal in N2's appearance as an N2.

Given this finding for a role of informativeness in English compound stress, I investigate the role of informativeness in Kansai Japanese compound prosody as well.

5.2.2 Semantics

It was previously discussed in Chapter 3 that compound nouns have the same general morphosyntactic structure (although they may differ in syntactic branchingness), consisting of two or more noun terminals which are combined to form new noun terminals, and new compound noun terminals can be created by iterating this combinatory process. However, despite the general uniformity of their morphosyntactic structures, compounds are not uniform when the semantics of how compound components relate to each other is taken into consideration. While one or more compound components specify the meaning of the head of the compound in some way, the precise way that the component(s) specify the meaning of the head differs from compound to compound. Observe in the following examples, given with the relationship (as labeled by Bell and Plag) between the members indicated. Examples are from Bell and Plag (2012) and Bauer (2017).

(241)

a. N2 is located at N1: *table lamp*
b. N2 is made of N1: *silk shirt*
c. N2 occurs during N1: *morning coffee*
d. N2 is for N1: *baby oil*
e. Compound is the name of a food item: *olive oil*

In the same experiment described in the previous subsection, Bell and Plag also examined the connection between semantic relationships between compound members and right prominence in English compounds. Bell and Plag tested four semantic relations: N1 is a temporal location defining N2 ("temporal"), N1 is a spatial location defining N2 ("location"), N1 is a material or ingredient of N2 ("made of"), and NN is the name of a food item ("name of food item"). In the token-based analysis, there were significant main effects for the temporal, location, and made of semantic relations, and compounds that were classified as one of these categories had a higher chance of have right prominence. No effect was found for name of food item, and Bell and Plag hypothesize that this is because most of their name of food item compounds were also all part of the larger "made of" class, which may have subsumed any independent effect of the smaller category. Similar results were obtained in the type-based analysis.

Given this, semantic factors may also play a role in whether the word-phrase parse is available for a compound in Kansai Japanese. However, one difficulty that arose in conducting such an analysis was determining what semantic categories should be tested. For example, I observed at least the following ways to categorize compounds according to their semantics in my data. Examples are also given.

(242)

a. N2 located at N1: *tyuuoo-tosyokan* 'central library'
b. N1 and N2 form a proper noun: *mainiti-sinbunsya* 'Mainichi Newspapers Co.'
c. N2 uses N1: *densi-keisanki* 'electric calculator'
d. N2 is made of/with N1: *huruutu-kureepu* 'fruit crepe'
e. N2 is made by N1: *murasakisikibu-nikki* 'Murasaki Sikibu's diary'
f. N1 is the object of the action indicated by N2: *seibutugaku-kenkyuusya* 'biology researcher'
g. N1 is for N2: *zyoosya-seiriken* 'boarding ticket'
h. Compound is a type of N2: *kayoo-sensyuken* 'singing championship'

In particular, it was not clear how to classify many compounds more specifically than "compound is a type of N2,' making it a rather heterogeneous class that likely has additional internal structure. Additionally, as there are at least 8 semantic classes that the data can be divided into, and not every class has equal or otherwise comparable amounts of data, it may be difficult to make conclusions based on semantics with the data collected for the present study. As a result, I leave the semantic factor-based analysis to future work, when more thorough data collection can be conducted to ensure comparable amounts of data for each semantic class.

5.2.3 The Word-Phrase Parse in Kansai Japanese and Informativeness

Having discussed the role of informativeness in compound prosody in English, I turn here to Kansai Japanese. As discussed above, the variability in Kansai Japanese compound prosodies, particularly in compounds with longer N2s, which may vary in whether they are pronounced with a word-phrase, mono-phrasal, or bi-phrasal parse, is reminiscent of the issue of whether a compound is pronounced with left or right prominence in English. Similar issues are involved, as well. Why can two compounds be pronounced with one prosodic structure on the one hand, but another prosodic structure on the other, when both compounds have what is evidently the same input syntactic structure?

Given these similarities, for the present study, I investigated the role of informativeness in the availability of the word-phrase parse in Kansai Japanese. This work was conducted under the following general hypothesis: The availability of the word-phrase parse is correlated with some measure of informativeness.

An important way in which the study of Kansai Japanese word-phrase parse compounds differs from compound prosody in English is that, while there was only one mark of "special" prosody in English, namely, right prominence, there are potentially two marks of special prosody in Kansai Japanese word-phrase parses. First, the accent of N1 is lost. Second, the register of N2 is retained. Respectively, these are marks that, as I argue in Chapter 3, are signs that N1 has been mapped to a prosodic word and that N2 has been mapped as being contained within a phonological phrase. These marks can be conceptualized in at least two ways, descriptively speaking. In one way, the word-phrase parse could be conceived of as a modification of the other parse with recursive structure, the bi-phrasal parse. Word-phrase compounds are prosodically like bi-phrasal compounds except that, instead of retaining the accent of N1, it is lost instead. In this conception, it is the loss of N1 which is the mark of surprisal, reflecting something about the informativeness of N1. In the second way, the word-phrase parse could be conceived of as a modification of the mono-phrasal parse. Word-phrase compounds are prosodically like mono-phrasal compounds except that, instead of losing the register of N2, it is retained instead. In this conception, it is the retention of N2's register which is the mark of surprisal, reflecting something about the informativeness of N2. Due to these possible conceptualizations of the relationship between word-phrase marking and surprisal, I investigate not only the informativeness of N2 on its own and in relation to N1 as Bell and Plag did for English, I also investigate the informativeness of N1 on its own and in relation to N2.

For the present study, I utilize the conception of informativeness as it relates to corpus frequency as used by Bell and Plag (2012) and as discussed above. Thus, for Kansai Japanese, I use absolute predictability and relative predictability measures of informativeness. Absolute predictability refers to the raw frequencies of N1 and N2 in the corpus I used, the Balanced Corpus of Contemporary Written Japanese (BCCWJ), regardless of whether N1/N2 occurs on its own or in a compound. I use four measures of relative predictability. The first two hold N1 constant and are 1) the conditional probability of N2 given N1 based on tokens, which is obtained by dividing the frequency of the whole compound by the frequency of N1, and 2) the conditional probability of N2 given N1's family size, a type-based measure, which is obtained by dividing 1 (because a compound containing both a given N1 and N2 is only one compound in the entire family size of N1) by the family size of N1. Similarly, the second two measures of relative predictability hold N2 constant and are 1) the conditional probability of N1 given N2 based on tokens, obtained by dividing the frequency of the whole compound by the frequency of N2, and 2) the conditional probability of N2 given N2's family size counted as types, obtained by dividing 1 by the family size of N2. In the statistical analysis, I focus primarily on relative measures of predictability, because the measures of absolute predictability, the raw frequencies of N1 and N2, are part of the calculation of the token-based measures of conditional probability. I discuss this in more detail below. A summary of the relative predictability measures I used is given in (243).

(243)

Measure	Calculation	Interpretation
Conditional probability of N1 given N2 (tokens)	Frequency of compound / frequency of N2	Higher value = lower informativeness → lower probability of second stress
Conditional probability of N2 given N1 (tokens)	Frequency of compound / frequency of N1	
Conditional probability of N1 given N2's family size (types)	1 / family size of N2	
Conditional probability of N2 given N1's family size (types)	1 / family size of N1	

Extending Bell and Plag's hypotheses regarding informativeness to Kansai Japanese, I use the following hypotheses. Hypotheses (244a-b) are based on the conception in which the surprisal being marked by the word-phrase parse concerns the informativeness of N1, while hypotheses (244c-d) are based on the conception in which the surprisal concerns the informativeness of N2.

(244) Hypotheses

a. The less informative (more frequent) N1 is given N2, the less likely N1 is to receive surprisal marking (in the form of N1 accent loss).

b. The more informative (less frequent) N1 is given N2, the more likely N1 is to receive surprisal marking (in the form of N1 accent loss).

c. The less informative (more frequent) N2 is given N1, the less likely N2 is to receive surprisal marking (in the form of N2 register retention).
d. The more informative (less frequent) N2 is given N1, the more likely N1 is to receive surprisal marking (in the form of N2 register retention).

An alternative conception of the hypotheses in (244a) and (244b) is that N1 is more likely to *lose* accent (with accent *retention* being the mark of surprisal) if it is less informative. This is a reasonable alternative, as this is closer to the situation in English, wherein an N2 loses its isolation stress if it is less informative. This version of the hypothesis is worth further consideration in future work, pending further investigation on what situation should be considered "default" in Kansai Japanese phrasal compounds, given that the word-phrase parse could be taken as surprisal from a mono-phrasal perspective with N2 retaining register or from a bi-phrasal perspective with N1 losing accent.

In order to investigate the informativeness of words in Kansai Japanese compounds and test these hypotheses, it was necessary to collect additional, novel data. I turn to this data collection in the next section.

5.3 Novel Fieldwork on the Word-Phrase Parse

In order to investigate whether informativeness plays a role in conditioning the possibility of the word-phrase parse in compounds, additional data beyond the 114 compounds reported by Nakai was collected. This data collection was undertaken to collect additional data on the availability of the word-phrase parse in compounds reported by Nakai to exhibit it, collect novel data on the availability of the word-phrase parse in compounds that have not been previously reported to exhibit it or which are not included in accent dictionaries, and collect novel data on compounds with the same first or second member as compounds previously reported to exhibit or not exhibit the word-phrase parse in order to compare them.

5.3.1 Materials

Novel items to be tested were constructed using the word-phrase compounds reported by Nakai (henceforth also referred to as "Nakai compounds") as a basis. Many of the Nakai compounds were also included as items. Novel items were constructed using at least one of the following principles. Some compounds adhere to more than one construction principle, such as *terebi-bangumihyoo* 'television program guide,' which adheres to both principle (245a), as *terebi-bangumi* is a Nakai compound, and both have the same N1, and principle (245c), as *bangumihyoo* 'program guide' is itself a compound consisting of *bangumi* 'program' and *hyoo* 'table.'

(245) Item construction principles

a. Has the same N1 as a Nakai compound or novel item with a word-phrase parse

b. Has the same N2 as a Nakai compound or novel item with a word-phrase parse
c. Has an N2 which is itself a compound
d. Has an N2 which is a relatively long loanword (3+ moras)
e. Has an N2 which has low register and is accented
f. Has an N1 which has low register and is accented

Principles (a) and (b) were selected because if these elements are present in Nakai compounds and some non-syntactic, non-phonological characteristic of these elements conditions the word-phrase parse, then using compounds with these same elements would allow for direct pairwise comparisons between Nakai compounds and novel data. An example of a compound adhering to principle (a) is *tyuuoo-hakubutukan* 'central museum,' which has the same N1 as the Nakai compound *tyuuoo-koominkan* 'central public hall,' while an example of a compound adhering to principle (b) is *zinriki-hikooki* 'human-powered aircraft,' which has the same N2 as the Nakai compound *mokei-hikooki* 'model aircraft.' Additional items beyond those having an N1 or N2 which is the same as the N1 or N2 of a Nakai compound were constructed by the same principle from novel data, using an N1 or N2 which is a component in a novel item which was found to have a word-phrase parse. For example, the Nakai compound *utyuu-hikoosi* 'astronaut' led to the creation of the novel item *utyuu-booenkyoo* 'space telescope' by adhering to principle (a). *Utyuu-booenkyoo* was found to have the word phrase parse in my consultants' productions, so a new item, *denpa-booenkyoo* 'radio telescope,' in which neither N1 nor N2 is present in a Nakai compound, was created, using the novel item *utyuu-booenkyoo*'s N2 and adhering to the second part of principle (b).

Principles (c), (d), and (e) were based on the descriptive generalizations given by Nakai, as discussed above, with some modifications. As observed by Nakai, many compounds with word-phrase prosody have an N2 which is itself a compound. Nakai specifically gives this generalization as a compound in which either of the elements is three moras or greater in length. However, he also does note several exceptions in which N2 is a compound, but neither component of N2 is three moras or greater, such as *niwaka-niwasi* 'bandwagon/fairweather gardener,' as discussed earlier. For this fieldwork's construction principle (c), compounds with smaller N2 compounds were also considered in addition to N2 compounds which adhere to Nakai's generalization. This was done in order to capture a wider ranger of N2 compound possibilities and to allow for the appearance of exceptions to Nakai's generalization, like *niwa-si* 'gardener' appearing as N2. Principles (d) and (e) are based on Nakai's generalizations that some word-phrase compounds have a loanword N2, which is either long (5+ moras in length), or which has low register and an accent on the second mora of the word. For this experiment, this latter observation was loosened to include accent anywhere in the middle of the word to allow for the consideration of more possible N2s. Shorter loanwords were considered as well, starting at 3 moras in length, as one Nakai compound has a 3 mora loanword N2, and there are several other Nakai compounds with a 4 mora loanword N2. This again allows for the appearance of exceptions to Nakai's generalizations.

Principle (f) is loosely based on Nakai's generalization involving low register N2s, as it is a mirror principle to this generalization, but it is also based on the observation that many of the Nakai compounds have a low register N1. Nakai reports word-phrase compounds with N1s and N2s having both high and low registers, resulting in a typology of four types of word-phrase compounds based on the registers of their input components – high register N1 and N2, high register N1 and low register N2, low register N1 and N2, and low register N1 and high register N2. Schematically, this typology can be represented as the following in (246), with x's representing each mora and a hyphen separating N1 and N2. An accent is arbitrarily placed after the third mora in N2 to show that N2 has an accent (if it has one in isolation).

(246) Schematics of possible word-phrase types, as reported by Nakai

a. ^{H}xxxx-^{H}xxx'x

b. ^{H}xxxx-^{L}xxx'x

c. ^{L}xxxx-^{H}xxx'x

d. ^{L}xxxx-^{L}xxx'x

However, the word-phrase parse is most easily identified with compounds involving at least one low register component (246b-d). This is because when both components are high register, even if N1 loses its accent and N2 retains its register, it is difficult to distinguish between the word-phrase parse and the mono-phrasal parse, in which N1 loses its accent, and N2 acquires N1's register. Schematically, a word-phrase compound with two high register components compares to a high-register mono-phrasal compound in the following example.

(247) Schematic of a word-phrase compound with two high register components and a high-register mono-phrasal compound

a. Word-phrase: ^{H}xxxx-^{H}xxx'x

b. Mono-phrasal: ^{H}xxxx-xxx'x

The result of both would be a compound with a high tone plateau from the beginning until the N2-internal accent. As described in Kori (1987), when a high plateau encounters the high tone of a following word, the two essentially coalesce. Accordingly, it would be very difficult to tell such parses apart, if any distinction can be made at all. Using an N1 with a low register allows for a clear distinction to be made, regardless of whether N1 or N2 has a high or low register. If N1 and N2 are both low register, then an N1-final high tone (which is found in low register unaccented words in isolation) will split N1 and N2, distinguishing it from a low-register mono-phrasal compound, which would have a low tone plateau from the beginning of the compound until the N2-internal accent, as shown below.

(248) Word-phrase compound with two low register components vs. low register mono-phrasal compound

a. Word-phrase: ^{L}xxxx^{H}-^{L}xxx’x

b. Mono-phrasal: ^{L}xxxx-xxx’x

If N1 is low register and N2 is high register, N1 will surface with a low tone plateau, and N2 will surface with a high tone plateau until the accent, a pattern which is distinct from both low register mono-phrasal compounds as discussed above and high register mono-phrasal compounds, which, as discussed above, have a high tone plateau from the beginning of the compound until the N2-internal accent. Similarly, if N1 is high register, and N2 is low register, N1 will surface with a high tone plateau until the end of N1, and N2 begins with a low tone plateau that continues until the accent. These two possibilities are shown below with comparison to high and low register mono-phrasal compounds

(249) Word-phrase compound with one low register component vs. mono-phrasal compounds

a. Word-phrase: ^{L}xxxx-^{H}xxx’x

b. Word-phrase: ^{H}xxxx-^{L}xxx’x

c. High register mono-phrasal: ^{H}xxxx-xxx’x

d. Low register mono-phrasal: ^{L}xxxx-xxx’x

5.3.2 Methods

PowerPoint slides were prepared with each item of interest included in a frame conversation. In some cases, two related items were included in the same slide, such as *siteiseki-ryookin* ‘fare for a designated seat’ and *ziyuuseki-ryookin* ‘fare for free seating.’ A picture representing the item (such as a picture of a fire alarm or a museum) or of something related to the item (such as a picture of a place where the item can be found or a situation using the item) were also included in each slide in order to provide additional information about what an item refers to. In the first session, where participants were presented with a trial version of the procedure, it was determined that the participants, who are teachers of Standard Japanese, encountered difficulty using Kansai Japanese pronunciations when asked to produce compound words in isolation, so frame sentences were constructed in order to provide a more natural context for compound words to be pronounced and to encourage using Kansai Japanese pronunciations. Frame conversations, which were always composed of at least one question and one answer containing items to be tested, originally consisted of これ何なん？ *kore nan nan?* ‘What is this/that?’ followed by [item]なん *[item] nan* ‘This/that is a [item]’ conversations. Upon receiving feedback that these exchanges were somewhat awkward, more conversational frame conversations were included as well, such as [place]に行ったらどこに行きたいん？ *[place] ni ittara doko ni ikitain?* ‘Where do you want to go when you go to [place]?’ followed by [item]に行き

たいねん *[item] ni ikitai nen* ‘I want to go to [item].’ Questions and context sentences preceding the questions (if any) always included vocabulary or grammatical features associated with Kansai Japanese, such as *nan nan?* ‘What is it?’ as opposed to Standard Japanese *nan desu ka* ‘What is it?’ or *nen* ‘(emphatic particle)’ as opposed to Standard Japanese *yo* ‘(emphatic particle),’[37] in order to encourage the participants to use Kansai Japanese prosody in their pronunciations of items. These more conversational frame conversations were developed with the assistance of both participants, who corrected errors and made changes according to their own dialect.

Each PowerPoint slide deck included two slides per item, one in which one participant was the question asker and the other was the answerer, and an equivalent slide with the roles reversed, and dialect-appropriate changes made to reflect the reversed roles. An example of a PowerPoint slide is given below.

(250) PowerPoint slide example

A:あの人何投げてんの？よう見えへんわ。

A: *ano hito nani nageten no? yoo miehen wa.* ‘What is that person throwing? I can’t really see it.’

B:<u>無人航空機</u>よ。楽しそうやな。

B: *<u>muzin-kookuuki</u> yo. tanosisoo ya na*. ‘It’s a <u>drone</u>. Looks fun.’

[37] It should be noted that *yo* is used in Kansai Japanese dialects as well, and for one participant, *yo* was a typical sentence ending particle in answers.

5.3.3 Participants

The participants were two adult female native speakers of a Kansai Japanese dialect. Each participant lived in the Kansai Region of Japan for at least 20 years and have spent at least 15 years outside of the Kansai Region, either in Japan or abroad. Both now reside in the United States and are teachers of Standard Japanese. Both were informed that they would be participating in a study of differences in how compound words are pronounced in Kansai Japanese dialects. While the participants had prosody consistent with Kansai Japanese prosody (e.g., words have high and low registers, verbs and adjectives and their conjugations have Kansai Japanese prosody), the specific realizations of lexical items and compounds in their dialects differed from each other in terms of features such as register, accentedness, and accent location in accented words (e.g., one participant may pronounce a word with high register, while the other pronounced it with a low register). The participants also consistently differed from each other on which sentence ending particles their dialects preferred.

5.3.4 Procedure

All sessions were conducted as group sessions with both participants. Due to restrictions related to the COVID-19 pandemic, sessions were conducted online by Zoom for about 4 months during the height of the pandemic. When restrictions were loosened, sessions were conducted in-person. Recording of sessions was accomplished with Zencastr, an online podcast recording service which creates local recordings instead of online cloud recordings. Local recordings have the advantage of ensuring the highest possible recording quality and protecting against any loss of relevant linguistic information due to connectivity issues or audio compression related to connectivity issues (Sanker et al. 2021). Zencastr was used for both online and in-person sessions. During Zoom sessions, audio was recorded from participants using the microphones on their laptops. During in-person sessions, audio was recorded with a FIFINE K668 USB microphone connected to a laptop with Zencastr recording the session.

Several days before each session, a PowerPoint slide deck containing the slides to be used for the next session was sent to the participants on Google Drive to be edited. This was done to ensure that the frame conversations on each slide were in natural Kansai Japanese for each speaker prior to the session. Participants edited the slides on their own, with each participant correcting their own lines. Participants were compensated for their time in both elicitation sessions and PowerPoint editing sessions.

Each session was divided into two parts. The first part was a group elicitation section, during which both participants would read aloud conversations containing items from the prepared PowerPoint slides. Group elicitation was performed in order to reduce interference from Standard Japanese and to ensure that Kansai Japanese pronunciations were used during the production of items, as well as to obtain the pronunciation of compounds in a conversational context. All slides with one participant as the first speaker and the other participant as the second speaker were read before switching roles. This was done in order to reduce the influence of each participant's pronunciations on the other participant's pronunciations of target words.

The second part of each session consisted of one-on-one elicitation. During this part, participants were asked to produce items in isolation. Items were underlined on the PowerPoint slides (as shown in (250) above), which were again presented to the participants during this part. Participants were allowed to use the context of the frame conversations to help them maintain Kansai Japanese pronunciations if necessary. Once a participant had read an item in isolation, they were asked to pronounce each component of the item in isolation. Thus, a participant would produce an item like *pengin-suizokukan* 'penguin aquarium' in isolation, followed by *pengin* 'penguin' in isolation and *suizokukan* 'aquarium' in isolation. Each participant was asked to do this for about five to ten items depending on the number of items to be elicited and the amount of time remaining in the session. Once these had been completed, the participants would switch, and the process would be repeated until all items were elicited or there was no more remaining time in the session. In order to confirm the prosody of each item and its components, I repeated each pronunciation back to the participants until I received confirmation that the pronunciation was correct. I then recorded the obtained prosody on a sheet of paper containing all items to be elicited for the session. Where necessary to distinguish between accent locations, I presented self-produced or computer synthesized pairwise comparisons and had participants confirm which production of the pair matched their production. Computer synthesized productions were created using a voice synthesis program created by AI Inc. called A.I.VOICE 琴葉茜・葵 (A.I.VOICE Kotonoha Akane/Aoi). To generate a synthesized word, the word of interest was placed into the text box of the program. A.I.VOICE Kotonoha Akane/Aoi allows for relatively precise adjustment of prosody, in which a user can modify the pitch of each mora, allowing for the adjustment of accent location and initial register. When synthesis was needed to present a pairwise comparison, two synthesized words differing in accent location were generated and presented to the participants. Participants were then asked to identify whether the first or second self-production/synthesized word matched their pronunciation.

For elicitation, participants were asked to produce items in the way that they would say it in their dialect. In some cases, they also offered alternative pronunciations that either they expected they might hear from other speakers of their own dialect or other speakers of a Kansai Japanese dialect or which they think they might produce themselves on another occasion. In general, when participants gave a non-word-phrase pronunciation, they were not asked if a word-phrase pronunciation would be possible. Because of the possibility that the conditioning factors of the word-phrase parse are statistical in nature, it was determined that it would be more beneficial to obtain data on a larger range of items rather than take extra time to probe alternative pronunciations for each compound.

In addition to these primary elicitation tasks, the participants were occasionally asked questions about the compounds. Questions included questions that probed syntactic structure (which is suggested by where a speaker might place the genitive particle *no*, cf., probing whether *John's history book* is *a book of John's history* or *a history book of John*), questions about the meaning or assumed meaning of a compound, and questions about the naturalness of a compound or equivalent expressions that might be more natural than the item presented. For example, an important question for longer compounds such as *toohoku-akusento-ziten* 'Tohoku Accent Dictionary' is what underlying syntactic branching the compound has. This compound could mean *an accent dictionary of/from/regarding the Tohoku region*, or it could mean *a dictionary of Tohoku accent*. Participants were asked where they would place the genitive particle *no*, which was taken as indicative of what kind of syntactic branching the compound has. An example of probing whether a compound was natural or not included asking whether *tanuki-nuigurumi* '(intended) raccoon dog plush toy' sounded natural or if there was a more natural expression. In some cases, these questions would lead to additional compounds suggested by the participants which would then be elicited later in the session or in a subsequent session.

In total, 218 compounds were elicited from the participants.

5.3.5 Data Processing and Analysis

5.3.5.1 Obtaining Measures of Informativeness

As mentioned previously, the present study was interested in two measures of absolute predictability, one for N1 and one for N2, and four measures of relative predictability, two for N1 and two for N2. Data for these measures was collected from the Balanced Corpus of Contemporary Written Japanese (BCCWJ), which is a corpus of approximately 100 million words of written Japanese collected from various media including general books, magazines, newspapers, legal documents, internet blogs, and other forms of print or digital written media spanning a period of 30 years from 1976 to 2006. This corpus was selected due to its large size and because many of the compounds elicited tend to appear in more formal discourse, which is more likely to be written.

The BCCWJ corpus is primarily interacted with using NINJAL's Chunagon corpus search application. The BCCWJ's database search function is divided into several search types: short unit word searches (短単位検索), long unit word searches (長単位検索), character string searches (文字列検索), and searches based on corpus position (位置検索). Informativeness data was primarily collected using the short unit word search, as greater control could be achieved with this method. For the BCCWJ, a "short unit word" is defined as a word made up of one or two "smallest lexical units" (essentially, morphemes), depending on which lexical stratum a word comes from. For native and Sino-Japanese words, a short unit word may (and often does) consist of up to two smallest lexical units, e.g., *hahaoya* 母親 'mother' (consisting of the smallest lexical units *haha* 母 'mother' and *oya* 親 'parent'), *kenkyuu* 研究 'research' (consisting of the smallest lexical units *ken* 研 'polish, study of' and *kyuu* 究 'research'). For loanwords, a short unit word consists of one smallest lexical unit, e.g., *orenzi* オレンジ 'orange.' Short unit word searches also allow searching by lexeme (語彙素). Given that the Japanese writing system is composed of three scripts working in tandem, the *hiragana* syllabary, the *katakana* syllabary, and the *kanji* logography, the same word can be represented in multiple ways in written text depending on factors such as author style, context, and audience. Searching by lexeme ensures that all instances of a given word, regardless of written representation, are captured by the search query. Searching for compounds in a short unit word search involves adding additional search conditions for each smallest lexical unit component. Thus, to search for 研究所 *kenkyuuzyo* 'laboratory,' the first search condition (the "key") is set to look for the lexeme 研究 *kenkyuu* 'research,' and a second condition is set to look for the lexeme 所 *zyo* 'place,' occurring one word after the key.

The long unit word search allows corpus users to search for longer word units, based on phrases. In this search function, *kenkyuuzyo* 研究所 'laboratory' could be searched using one search condition rather than setting multiple conditions as in the short unit word search. However, I would occasionally run into difficulties with the long unit word search, as it would return fewer results for the same compound than a multi-condition search in the short unit word search function would return, possibly due to differences in tagging in the corpus across compounds. As a result, no informativeness measures were collected using long unit word searches, and the great majority of data is collected using short unit word searches.

Character string search was generally not used to collect informativeness measures, except in two main cases. The first case is when a compound was expected to exist in the corpus, such as *minami-taiheiyoo* 南太平洋 'the South Pacific,' but which a multi-condition query in the short unit word search function would not return. This again may be due to factors related to tagging in the corpus. The second case is when the compound was a loan compound, such as *gasorin-sutando* ガソリンスタンド 'gasoline station.' Sequences of words in loan words and names in Japanese may be written together with no separating symbols (as a typical sequence of Japanese words), as in ガソリンスタンド *gasorin-sutando*, or with an intervening interpunct, as in ガソリン・スタンド. To my knowledge, this kind of orthographical difference cannot be specified in the short unit word search, so accounting for these orthographical variants required searches using the character string search function.

The position search, which allows users to search for words based on sample ID and position of the word in the corpus, was not used.

The absolute predictability measure of raw corpus frequencies for N1 and N2 were conducted simply by running a search query for the word in question in a short unit word search in the BCCWJ, using multiple conditions if necessary, and recording the number obtained. Raw corpus frequencies for the compounds under study were collected in the same way. All three raw frequency measures included instances where the search key occurred alone or in the context of a compound (or in the case of compound searches, in the context of an even larger compound). These and other BCCWJ searches were downloaded to a CSV file compatible with Microsoft Excel.

The token-based relative predictability measures were calculated using the raw frequency counts for N1/N2 and the compounds. The conditional probability of N1 given N2 was calculated by dividing the raw corpus frequency of a compound containing N1 by the raw corpus frequency of N2. The conditional probability of N2 given N1 was calculated by dividing the raw corpus frequency of a compound containing N2 by the raw corpus frequency of N1.

Family sizes are the number of types of compounds with a given N1 or N2. Obtaining family sizes required a multi-condition short unit word search. In order to do this, the first short unit word lexeme in the constant component (for example, *kenkyuu* 研究 'research' in *kenkyuusya* 研究者 'researcher') was set as the key in order to ensure that output files could be organized by lexeme for later analysis. Then, in order to search for compounds with a constant N1, a search condition was added after all conditions related to N1 and set to search for sequences of N1 followed by a word tagged as a noun. In order to search for compounds with a constant N2, a search condition was added before all conditions related to N2 and set to search for sequences of a word tagged as a noun followed by N2. The results of each search were downloaded as a CSV for further processing in Excel.

Because of the search procedure, leaving the data as-is would result in an overestimation of how many compound types existed with a given N1 or N2. This is due to the fact that not every noun-noun sequence in the corpus is actually a compound. Many cases are in fact cases of the type discussed by Bell and Plag (2012) as the *tea mother* cases, which arise when two nouns come together because the second one is a vocative, as in the sentence *Would you like some tea, mother?*. In Japanese, many adverbial phrases involve a word that was tagged as a noun. These include sequences such as *sono ato [N2 of interest]*, literally 'afterwards, N2' or *[N1 of interest] mainiti*, literally 'N1 everyday…' occurring at a sentence boundary that was not marked. Each CSV downloaded for family size calculation was examined for such cases, and these cases were removed.

Three additional case types were removed as well. First, compounds involving a so-called Aoyagi prefix (Poser 1990b), such as *doo* 同 'above-mentioned,' *tai* 対 'anti-,' or 元 *moto* 'former,' were removed. These were removed because, as Poser discusses for Standard Japanese, Aoyagi prefixes lexically require a following phrase boundary, resulting in a bi-phrasal compound regardless of the structure of N2. Aoyagi prefixes have the same effect in Kansai Japanese as well (Nakai 2002). Second, compounds in which the database retrieved a numeral which was tagged as a noun (represented either in Arabic, Roman, or *kanji* numerals) were mostly removed, as these sequences often involved addresses, phone numbers, prices, economic numbers, or other numbers. Sequences involving numerals were retained if they could be determined to be part of compounds, e.g., *sekai-iti* 世界一 'best in the world (lit. world-one).' Third, sequences involving *ika* 以下 'below and including,' *izyoo* 以上 'above and including,' *igo* 以後 'after and including,' and *izen* 以前 'before and including' as the second noun, as in phrases like *gozyuu-izyoo* 五十以上 'above and including 50,' were removed as well.

All remaining data not involving these cases were assumed as a heuristic to contain legitimate compounds and were retained due to time constraints. Under the assumption that legitimate compounds would appear in noun-noun sequence searches more frequently than *tea mother* type sequences, given the removals above, it seems safe to assume that the great majority of the remaining data consists of legitimate compounds. A future study would involve more thorough and rigorous cleaning of the data.

Returning to the type-based measures of predictability, once the family size CSVs were cleaned up with the aforementioned removals, the conditional probability of N1 given N2 was calculated by dividing 1 (representing the one type in which N1 and N2 form a compound) by the family size of N2, and the conditional probability of N2 given N1 was calculated by dividing 1 by the family size of N1.

In order to account for compounds with a frequency of 0 in the corpus, the Laplace transformation, as discussed in Brysbaert and Dipendaele (2013), was used. The Laplace transformation involves adding 1 to every frequency and increasing the corpus size by the number of types in the corpus. Accordingly, I added 1 to every raw frequency and family size count in the data.

Finally, of the 218 compounds elicited from the participants (henceforth referred to as "participant compounds") 10 were discarded for the present analysis. There were two reasons for this. In the first case, one or both components included so many results that processing them for family size determination would have been unfeasible. For example, a search of *nippon* 日本 'Japan' as an N1 of a compound returned 41,988 results. In the second case, the word was discarded because the vast majority of search results involved *tea mother* sequences. An additional 4 compounds were discarded due to family size searches of each component yielding fewer results than a search for the compounds themselves. This again may have been due to tagging issues in the corpus. In addition to the remaining 204 participant compounds, an additional 20 Nakai compounds that were not elicited from the participants were also added to the statistical analysis. Not all Nakai compounds were added because they involved more parts than the other compounds, such as *entyoo-zikkai-ura* 延長十回裏 'bottom (*ura* 裏*)* of the tenth (*zikkai* 十回) extra inning (*entyoo* 延長),' involved numbers, which had extreme values in the BCCWJ search results, such as *kyuuhyaku-sanzyuu-roku* 九百三十六 '36,' or which were not actually compounds, despite having the compound word-phrase prosody, such as *uti no hito* うちの人 'my husband; one's family.'

The participant compounds and Nakai compounds and their related informativeness measure values were pooled into the same document.

For the purposes of the present analysis, compounds were classified as having the word-phrase parse available or not based on whether at least one participant or Nakai reported a word-phrase parse. Although this comes with the obvious risk of collapsing all of Nakai's consultants into one entity, 'the Nakai dictionary,' doing this allows for treating all of the Kansai Japanese data together, regardless of the specific production of any given speaker. This also simplifies the analysis by making the dependent variable, whether a word-phrase parse is available, a binary variable, rather than a trinary variable, such as 'yes, both participants and the Nakai dictionary report a word-phrase parse,' 'yes, at least one, but not all three report a word-phrase parse,' and 'no one reports a word-phrase parse.' The danger of collapsing all of Nakai's consultants into a single entity is readily apparent in the case of a trinary variable. Specifically, because Nakai does not report how many speakers gave a word-phrase parse, it is not clear exactly how strong a 'yes' from the Nakai dictionary actually is. The use of a binary variable allows for taking Nakai's reports into consideration without making any claims about the strength of a 'yes' report from the Nakai dictionary.

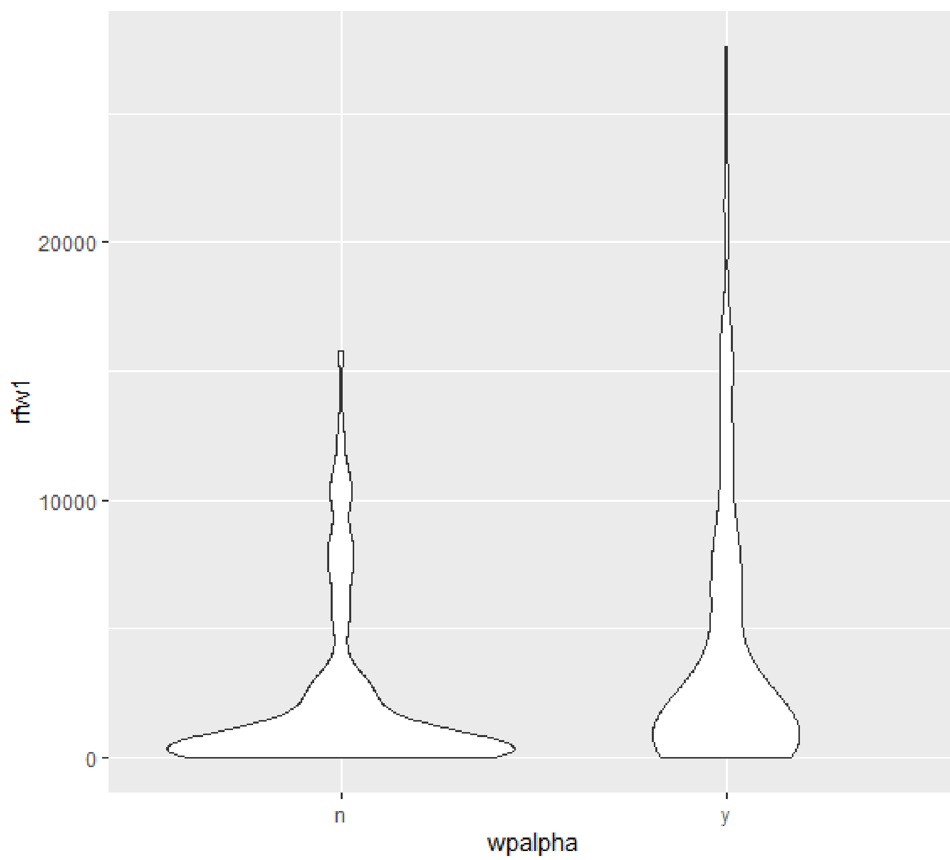
5.3.5.2 Visualizing the Data

All of the informativeness measures collected above were put into a single CSV file, along with their corresponding compounds and whether the compound was reported by at least one of the participants or the Nakai dictionary as having the word-phrase parse available. Whether a compound has the word-phrase parse (henceforth “Word-phrase parse?”) was plotted against the measures of informativeness in RStudio (RStudio Team 2020) to visualize the data using the ggplot2 package (Wickham 2016) and its violin plot function.

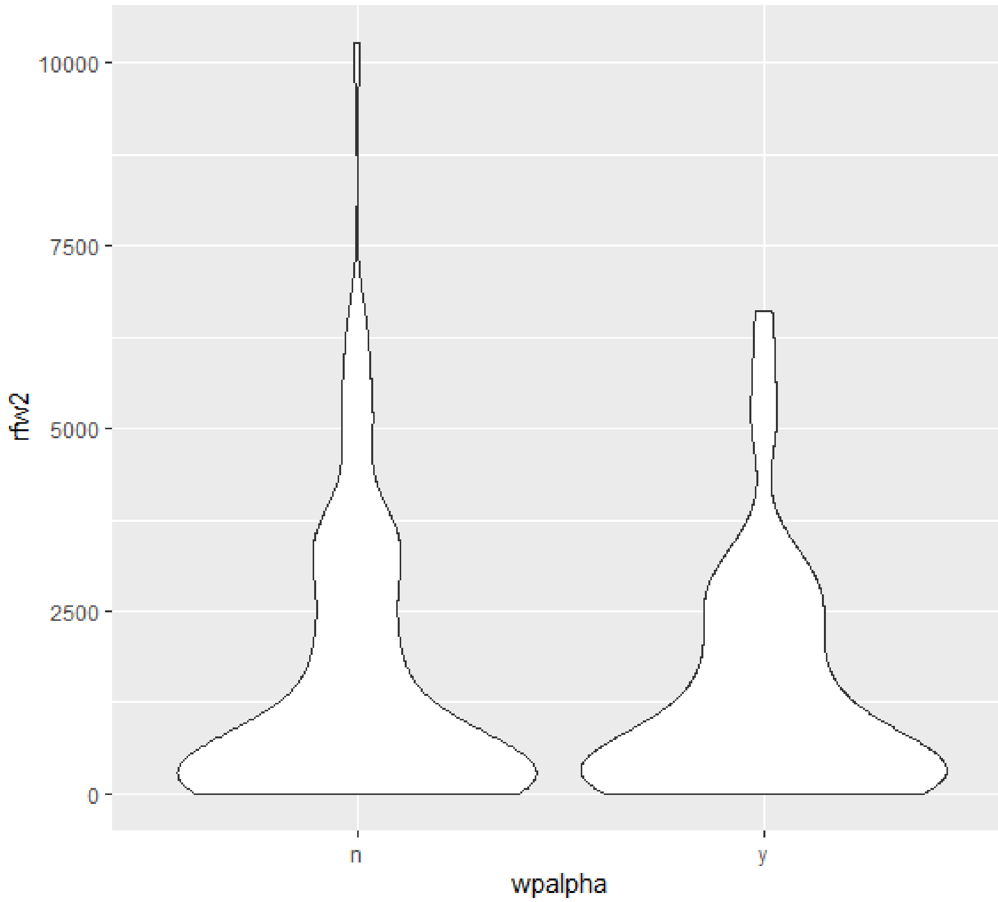
To reduce the effects of outliers on these visualizations, a process of outlier removal was undertaken. A data point was considered an outlier if the value of at least one of the frequency measures involved in the calculation of the conditional probabilities (i.e., the raw frequencies of the compound, N1, and N2, and the family sizes of N1 and N2) was at or greater than the 97.5th percentile, as calculated in R. Though somewhat stipulative, this method allows for the removal of true outliers, given the relatively small sample of data points, and the fact that data points with very high values for these frequency measures usually had values that were multiple times larger than nearby, lower percentile values. For example, the largest value (100th percentile) for the raw frequency of N1 was 42,935. The 95th percentile as calculated in R was 15773.30.

The following two violin plots show “Word-phrase parse?” (represented as “wpalpha” with the values y(es) and n(o)) plotted against the raw frequencies in tokens of N1 (rfw1) and N2 (rfw2). Although not much can be concluded from these violin plots, they do suggest possible tendencies. When it comes to the absolute predictability measures "raw frequency of N1" and "raw frequency of N2," (251) and (252) suggest a possible weak correlation between N1/N2 informativeness and the word-phrase parse. At least some of the data with low raw frequency values (= high informativeness) for both N1 and N2 have an available word-phrase parse. While most compounds with low N1 raw frequency values cluster around "no" for word-phrase parse availability, the densities for both "yes" and "no" for low N2 raw frequency values appear to be more equal, which may suggest no correlation.

(251) Word-phrase parse? (wpalpha) vs. raw frequency of N1 (rfw1)

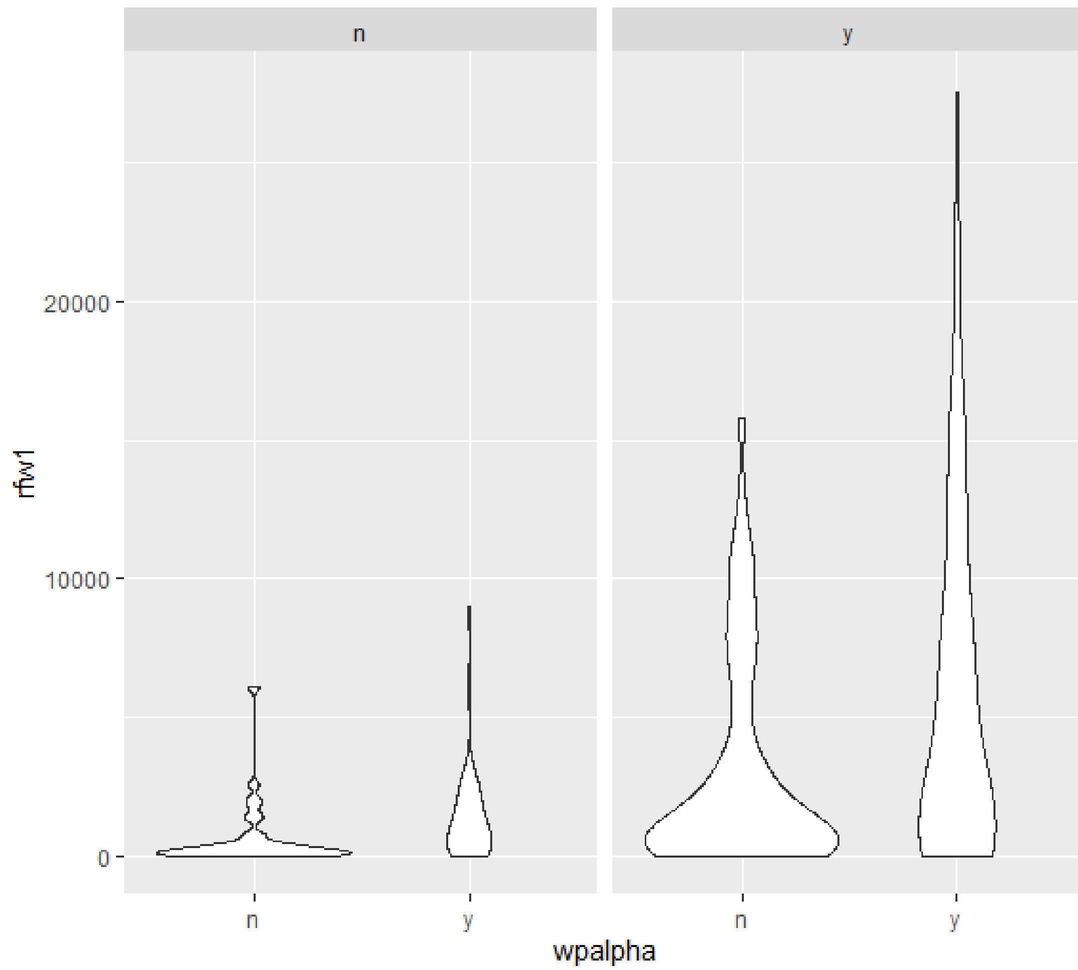


(252) Word-phrase parse? (wpalpha) vs. raw frequency of N2 (rfw2)

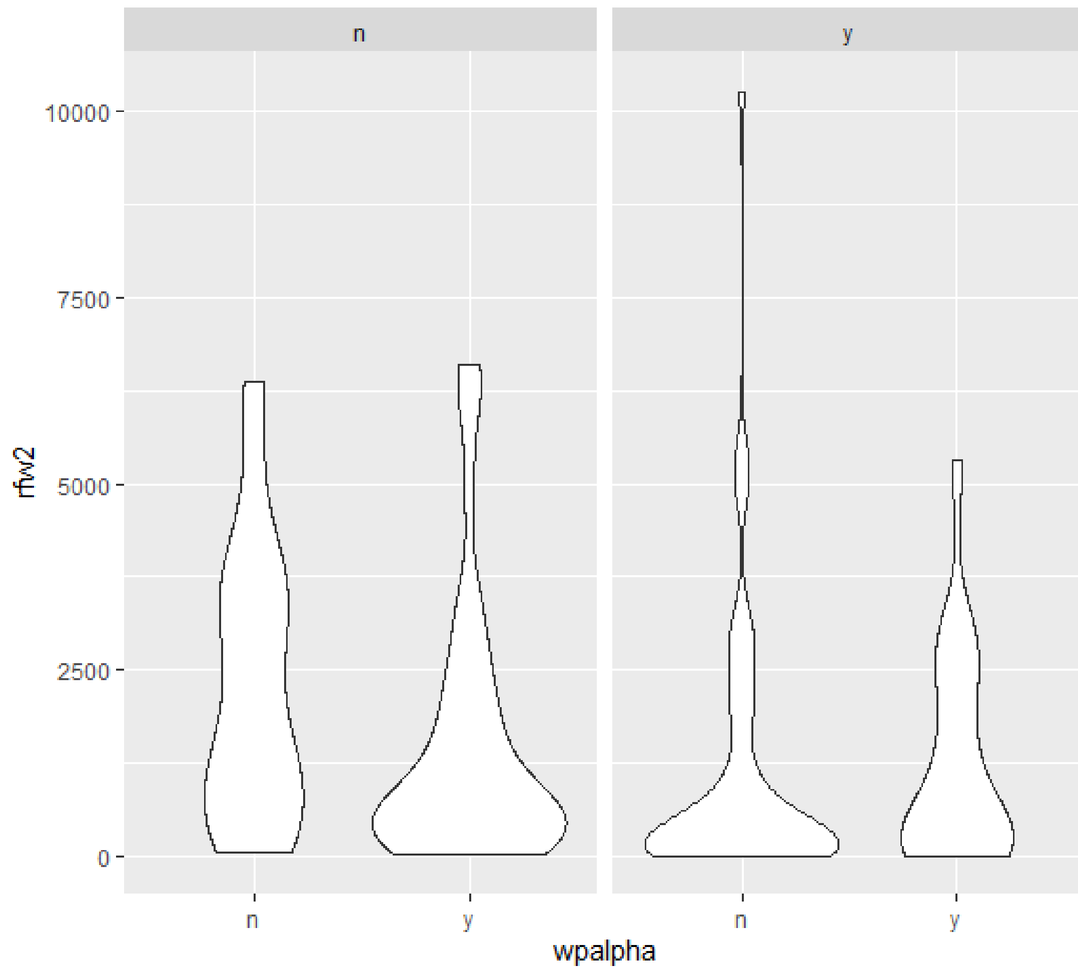


Because of the tendency for word-phrase compounds to have a compound N2, as noted by Nakai (2002), it is also useful to visualize the data split by whether N2 is a compound or not. In these plots, the bottom x-axis indicates wpalpha, while the top x-axis indicates whether N2 was a compound (y) or not (n). Like the consolidated data given above, these split data also suggest perhaps a weak correlation between low N1/N2 informativeness and the availability of the word-phrase parse.

(253) Word-phrase parse? (wpalpha, bottom x-axis) vs. Raw Frequency of N1 (rfw1), split by whether N2 is a compound (top x-axis)

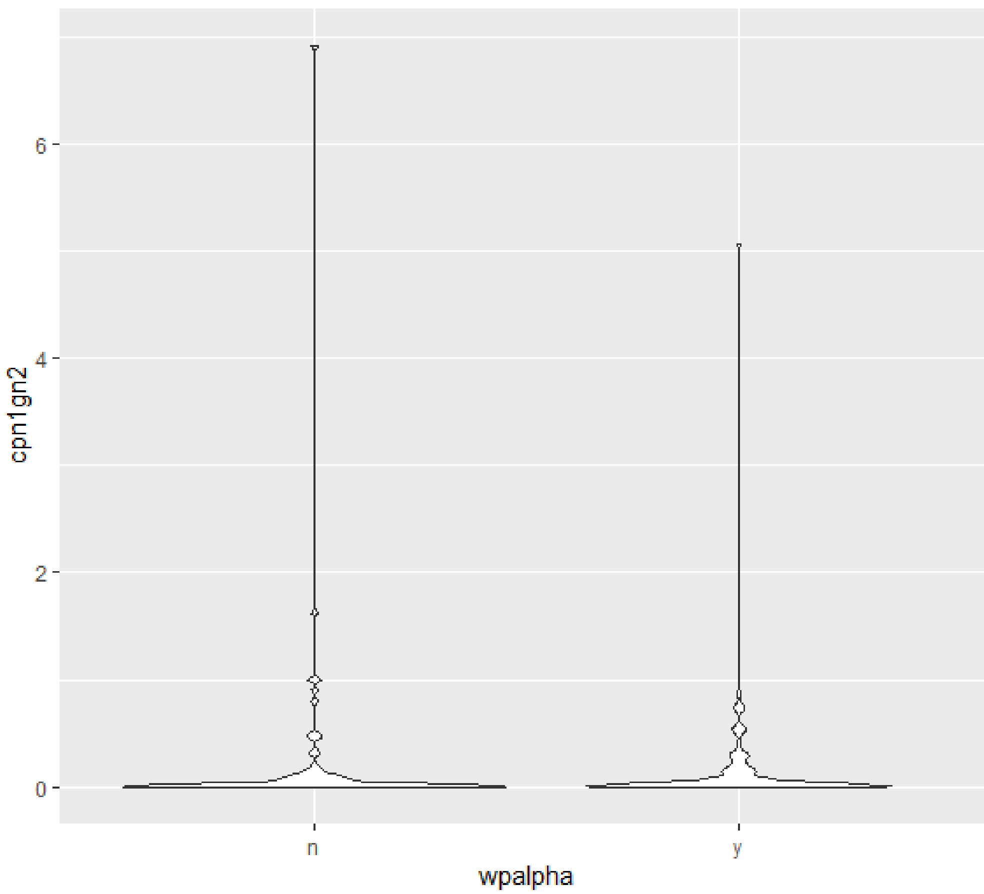


(254) Word-phrase parse? (wpalpha, bottom x-axis) vs. Raw Frequency of N2 (rfw2), split by whether N2 is a compound (top x-axis)

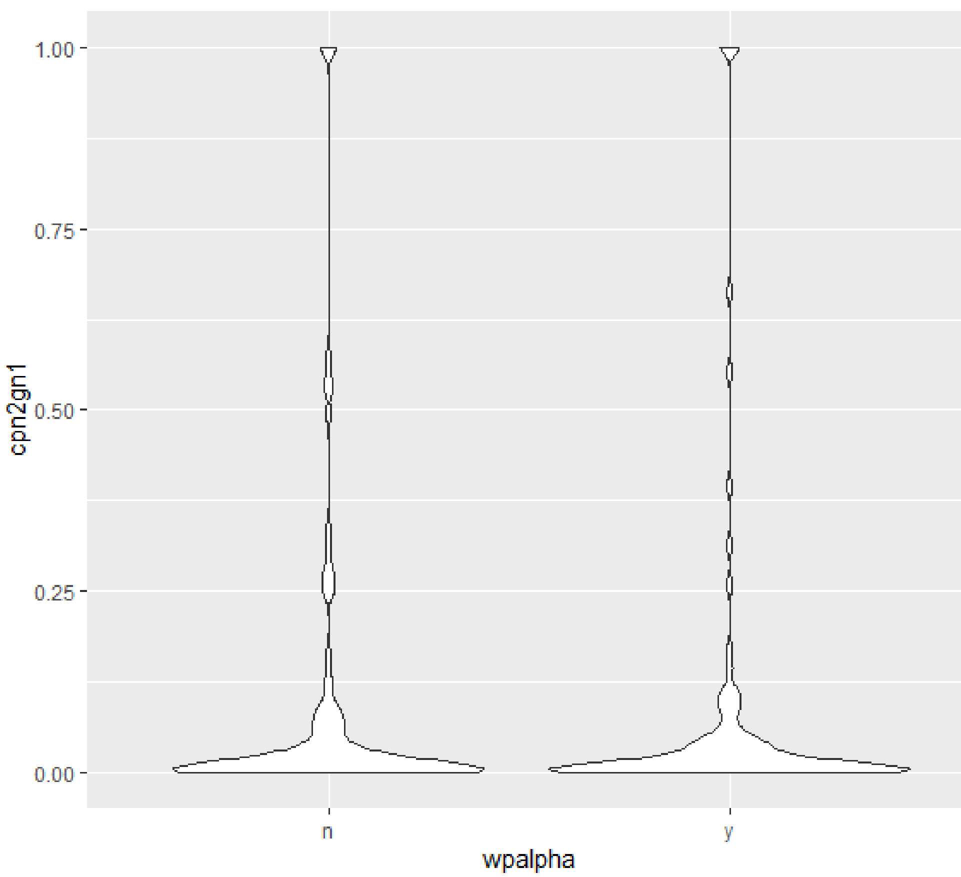


Turning to the relative measures of informativeness, “Word-phrase parse?” was plotted against the two token-based measures of informativeness, the conditional probability of N1 given N2, and the conditional probability of N2 given N1. In these plots, both “yes” and “no” have similar densities for N1 or N2 having low informativeness measure values, though the plot in (255) has a slightly larger density for “no” than “yes”, and (256) has a slightly larger density for “yes” than “no.”

(255) Word-phrase parse? (wpalpha) vs. conditional probability of N1 given N2 (tokens) (cpn1gn2)

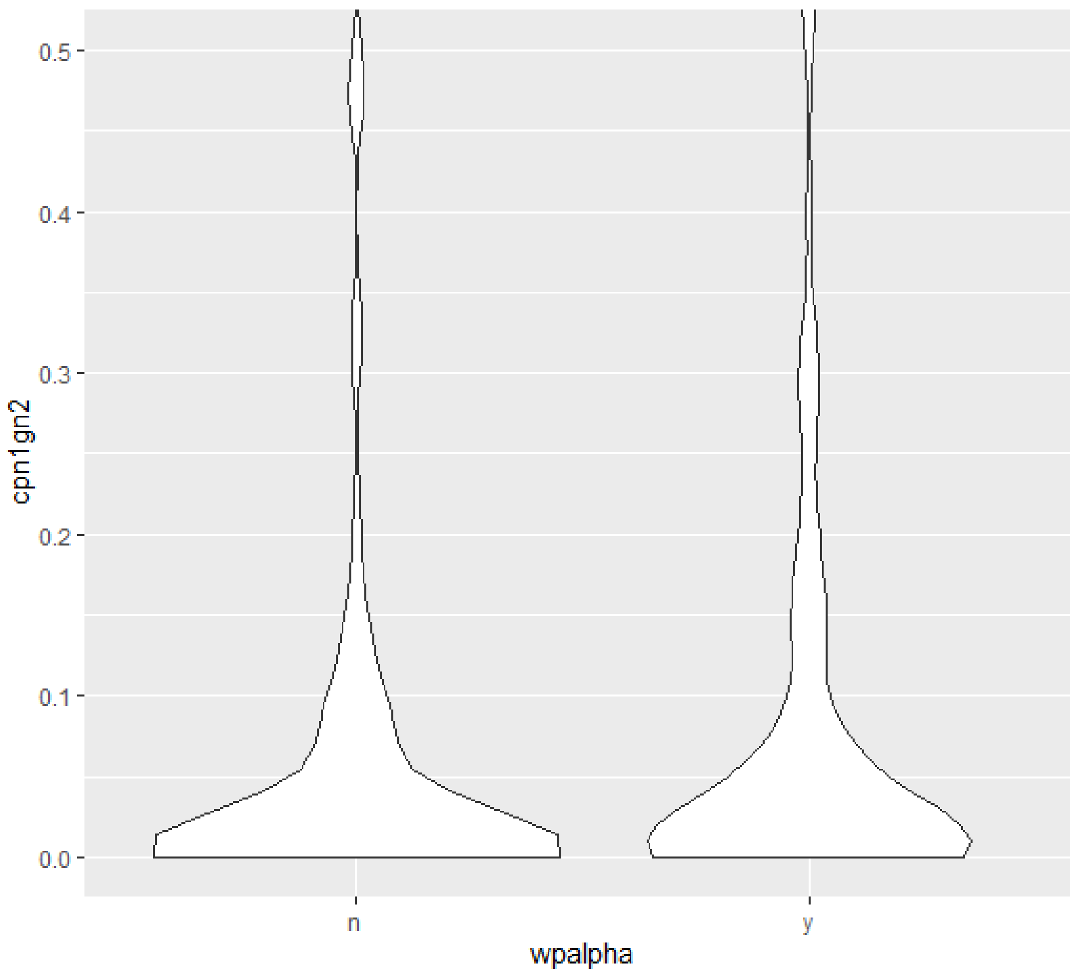


(256) Word-phrase parse? (wpalpha) vs. conditional probability of N2 given N1 (tokens) (cpn2gn1)

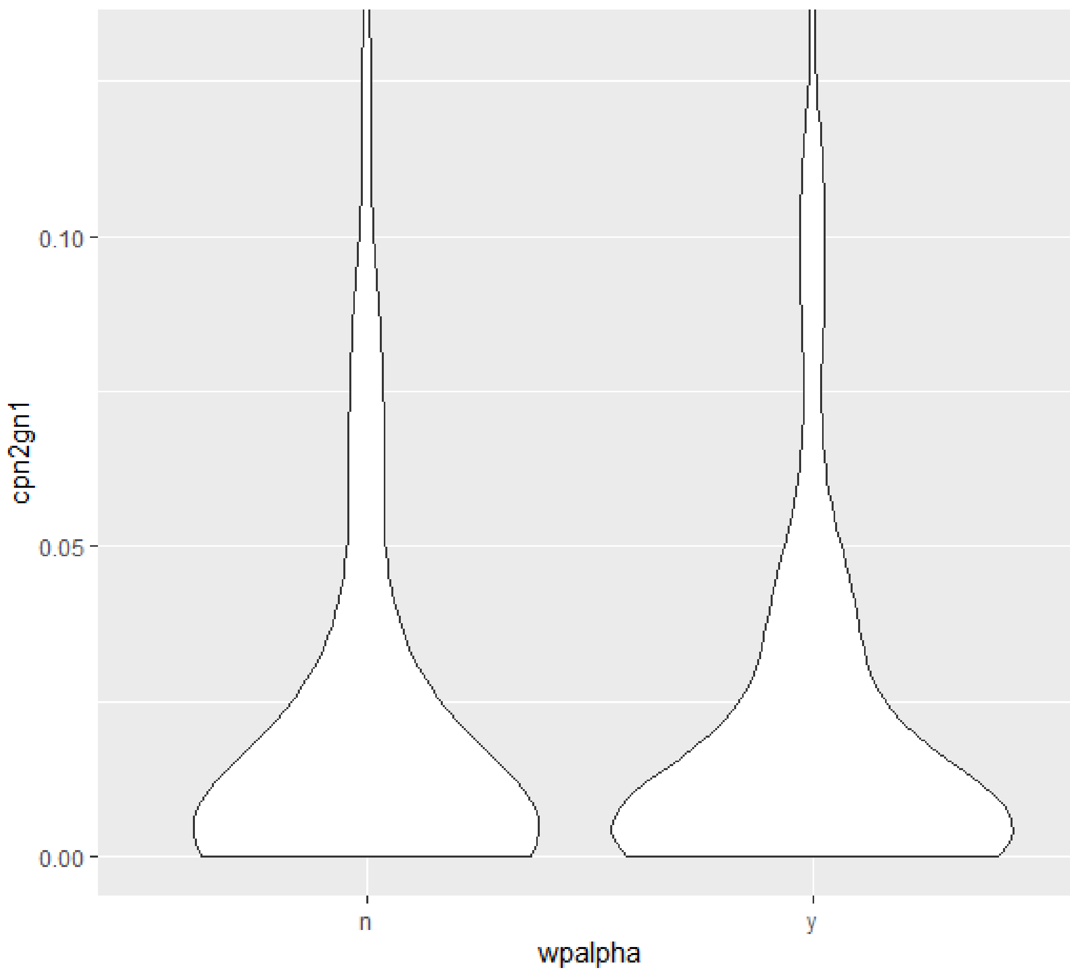


These data still have very long tails, even after outlier removal, making the bottom densities difficult to visualize, so the coord_cartesian() function was also used to zoom in to the bottom portions of the plot. For the conditional probability of N1 given N2, the plot was zoomed to below the 0.5 mark, and for the conditional probability of N2 given N1, the plot was zoomed to below the 0.13 mark. These plots again show possibly a weak correlation: in the case of low conditional probability of N1 given N2 (257), where the density for "no" is slightly wider than for "yes," and in the case of low conditional probability of N2 given N1 (258), where the density for “yes” is slightly wider than for “no.”

(257) Word-phrase parse? vs. conditional probability of N1 given N2 (tokens) (cpn1gn2), zoomed below 0.5



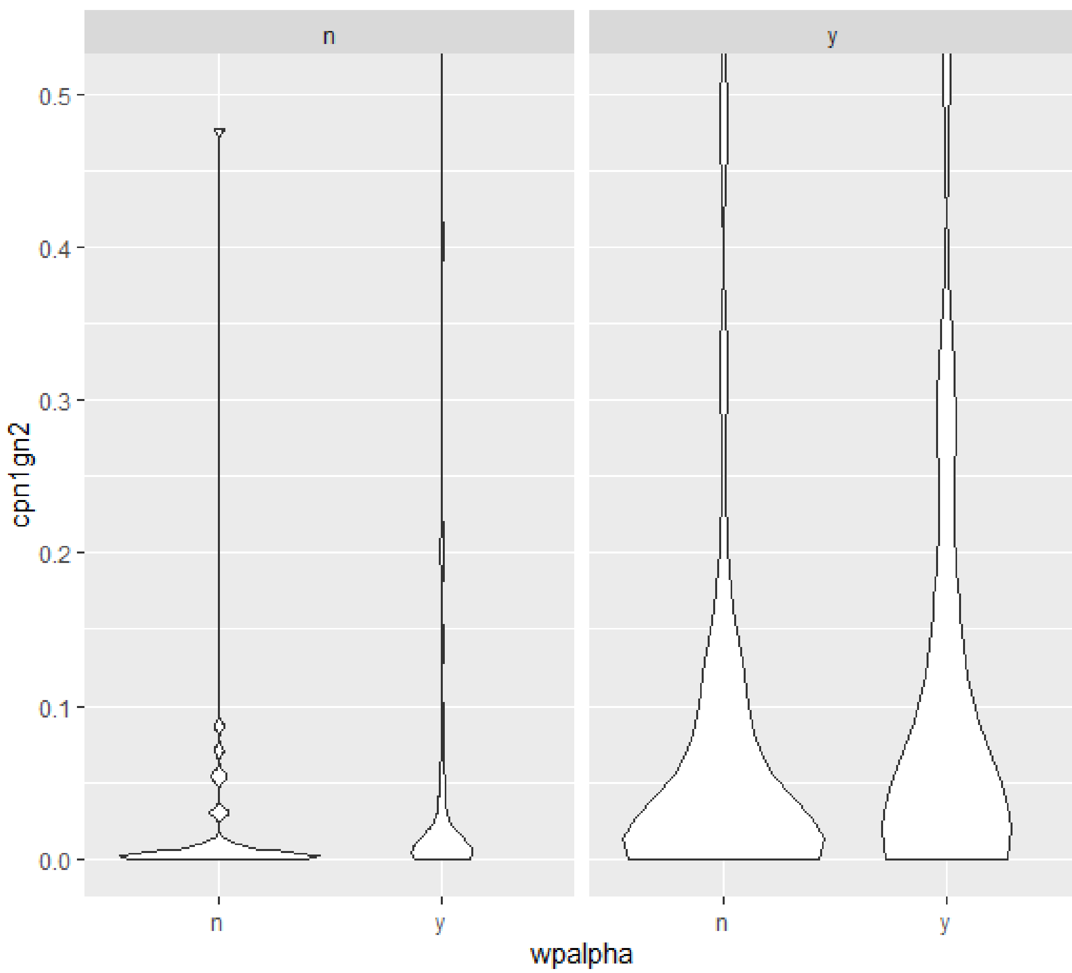
(258) Word-phrase parse? vs. conditional probability of N2 given N1 (tokens) (cpn2gn1), zoomed below 0.13



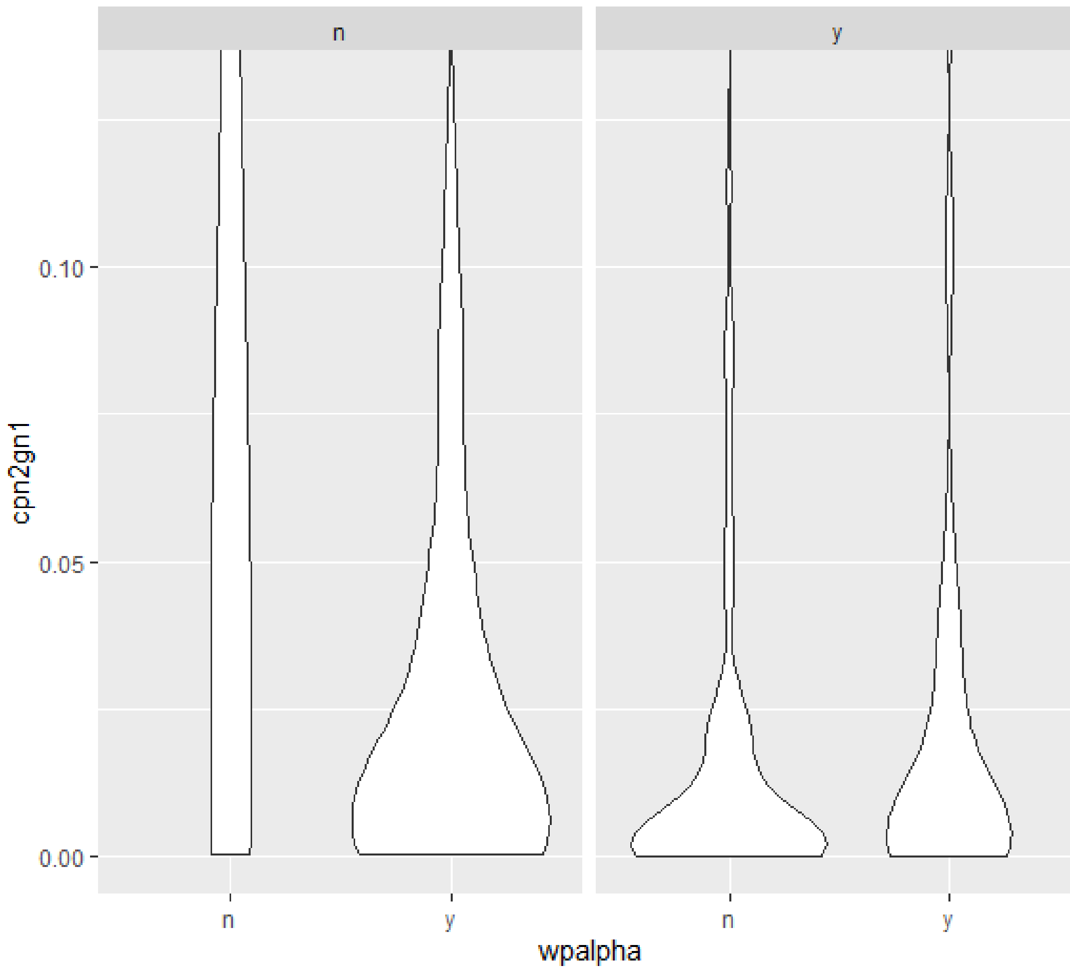
Splitting these by whether N2 is a compound or not again shows slightly greater density for “no” when considering the conditional probability of N1 given N2 and slightly greater density for “yes” when considering the conditional probability of N2 given N1, suggesting perhaps a weak correlation between these token-based measures and word-phrase parse availability. Interestingly, there is much greater density for “yes” when

N2 is not a compound in this latter case, in light of Nakai's reported tendency for N2 to be a compound.

(259) Word-phrase parse? (wpalpha, bottom x-axis) vs. conditional probability of N1 given N2 (tokens) (cpn1gn2), zoomed below 0.5, split by compound status (top x-axis)

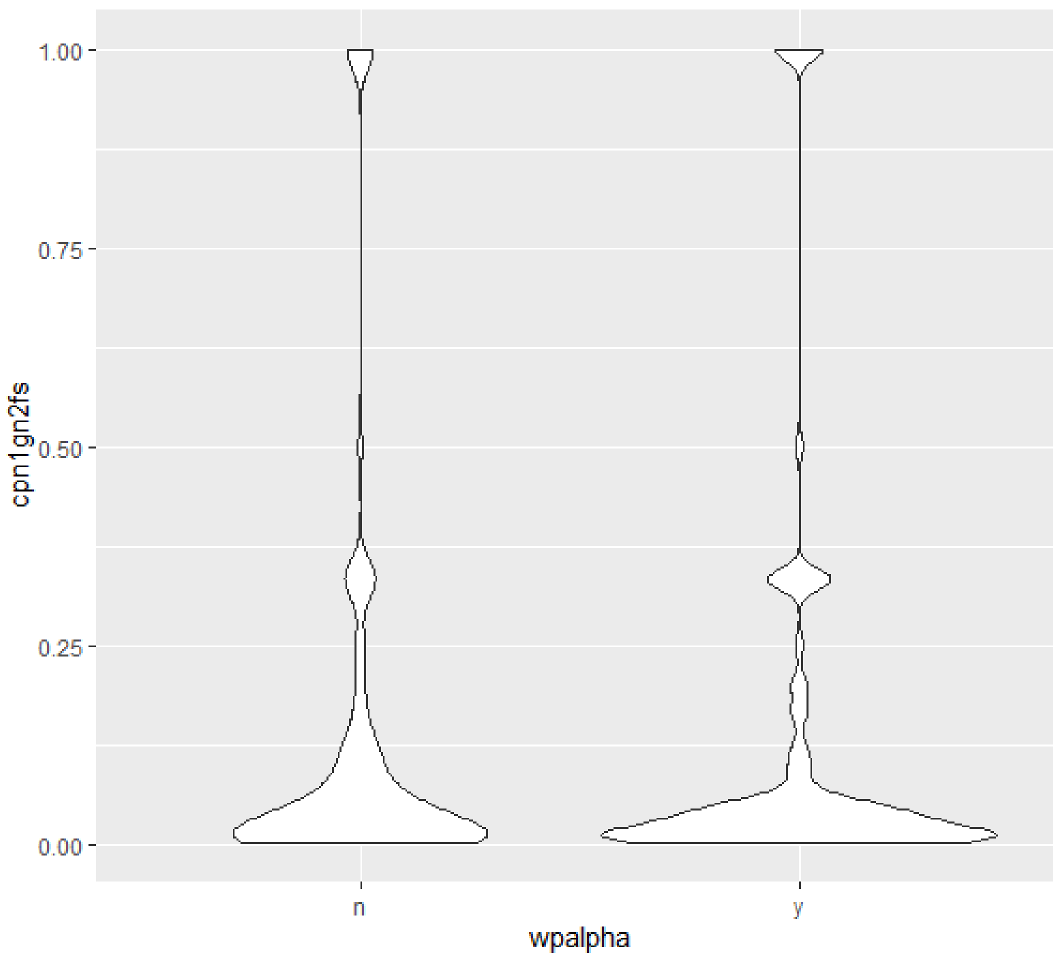


(260) Word-phrase parse? (wpalpha, bottom x-axis) vs. conditional probability of N2 given N1 (tokens) (cpn2gn1), zoomed below 0.13, split by compound status (top x-axis)

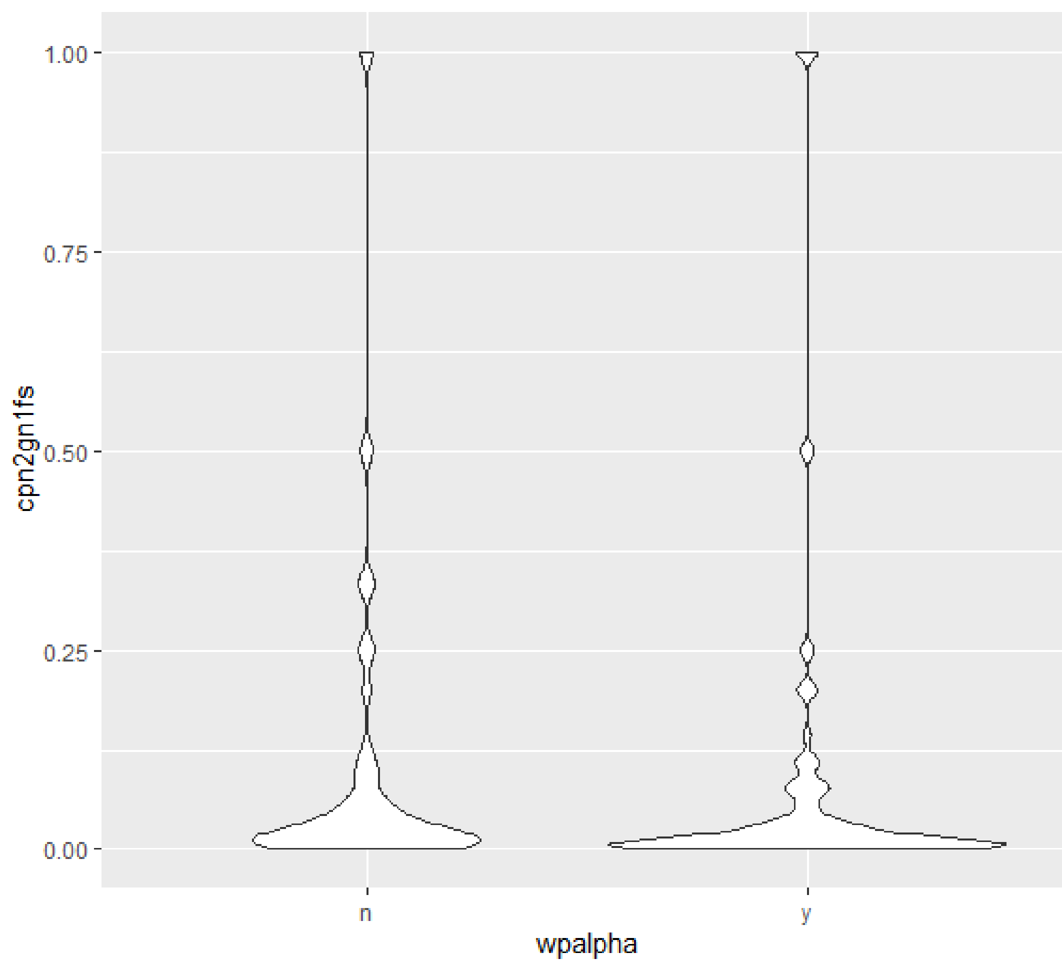


"Word-phrase parse?" was also plotted against the type-based informativeness measures, conditional probability of N1 given N2 family size, and conditional probability of N2 given N1 family size. These two plots show greater density of low-informativeness components in "yes" and suggest the possibility of a role for informativeness in compounds having a word-phrase parse when it comes to type-based conditional probabilities, which may be expected given Schreuder and Baayen (1997) reporting greater psychological salience of type frequencies.

(261) Word-phrase parse? (wpalpha) vs. conditional probability of N1 given N2 family size (types) (cpn1gn2fs)

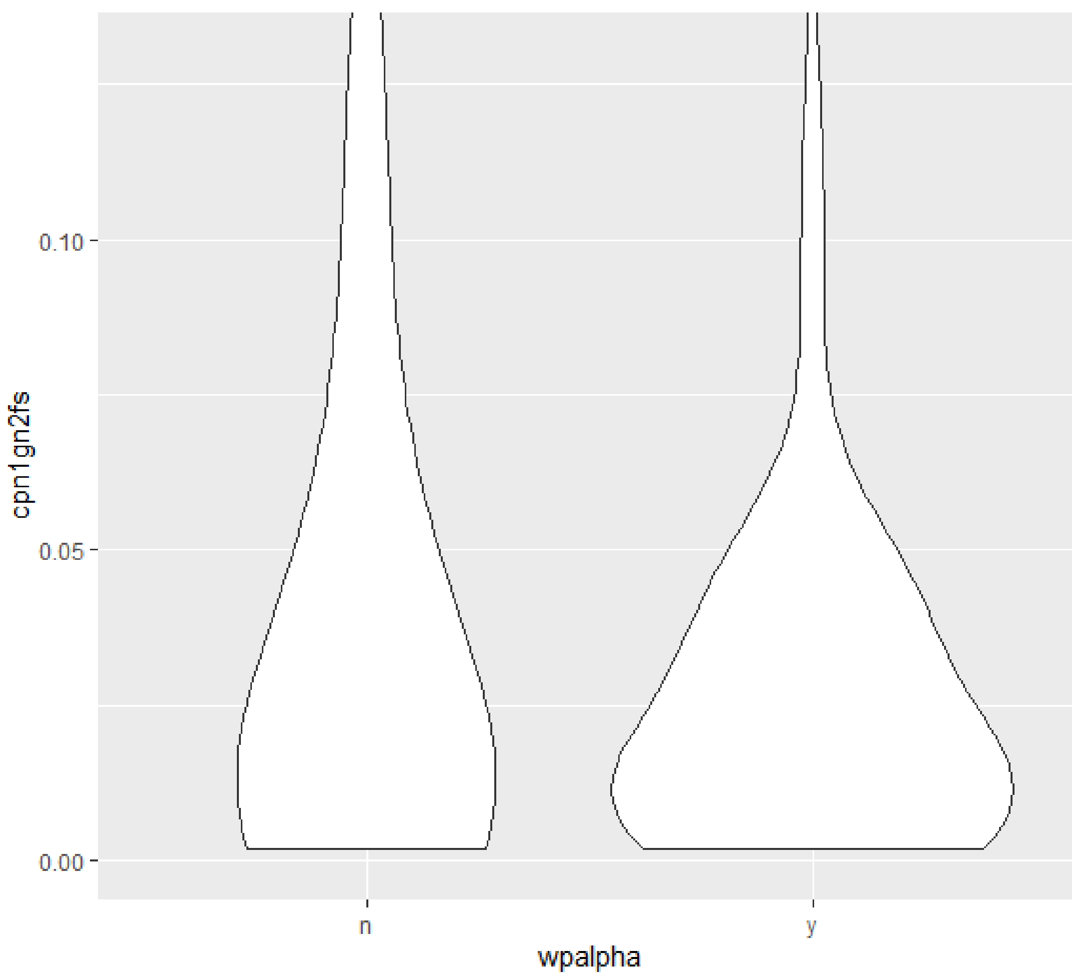


(262) Word-phrase parse? (wpalpha) vs. conditional probability of N2 given N1 family size (types) (cpn2gn1fs)

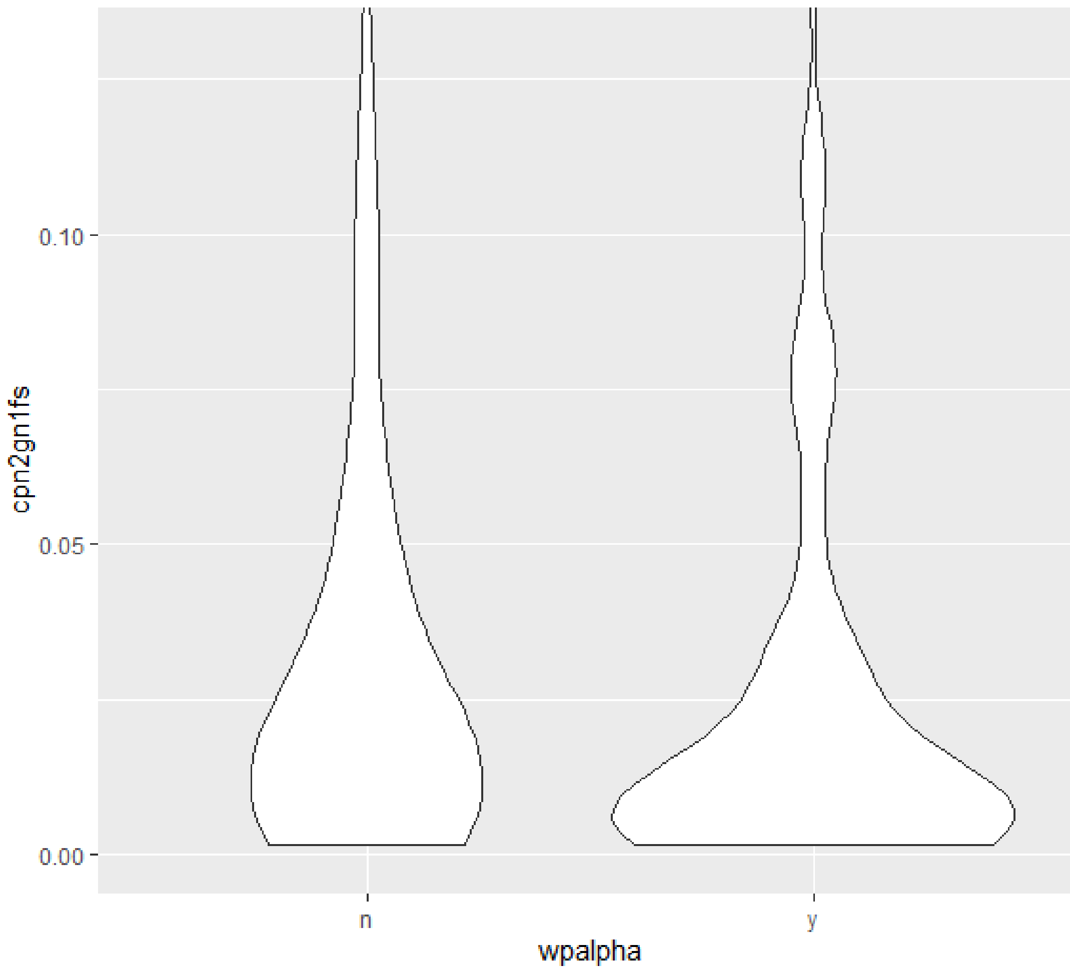


Like the plots for the token-based measures, these still have very long tails, so they were zoomed in to below the 0.13 mark for both measures in order to more clearly see the plot densities at the base of each violin. These too show greater density for "yes" than for "no."

(263) Word-phrase parse? (wpalpha) vs. conditional probability of N1 given N2 family size (types) (cpn1gn2fs), zoomed below 0.13

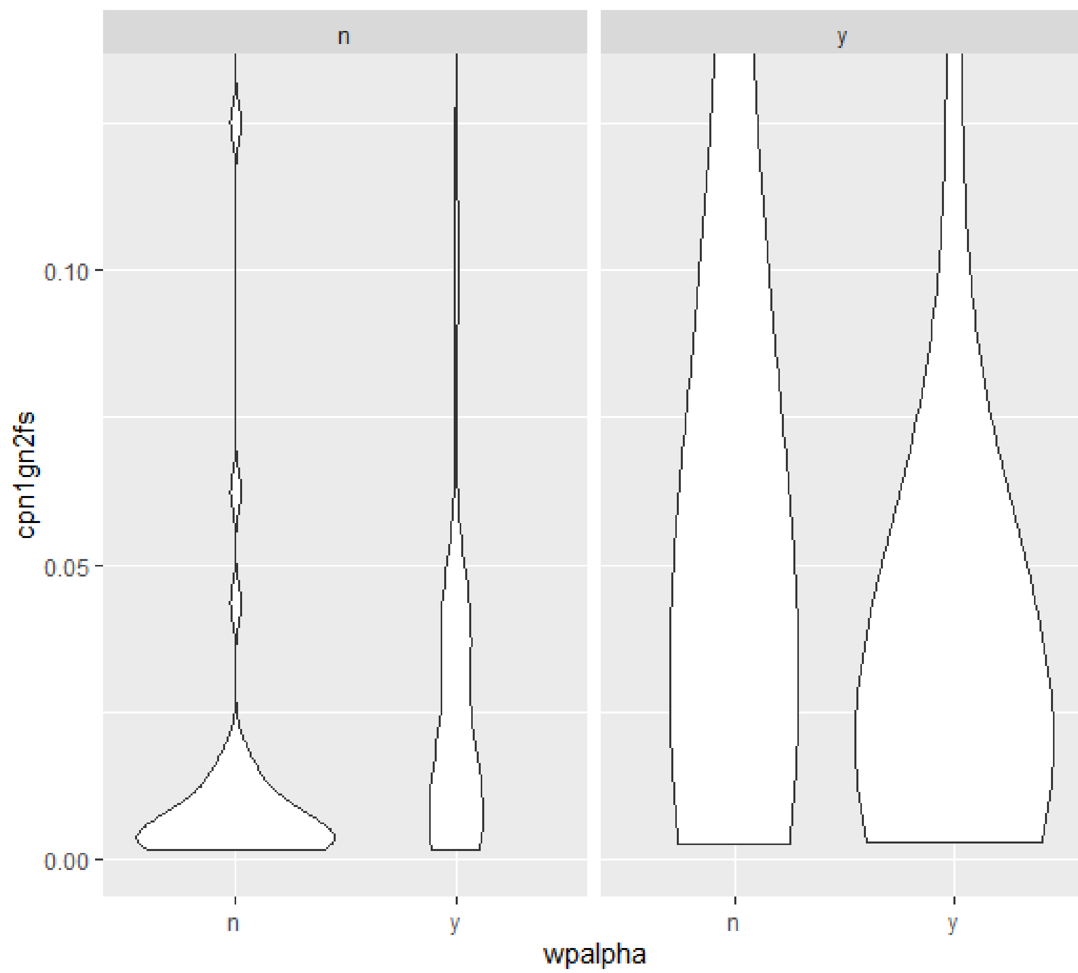


(264) Word-phrase parse? (wpalpha) vs. conditional probability of N2 given N1 family size (types) (cpn2gn1fs), zoomed below 0.13



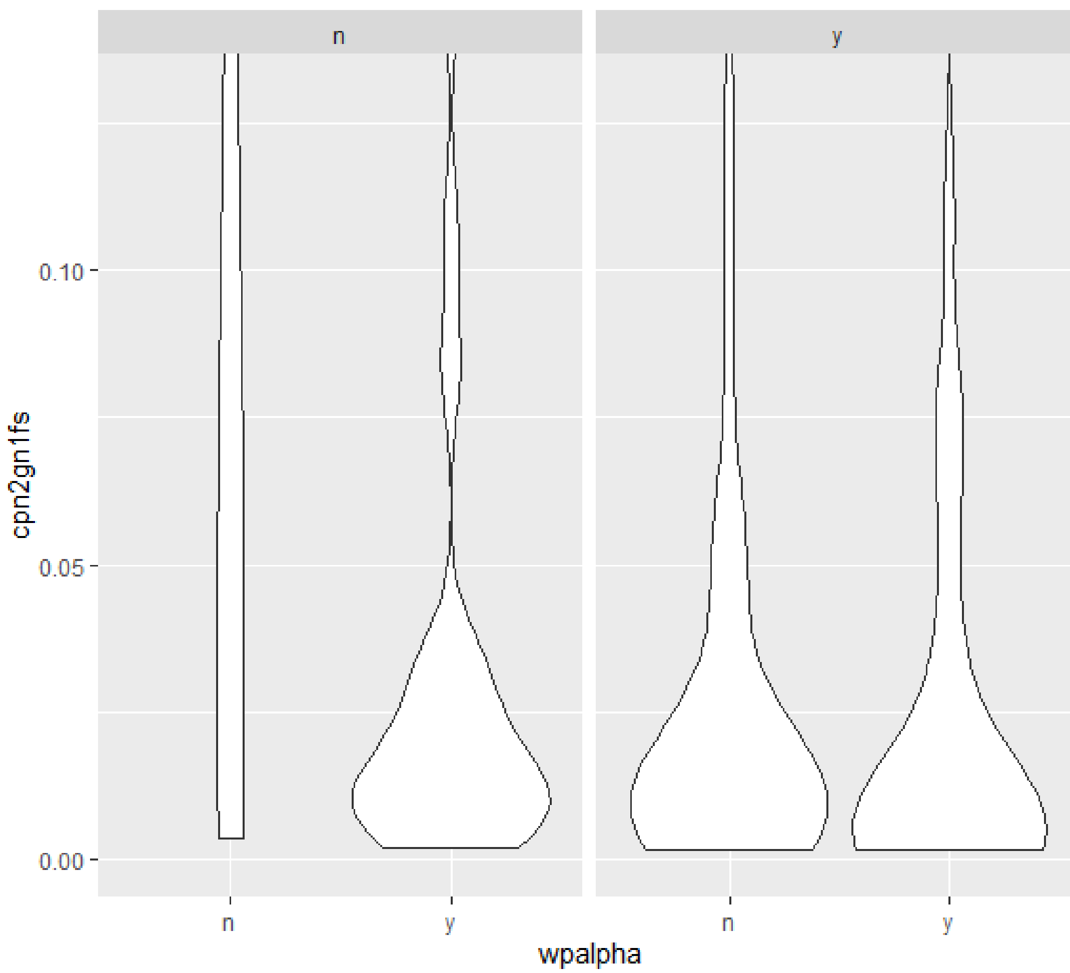
Splitting these by whether N2 is a compound or not yields interesting results as well. Again they suggest some correlation between availability of the word-phrase parse and low informativeness, but the tendencies are somewhat clearer than shown above for other informativeness measures. When considering the conditional probability of N1 given N2's family size, there seems to a weak tendency for compounds to have the word-phrase parse available when N2 is a compound, and for compounds to not have the word-phrase parse available when N2 is not a compound. This is shown below.

(265) Word-phrase parse? (wpalpha, bottom x-axis) vs. conditional probability of N1 given N2 family size (types) (cpn1gn2fs), zoomed below 0.13, split by N2 compound status (top x-axis)



When considering the conditional probability of N2 given N1's family size, however, the tendency seems to be reversed. There is perhaps a slight tendency for compounds to not have the word-phrase parse when N2 is a compound, and a greater tendency for compounds to have the word-phrase parse when N2 is not a compound.

(266) Word-phrase parse? (wpalpha, bottom x-axis) vs. conditional probability of N2 given N1 family size (types) (cpn2gn1fs), zoomed 0.13, split by N2 compound status (top x-axis)



Overall, these suggest some role for informativeness in whether a compound has the word-phrase parse available or not. In the next section, I turn to a statistical analysis of a subset of the informativeness measures considered above in order to formally confirm a role for informativeness in word-phrase parse availability.

5.3.5.3 Statistical Modeling

As previously mentioned, whether a compound has a word-phrase parse available was considered a binary variable "yes, at least one source reports the word-phrase parse" vs. "no, no source reports the word-phrase parse" for the present study. Accordingly, a binomial logistic regression is appropriate for conducting a statistical analysis on this data (Gries 2013). The binary variable "Word-phrase parse?" was set as the dependent variable for this analysis, with the measures of informativeness treated as independent variables.

The six measures of informativeness discussed to this point are the raw frequency of N1 in the corpus, the raw frequency of N2 in the corpus, the conditional probability of N1 given N2 (tokens), the conditional probability of N2 given N1 (tokens), the conditional probability of N1 given N2 (types), and the conditional probability of N2 given N1 (types). As mentioned above, the raw frequencies are involved in the calculation for the conditional probability of N1 given N2 (tokens) and the conditional probability of N2 given N1 (tokens), so there is a correlation between the raw frequency measures and the conditional probabilities. One of the assumptions of a binomial logistic regression is that there are relatively low levels of correlation between the variables, as high levels of correlation can make the results of a statistical analysis essentially uninterpretable, as, if there are high levels of correlation, it is not clear which factors explain the data. In order to check the severity of correlations between independent variables, a variance inflation factor (VIF) was calculated for each independent variable in R. If raw frequencies are not removed from the model, the VIF for each factor ranges from relatively low, below 3, for predictors which are not related to informativeness measures, such as whether N2 is a compound, to extremely high, above 1×10^{13}, for informativeness measure predictors. Accordingly, because the raw frequencies are used to calculate the conditional probabilities, the raw frequencies were removed, as they are highly correlated with the conditional probabilities. With raw frequencies removed from the model, the VIF for each factor was relatively low, below 4.3, indicating relatively low levels of correlation between factors. This leaves only the four conditional probability measures as independent variables.

In addition to the informativeness measures, three additional factors were also included. These were the length of N2 in moras, known to be a factor for Kansai Japanese compounds in general, whether N2 is a foreign loanword or not (based on Nakai's generalization that word-phrase compound N2s may be foreign loanwords), and whether N2 is a compound or not (based on Nakai's generalization that word-phrase compound N2s tend to be compounds). For this last factor, N2s were considered compounds if they had the form of one of the compound types present in Kansai Japanese as discussed in this dissertation. Sino-Japanese words made up of two Sino-Japanese morphemes, such as *bangumi* 番組 'program' and *taisyoo* 大将 'general' were not considered compounds for this classification, as such words cannot usually be decomposed into smaller parts that can stand alone. These can be considered compounds of roots (Ito and Mester 2015), but because they are limited in size and maximally bimoraic, root-root compounds would be expected to be prosodically like foot-foot compounds, and thus prosodically like simplex words. Indeed, examining these types of words in Sugito (1995) and Nakai (2002) shows that many of them are unaccented in Kansai Japanese, like many foot-foot compounds.

Given that most of the word-phrase compounds reported by Nakai have a compound as an N2, there is some sense in which this is the “prototypical” word-phrase structure, at least descriptively speaking. Accordingly, I also considered the possibility that whether a compound has a “prototypical” N2 interacts with the informativeness measures. Thus, in addition to the simple factors of the four informativeness measures, N2 length, N2’s status as a loanword, and N2’s status as a compound, I also considered the interaction of N2 being a compound with the conditional probabilities of N1 given N2 and N2 given N1 in both tokens and types. Second, because N2 length in moras has long been known to be an important factor in Japanese compound prosody, I also considered the interaction of N2 length with the four measures of informativeness.

The initial model for this binomial logistic regression, then, is as follows. The abbreviated variable name I used in R is given as well.

(267) Initial model

a. Dependent variable: Variable Name
   i. Word-phrase parse? wpnum
b. Independent variables:
   i. Conditional probability of N1 given N2 (tokens) cpn1gn2
   ii. Conditional probability of N1 given N2 (types) cpn1gn2fs
   iii. Conditional probability of N2 given N1 (tokens) cpn2gn1
   iv. Conditional probability of N2 given N1 (types) cpn2gn1fs
   v. N2 length n2lenmoras
   vi. N2 a loanword? loann2num
   vii. N2 a compound? n2compoundnum
c. Interactions:
   i. N2 a compound? with conditional probability of N1 given N2 (tokens) n2compoundnum:cp1gn2
   ii. N2 a compound? with conditional probability of N1 given N2 (types) n2compoundnum:cp1gn2fs
   iii. N2 a compound? with conditional probability of N2 given N1 (tokens) n2compoundnum:cp2gn1
   iv. N2 a compound? with conditional probability of N2 given N1 (types) n2compoundnum:cp2gn1fs
   v. N2 length with conditional probability of N1 given N2 (tokens) n2lenmoras:cp1gn2
   vi. N2 length with conditional probability of N1 given N2 (types) n2lenmoras:cp1gnfs
   vii. N2 length with conditional probability of N2 given N1 (tokens) n2lenmoras:cp2gn1
   viii. N2 length with conditional probability of N2 given N1 (types) n2lenmoras:cp2gn1fs

The informativeness factors were centered and log-transformed (represented in R by the scale() and log() functions) in order to reduce the influence of any remaining outliers below the 97.5th percentile in the data.

The formula used in R for this model is given below.

(268)

```
model<-glm(wpnum ~ scale(log(cpn1gn2fs)) + scale(log(cpn2gn1fs))
           + scale(log(cpn1gn2)) + scale(log(cpn2gn1))
           + n2compoundnum + loann2num
           + n2lenmoras
           + n2compoundnum:scale(log(cpn1gn2fs)) + n2compoundnum:scale(log(cpn2gn1fs))
           + n2compoundnum:scale(log(cpn1gn2)) + n2compoundnum:scale(log(cpn2gn1))
           + n2lenmoras*scale(log(cpn1gn2fs)) + n2lenmoras*scale(log(cpn2gn1fs))
           + n2lenmoras*scale(log(cpn1gn2)) + n2lenmoras*scale(log(cpn2gn1))
           ,
           data = freq_no_outlier97, family = 'binomial')
```

5.3.5.4 Results of the Model and Discussion

When this model is run in R using the generalized linear model glm() function, the following results are given. This model was run after removing outliers from consideration according to the process described above in the section on visualization of the data.

(269) Results of a binomial logistic regression on the model in (267)

```
Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.6273  -1.0754   0.1724   1.0151   2.1352

Coefficients:
                                    Estimate Std. Error z value Pr(>|z|)
(Intercept)                           1.6753     0.9048   1.852 0.064087 .
scale(log(cpn1gn2fs))                 1.4507     1.4617   0.992 0.320959
scale(log(cpn2gn1fs))                 1.3982     1.6099   0.869 0.385108
scale(log(cpn1gn2))                   0.2795     1.6501   0.169 0.865500
scale(log(cpn2gn1))                  -1.3538     1.6738  -0.809 0.418614
n2compoundnum                        -0.3366     0.6318  -0.533 0.594195
loann2num                             0.4266     0.5698   0.749 0.454094
n2lenmoras                           -0.2760     0.1761  -1.567 0.117085
scale(log(cpn1gn2fs)):n2compoundnum  -2.8825     0.8466  -3.405 0.000662 ***
scale(log(cpn2gn1fs)):n2compoundnum   2.4188     0.9684   2.498 0.012503 *
scale(log(cpn1gn2)):n2compoundnum     2.4494     0.9692   2.527 0.011501 *
scale(log(cpn2gn1)):n2compoundnum    -2.3205     1.0488  -2.212 0.026932 *
scale(log(cpn1gn2fs)):n2lenmoras      0.1772     0.3152   0.562 0.574022
scale(log(cpn2gn1fs)):n2lenmoras     -0.8038     0.3515  -2.286 0.022229 *
scale(log(cpn1gn2)):n2lenmoras       -0.4663     0.3515  -1.327 0.184603
scale(log(cpn2gn1)):n2lenmoras        0.7311     0.3813   1.918 0.055174 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 286.96  on 206  degrees of freedom
Residual deviance: 248.83  on 191  degrees of freedom
AIC: 280.83

Number of Fisher Scoring iterations: 4
```

As the results show, none of the single factors are significant. However, all four interactions between the conditional probability measures and whether N2 is a compound are significant, one interaction between a conditional probability measure (cpn2gn1fs) with N2's length in moras is significant, and another interaction between a conditional probability measure (cpn2gn1) with with N2's length approaches significance. First, the interactions of whether N2 is a compound with the conditional probability of N2 given N1 family size (types) (cpn2gn1fs), the conditional probability of N1 given N2 (tokens) (cpn1gn2) and of N2 given N1 (tokens) (cpn2gn1) are significant to the $p<0.05$ level. The interaction of N2's length in moras with the conditional probability of N2 given N1 family size (types) (cpn2gn1fs) is also significant to the $p<0.05$ level. Even more significant, however, is the interaction of whether N2 is a compound with the conditional probability of N1 given N2 family size (types) (cpn1gn2fs), which is significant to the $p<0.001$ level. The interactions between whether N2 is a compound and N2's length in moras with the family size-based measures of informativeness may be expected if informativeness measures play a role in whether a word-phrase parse is available, given that type frequencies are psychologically more salient as found by Schreuder and Baayen (1997). However, the model also finds a role for the interactions between whether N2 is a compound and the token-based informativeness measures as well, further suggesting a role for frequency on the word-phrase parse, whether frequency is measured in types or in tokens. Second, unlike the case of English compound prosody, in which it is the informativeness of N2 which plays a role in double accenting (noting that Bell and Plag did not test N1 in the same way that N2 was tested), it may be the case that Kansai Japanese word-phrase compounds are more concerned with the informativeness of N1 than the informativeness of N2, if the greater significance of the interaction between whether N2 is a compound and the conditional probability of N1 given N2's family size (cpn1n2fs) can be taken as related to a larger role of N1's informativeness in whether a compound can get the word-phrase parse. In this case, the former conception discussed above of N1 losing its accent being the mark of surprisal may be the state of affairs in Kansai Japanese, rather than the latter conception of N2 retaining its accent being the mark of surprisal. That said, the fact that there is a significant interaction between N2's length in moras and the conditional probability of N2 given N1's family size (cpn2gn1fs), despite no other interaction with N2 length being significant, as well as both interactions between whether N2 is a compound and conditional probabilities of N2 given both N1 family size (cpn2gn1fs) and N1 tokens (cpn2gn1), suggests that N2 is not in any way unimportant in the consideration. The informativeness of both N1 and N2 are important for the availability of the word-phrase parse.

As expected, the traditional factor of N2's length in moras determining compound length is perhaps not as important for word-phrase compounds as whether N2 is a compound or not. However, given that one interaction with N2's length is significant and another interaction approaches significance suggests that N2 length still has a role to play, even if it plays less of a role than whether N2 is a compound or not. That N2 length has a role to play *at all* is perhaps not unexpected, given that, as previously mentioned, compounds seem to need to have an N2 larger than a certain number of moras to be eligible for the word-phrase parse, generally speaking. That there is an interaction between N2 length and one of the conditional probability measures confirms a role for N2 length, even if such a role is not the same as or as clear-cut as the role it has for other compound types.

Although whether N2 is a compound or not is not significant by itself as a factor, when it is considered interacting with the informativeness measures, its effect can be seen. This is interesting given that the compound status of N2 has not to this point played a role in the prosodic parse of a compound. While it cannot be the case that N2 being a compound is necessary, as word-phrase examples like *gasorin-sutando* and *gureepu-huruutu*, which both have simplex loanword N2s, show, when a compound N2 is combined with low informativeness in N1 or N2, a word-phrase parse is more likely to result. In the case of word-phrase compounds with simplex N2s, perhaps these are in some sense “super” informative, which may lead to the word-phrase parse, or perhaps the significant interaction of N2 informativeness (types) with the length of N2 in moras or the interaction of N2 informativeness (tokens) with the length of N2 in mora, which approaches significance, may be playing a role. There is also the possibility that these compounds are pseudo-compounds (Kubozono 2002, Karvonen 2005), as previously discussed in the section on the syntax-prosody mapping of mono-phrasal compounds, even though their parts also exist as independent words. This may especially be the case for *gureepu-huruutu* ‘grapefruit,’ as although *gureepu* ‘grape’ and *huruutu* ‘fruit’ both exist, *gureepuhuruutu* refers to a different fruit, not a grape, just as ‘grapefruit’ does in English, compared to ‘grape’ and ‘fruit.’ Further investigation of pseudo-compounds would be needed to determine whether the word-phrase parse is available to them, and if so, exactly how informativeness might influence the word-phrase parse. It may be that even though a *gureepuhuruutu* is not literally a *gureepu-huruutu* ‘fruit which is a grape, fruit of the grape plant,’ the informativeness of the N2 *huruutu* ‘fruit’ still plays a role. Similarly, *irasutoreesyon* ‘illustration’ shows compound accentuation *irasuto-re’esyon* in Tokyo Japanese

(Kubozono 2002), but the division of the word results in the combination of *irasuto* ‘illustration’ (clipping of *irasutoreesyon*) and *reesyon* ‘field/combat rations.’

In order to attempt to refine the model, I attempted to remove one of the least significant interactions in the model, which was the interaction between N2 length in moras and the conditional probability of N1 given N2 family size (cpn1gn2fs). However, when the original and the simplified models were compared with a Chi-Square Test using the anova() function in R, the result of this simplification was a model that was significantly different from the original model (Pr(>Chi) of 0.5733), so the original model was kept. The original model has a p-value from chi-squared distribution of 0.0008632245, as calculated by R, indicating that the model is highly significant.

These results suggest informativeness may play a role in whether a compound can have the word-phrase parse in Kansai Japanese. Second, it suggests that neither informativeness measures nor morphological or phonological length factors are sufficient on their own to influence the availability of a word-phrase parse. Rather, this availability seems to come from some combination of factors, particularly the morphological status of N2 as a compound itself, in combination with the informativeness of N1 and N2, and to some extent the length of N2 in moras, particularly in combination with the informativeness of N2.

These results open up a path to further research in the role of gradient, usage/frequency-based measures in influencing prosodic structures in Japanese and in other languages. In particular, because the word-phrase parse is predicted as a separate prosodic structure, per the discussion in Chapter 3, it seems that informativeness does not simply influence a compound's pronunciation itself, but rather, it does so because informativeness plays a role in mapping a compound syntactic structure to a word-phrase prosodic structure. If it is the case that informativeness is involved, however, this will necessitate an approach to syntax-prosody mapping that takes into account such gradient factors. One possible approach would be to attempt to implement Match Theory in approaches that use weighted constraints, such as Harmonic Grammar (Legendre, Miyata, and Smolensky 1990), Maximum Entropy Grammar (Goldwater and Johnson 2003), or Gradient Symbolic Computation (Smolensky and Goldrick 2016). For such grammars with weighted constraints, higher or lower weights may be assigned based on higher or lower values of informativeness. For example, in cases when the informativeness of one or both constituents of the compound is high (= greater surprisal), then the relative weight of a constraint that would force N2 to surface within a minimal phonological phrase co-extensive with N2, leaving N1 the daughter of only the maximal phonological phrase, may allow (perhaps optionally) the word-phrase parse to surface, even if no syntactic or phonological factors require the word-phrase parse to surface. If this is reasonable, it seems that an additional constraint forcing this phonological phrase would be required, as the constraints covered in the previous chapter would only put N2 in its own minimal phonological phrase if N2 were long enough. Such a constraint may be a simple "map X^0 to φ" constraint of some sort, although the motivation for such a constraint in general seems rather tenuous. In a system with weighted constraints, however, it might be conceivable that such a constraint exists but usually has a weight of 0 (or otherwise very close to 0) and thus never influences anything in the general case. When informativeness is taken into account, then this constraint may gain a weight high enough to influence the possible outcomes of the mapping. Even still, in the case of word-phrase parses, it would be necessary to additionally explain how only N2 gets mapped to a phonological phrase, while N1 does not.

I briefly sketch this proposal here, using *tyuuka-ryooriya* 'Chinese restaurant,' a compound which has both mono-phrasal and word-phrase prosodic patterns available, as many word-phrase compounds have the same N2 length as mono-phrasal compounds. Only the correct mono-phrasal and word-phrase outputs are considered in this illustration, and only Match constraints are given here. The informativeness-dependent constraint is given here as MATCH(X^0,φ). The weight of every constraint is given as an integer below each constraint. A score is provided in the last column of the two tableaux; the candidate with the lowest score (indicating best performance on all of the constraints) is selected as the winner. Scores for each constraint are calculated here simply by multiplying violation counts by constraint weights. The total score for each candidate is calculated by adding values across the rows, by candidate.

The first tableau displays a competition in which the informativeness of N1 and N2 are not particularly high (= lower surprisal), so the mono-phrasal parse would be expected. Because the informativeness of N1 and N2 are low, the weight of the MATCH(X^0,φ) constraint is low, here set to 0 so that it does not influence the outcome at all. Candidate (270a), the mono-phrasal parse, has a lower score, since it violates

MATCH(X^0,ω) one fewer time than candidate (270b), so candidate (270a) emerges as the winner.

(270)

$[_{x^0}[_{x^0}$ tyuuka]$[_{x^0}[_{x^0}$ ryoori]$[_{x^0}$ ya]]] 中 tyuu 華 ka 料 ryoo 理 ri 屋 ya	MATCH (X^0, ω) 1	MATCH(X^0,φ) 0	SCORE
→ a. Mono-phrasal $[_φ[_ω$ tyuuka]$[_ω[_ω$ ryoori]$[_f$ ya]]]	** = 2	**** = 0	2
b. Word-phrase $[_φ[_ω$ tyuuka]$[_φ[_ω$ ryoori]$[_f$ ya]]]	*** = 3	*** = 0	3

However, if the informativeness of one of the components is high, then MATCH(X^0,φ) has a higher weight, here set to 2, as shown in the following tableau.

(271)

$[_{x^0}[_{x^0}$ tyuuka]$[_{x^0}[_{x^0}$ ryoori]$[_{x^0}$ ya]]] 中 tyuu 華 ka 料 ryoo 理 ri 屋 ya	MATCH (X^0, ω) 1	MATCH(X^0,φ) 2	SCORE
a. Mono-phrasal $[_φ[_ω$ tyuuka]$[_ω[_ω$ ryoori]$[_f$ ya]]]	** = 2	**** = 8	10
→ Word-phrase b. $[_φ[_ω$ tyuuka]$[_φ[_ω$ ryoori]$[_f$ ya]]]	*** = 3	*** = 6	9

This time, the score of candidate (271b), the word-phrase parse, is lower, and so it is selected as the winner. Speculating on the meaning of the scores (which were based on arbitrary numerical weight assignments to the relevant constraints, so care should be taken in interpreting the scores too heavily beyond simple optimum determination), if scores are close, as they are in this illustration, it may have bearing on the fact that the word-phrase parse is never the sole parse available for compounds which allow it. Further investigation is needed.

The possibility that informativeness plays a role in Japanese compound prosody also provides a possible path to explore when it comes to the bigger picture of Japanese compound prosody in dialects/dialect families like Tokyo and Kansai Japanese. Although the mapping to the word-foot, word-word, mono-phrasal, and bi-phrasal parses was treated as essentially categorical in the discussion in this dissertation, the big picture is actually more complex. Not all noun-noun compounds surface with prosody that corresponds to these compound types. That is, the patterns of N1 accent loss/retention, N2 accent loss/retention, and N2 register loss/retention (in the case of Kansai Japanese), are not always observed as discussed in this dissertation. In some cases, a compound with a short "N2" may surface with word-word prosody, instead of the expected word-foot prosody. Two examples of this are *momen-i'to* 木綿糸 'cotton thread' (Poser 1990a) and *perusya-ne'ko* ペルシャ猫 'Persian cat' (Ito and Mester 2018a). In other cases, compounds may surface unaccented rather than acquiring a compound accent or retaining N2's original accent in place. Two examples of these are *sansui-ga* 山水画 'landscape painting' (instead of *sansui'-ga*) and *garasu-dama* ガラス玉 'glass bead' (instead of *garasu'-dama*) (Poser 1990a). Examples of these are found in Kansai Japanese as well, such as ^{L}*tenaga-za'ru* テナガザル 'gibbon, lit. long-handed monkey,' which has accent on N2 despite looking like it should be a word-foot compound like ^{L}*tenaga'-zaru*, and ^{H}*seiseki-yuusyuu* 成績優秀 'having excellent grades, lit. grades-excellent,' which is unaccented despite looking like it should be a word-word compound like ^{H}*seiseki-yu'usyuu*. If such non-syntactic, non-phonological roles as informativeness can play a role in compound prosody, then perhaps these exceptions to the generalizations can also be explained to some extent by factors like informativeness. Like in the discussion above, the influence of informativeness could possibly be implemented in a constraint-based approach with weighted constraints. In the case of unexpected N2 accent, then, perhaps high informativeness increases the weight of the constraints which place accent at the beginning of N2 and decrease the weight of the constraints which place accent at the end of N1. It should be noted that some role of N2's isolation accent may be important as well, as this exception tends to occur when N2 has initial accent in isolation. For unexpected unaccented compounds, then perhaps the constraint requiring accent on the compound is given a low weight when high or low informativeness is involved, allowing unaccented compounds to surface.

I leave the exploration of these possibilities to future research. For now, it seems to me to be possible to say that informativeness may play a role in compound prosody in Japanese as well, and that more research into this area (as well as other types of non-syntactic, non-morphological, non-phonology influencing of prosodic structure, such as by factors like the semantic relations between compound constituents) is warranted.

Chapter 6: Conclusion

In this dissertation, I have discussed compound nouns in several dialects of Japanese, with a particular focus on Kansai Japanese and its implications on research on the syntax-prosody interface and on compounding in general.

In Chapter 2, I compared the prosody of simplex and compound words in the Kansai, Tokyo, Kagoshima, and Nagasaki dialects of Japanese and show that they have in common some subset of a set of prosodic characteristics, although the four dialects differ from each other in the specifics of their prosodic systems and what aspects of Japanese prosody are used, with Tokyo, Kagoshima, and Nagasaki Japanese each having features that can be found or analogized to features of Kansai Japanese. Specifically, Kansai Japanese uses both register and accent, while Tokyo Japanese uses only accent, Kagoshima Japanese uses only register, and Nagasaki Japanese uses a system that looks like an intermediate between accent and register. Because the dialects have similarities in this way, I propose that their different prosodic systems can be accounted for with the same constraints, arranged in different ways.

In Chapter 3, I discussed syntax-prosody mapping and the motivations for considering various prosodic phenomena to be diagnostic of particular prosodic categories, extending Ito and Mester (2021)'s theory of prosodic structure and analysis of Tokyo Japanese to Kansai Japanese. First, word compounds have similar prosodic characteristics to simplex words, including having only one accent and one register (foot-word, word-foot, and word-word compounds) or having only one register and no accent (foot-foot compounds). Accordingly, I proposed that some compounds have a prosodic word as their top level node, with the daughter nodes being prosodic words or feet, based on the length of the word, and that the subset of compounds which have a maximal, non-minimal word receive a new compound accent. Second, I showed that phrasal compounds have similar characteristics to non-compound sequences and posited that if a member of a compound keeps its original accent, as non-compound phrases do, then the compound involves phrasal structure. These comparisons yielded the following as diagnostics: accent and culminativity are both features of the minimal phonological phrase, compound accent is a feature of the maximal, non-minimal prosodic word, and register is a feature of any phonological phrase. Having established these, I proposed that Kansai Japanese has all six of the prosodic structures proposed by Ito and Mester (2021) for Tokyo Japanese: foot-foot, foot-word, word-foot, word-word, mono-phrasal, and bi-phrasal. Their theory, which makes crucial use of recursion, both symmetrical recursion (as in word-word and bi-phrasal compounds) and asymmetrical recursion (as in foot-word and word-foot compounds), predicts the existence of the asymmetrically recursive phrasal structures phrase-word and word-phrase, though these were not attested in Tokyo Japanese. The diagnostics developed in this dissertation for Kansai Japanese, with the crucial availability of register retention/loss as another diagnostic for prosodic structure, gives a concrete prediction for what prosodic characteristics a potential phrase-word or word-phrase compound would have in Kansai Japanese. I show that Kansai Japanese does indeed have word-phrase compounds, which have the predicted characteristics. This finding provides a confirmation of Ito and Mester (2021)'s theory of prosodic structure by providing evidence for a word-phrase structure. Chapter 3 continued with an Optimality Theoretic analysis of the syntax-prosody mapping. However, it was noted that although the six compound types shared by Tokyo and Kansai Japanese can be straightforwardly derived based on the size of N2, word-phrase compounds cannot be.

In Chapter 4, I discussed the grammatical systems which are responsible for register retention/loss, accent retention/loss, and accent placement in Kansai, Tokyo, and Kagoshima Japanese. For register retention, I argued that a kind of positional faithfulness constraint causes registers to be retained at the beginning of phonological phrases, following the diagnostics discussed in the previous chapter. For accent, I argued that culminativity is active below the phonological phrase, and that a constraint requiring accent below a maximal, non-minimal word places compound accent, which always wins out over any input accents. Compound accents are subject to a junctural alignment constraint, which places compound accent immediately before or after the juncture between compound components, which I argue is crucial for Kansai Japanese, although Ito and Mester (2021) argue that it is not necessary in the case of Tokyo Japanese, showing that accent position can be derived from the combined action of NONFINALITY(FT') and RIGHTMOST. In this dissertation, a constraint with a similar effect as RIGHTMOST, ALIGN-RIGHT/HIGH is used instead, in order to allow for the possibility of accent falling on the non-head mora of a foot. I show that no combination of the ALIGN-RIGHT/HIGH or ALIGN-LEFT/HIGH (the mirror image constraint of ALIGN-RIGHT/HIGH) family of constraints can account for junctural alignment in Kansai

Japanese and thus argue that the junctural alignment constraint ALIGN-JUNCTURE/HIGH, similar to Kubozono (1995)'s ALIGN-COMPOUNDACCENT constraint, is necessary in Kansai Japanese. For phrasal compounds, a NOFLOP constraint is introduced to prevent accents from moving to the juncture. Finally, I show that, just as word-phrase compounds are predicted as a natural consequence of the diagnostics used to find prosodic categories in Kansai Japanese, the prosodic profile of word-phrase compounds is also predicted by the grammar developed in Chapter 4 for other compound types. Accordingly, Chapter 3 and Chapter 4 show that, at least prosodically, word-phrase compounds are not actually special in any way but are rather the natural consequence of the grammar proposed for Kansai Japanese.

Chapter 4 ends with a discussion on the implications of the use of recursion in syntax-prosody research. A key point is that, given the large amount of distinct prosodic structures in Kansai (and Tokyo) Japanese compounds, adhering to the strict notion that categorically different phonological phenomena must signal categorically different prosodic categories, as opposed to using different levels of basic primitive prosodic categories such as the prosodic word and phonological phrase, seems to result in a correspondingly large proliferation of prosodic categories. A major consequence of this is that the prosodic hierarchy between the prosodic word and phonological phrase is inflated, all on the basis of different realizations of one basic syntactic structure (compounding), which weakens claims of universality of particularly that portion of the prosodic hierarchy. Furthermore, the intermediate set of categories discussed have an unclear ranking within the prosodic hierarchy beyond simply being intermediate between the prosodic word and phonological phrase. Even in an analysis where non-recursive categories are used within compound prosodic structures, when such structures are considered in the context of non-compound utterances, recursion still appears to be necessary. Finally, I argue that the word-phrase compound in Kansai Japanese provides evidence that even if it is possible to treat bi-phrasal compounds as simple sequences of a *bunsetsu*-corresponding prosodic category (such as the minor phrase, used in earlier treatments of the syntax-prosody interface in Japanese), the fact that word-phrase compounds have an N2 that looks identical to a *bunsetsu*/minor phrase following an N1 which is clearly prosodically dependent on N2, due to N1 losing its isolation accent as if it were part of a compound, makes a case for higher prosodic categories like the phonological phrase being used in compound prosodic structure. In a theory without recursion, this higher prosodic category could be the major phrase, which will have the unintended consequence of causing recursion when the word is put in the context of a larger, non-compound utterance. In a theory that allows recursion, recursion is not an undesirable consequence and indeed reflects the fact that compound components can behave like non-compound phrases.

Chapter 5 discusses an in-depth investigation of the word-phrase compound, which I had said in previous chapters was not straightforwardly derived from N2 length in the same way as the other compound types. Indeed, word-phrase compounds often have an N2 which is the same length as N2s in other compounds, as revealed by an investigation of the lengths of word-phrase compounds reported by Nakai (2002), particularly mono-phrasal compounds. Furthermore, perhaps unsurprisingly, compounds that have a word-phrase parse available almost never have *only* a word-phrase parse available. Instead, they often have multiple other pronunciations, often mono-phrasal or bi-phrasal, though in some cases also word-word. Given this information, it appears that N2 length is at best a necessary criterion, but not a sufficient one, for the determination of whether a compound has the word-phrase parse available or not. Building on work by Bell and Plag (2012) on the well-known problem of double stress in English compounds, I proposed that informativeness plays a role in the availability of the word-phrase parse, whereby higher informativeness in a compound component may increase the chances of a compound having a word-phrase parse available. A statistical analysis conducted on data collected in novel fieldwork suggests a role for informativeness in compound prosody, and further research in Kansai Japanese, other Japanese dialects, and beyond, with a larger set of data, is needed.

I have shown, then, that recursive structure, both asymmetrical and symmetrical, deserves continued consideration in research on the syntax-prosody interface. “Pitch accent” languages like Japanese which show a large variety of compound prosodies are, I propose, an important test case, as such languages involves a large range of prosodies that are associated with a single syntactic process, namely compounding. It will be useful to consider theories which involve no recursion, limited recursion (such as asymmetrical recursion only or recursion only at lower levels of the prosodic hierarchy), and any recursion on such data. Other “pitch accent” languages, like Serbo-Croatian and certain variants of Basque, will likely prove important as well.

I have also shown that stochastic factors such as frequency-based informativeness should be considered seriously in research on compounds, compound prosody, and the syntax-prosody interface, as they may be involved not only in whether a compound is pronounced a certain way, but also in whether a compound is mapped to prosodic structure in a certain way. As discussed in Chapter 5, I suggest that informativeness factors may play a role in the syntax-prosody mapping process, perhaps in a system using weighted constraints, causing an unusual mapping like the word-phrase parse to occur instead of a more typical mapping within that language's grammar. Future work will involve further investigation on Kansai Japanese, including the variably pronounced other compounds discussed in Chapter 5, in order to form a more robust conclusion regarding the role of stochastic factors, as well as semantic factors which could not be explored in this dissertation, and developing theories of syntax-prosody mapping which take these into account. Work on other languages along these lines will be important as well.

Appendix A: List of Constraints

A.1 Match Constraints

MATCH (X^0_{head}, ω): A head terminal node X^0 in the input must be matched with a prosodic word ω in the output, and both must dominate all and only the same elements.

Assign one violation for every terminal node X^0 in the syntax that is a head such that the segments belonging to X^0 are not all dominated by the same prosodic word ω in the output.

MATCH (X^0, ω): A terminal node X^0 in the input must be matched with a prosodic word ω in the output, and both must dominate all and only the same elements.

Assign one violation for every terminal node X^0 in the syntax such that the segments belonging to X^0 are not all dominated by the same prosodic word ω in the output.

MATCH (φ, XP): A phonological phrase φ in the output must be matched with a syntactic phrase XP in the input, and both must dominate all and only the same elements.

Assign one violation for every phonological phrase φ in the output such that the segments belonging to φ are not all dominated by the same XP in the input.

MATCH (ω, X^0): A prosodic word ω in the output must be matched with a terminal node X^0 in the input, and both must dominate all and only the same elements.

Assign one violation for every prosodic word ω in the output such that the segments belonging to ω are not all dominated by the same terminal node X^0 in the input.

A.2 Binarity Constraints

BINMAXHEAD($\omega_{[+max,\ -min]}$)-LEAVES: Heads of maximal prosodic words are maximally binary in terms of leaves.

Assign one violation for a head of a maximal prosodic word ω which has more than two terminal daughters (leaves).

BINMAX-$\varphi_{[+min]}$: Minimal φs are maximally binary.

Assign one violation for a minimal phonological phrase φ which dominates more than two (minimal) prosodic word ωs.

BINMIN-φ: Phonological phrases are minimally binary.

Assign one violation for a φ which has fewer than two branches.

WORDBINARITY (WORDBIN): A prosodic word ω must be binary.

Assign one violation for a prosodic word ω which measures no more than a single foot.

A.3 Alignment Constraints

ALIGN-JUNCTURE/HIGH (ALIGN-JH): Either the left or right edge of an H tone must be aligned with the juncture.

Assign one violation for an H tone which is not aligned to a juncture.

ALIGN-LEFTHIGH (ANYWORD): Align a high tone to the left edge of **any** prosodic word.

Assign one violation for every mora which intervenes between the left edge of a high tone and the left edge of **any** prosodic word.

ALIGN-LEFTHIGH (MAXWORD): Align a high tone to the left edge of a **maximal** prosodic word.

Assign one violation for every mora which intervenes between the left edge of a high tone and the left edge of a **maximal** prosodic word.

ALIGN-LEFTHIGH (MINWORD): Align a high tone to the left edge of a **minimal** prosodic word.

Assign one violation for every mora which intervenes between the left edge of a high tone and the left edge of a **minimal** prosodic word.

ALIGN-LEFT-HIGH/WORD (ALIGN-LEFTH): A high tone must be aligned as far to the left as possible in a word.

Assign one violation for every mora that intervenes between the left edge of a high tone and the left edge of a word.

ALIGN-RIGHTHIGH (ANYWORD): Align a high tone to the right edge of **any** prosodic word.

Assign one violation for every mora which intervenes between the right edge of a high tone and the right edge of **any** prosodic word.

ALIGN-RIGHTHIGH (MAXWORD): Align a high tone to the right edge of a **maximal** prosodic word.

Assign one violation for every mora which intervenes between the right edge of a high tone and the right edge of a **maximal** prosodic word.

ALIGN-RIGHTHIGH (MINWORD): Align a high tone to the right edge of a **minimal** prosodic word.

Assign one violation for every mora which intervenes between the right edge of a high tone and the right edge of a **minimal** prosodic word.

ALIGN-RIGHT/HIGH (ALIGN-RH): The right edge of an H tone must be aligned with the right edge of a word.

Assign one violation for every mora intervening between the right edge of an H tone and the end of the word.

A.4 Accent and Tone Constraints

CULMINATIVITY (ONEPEAK): A word must have no more than one peak (i.e., two or more high tones separated by low-toned moras).

Assign one violation for a word which has more than one peak.

CULMINATIVITY-MINPHRASE (CULMINATIVITY): A minimal phrase must not have more than one accent.

Assign one violation for every minimal phrase which has more than one accent.

FINAL-H (categorical): A word must end with an H tone.

Assign one violation for a word which does not end with an H tone.

FINAL-H (gradient): There must be an H tone aligned as far to the right in a word as possible.

From the right edge of the word, assign one violation for every mora which does not have an H tone until an H tone or the left edge of the word is reached.

H-TO-HEADWORD (HTOHDWD): An H tone (if present) is linked to the head word.

Assign one violation for an H tone which is not linked to the head word.

HIGH-TO-FOOTHEAD (HTOFTHD): H is linked to the head (first) mora of a foot.

Assign one violation for every H linked to a non-head mora of a foot.

HIGH-TO-SYLLABLEHEAD (HTOSHD): H is linked to the head (first) mora of a syllable.

Assign one violation for every H linked to a non-head (non-initial mora of a syllable).

INITIAL-LOW/PHRASEINIT (INIT-L/PHRASE): A word at the beginning of a phrase must begin with an L tone.

Assign one violation for a phrase-initial word that does not begin with an L tone.

MAX-TONE: Do not delete a tone that was present in the input.

Assign one violation for a tone which is present in the input but not present in the output.

MAX-TONE/PHRASEINITIAL (MAX-T/PHRASEINIT): A phrase-initial tone is not deleted.

Assign one violation for every phrase-initial tone in the input which is not present in the output.

NOFLOP-ACCENT (NOFLOP): An accent must not be moved from its input position.

Assign one violation for an accent in the output (if present) which is not linked to its corresponding input position.

NOFLOP-TONE: A tone must not be moved from its input position.

Assign one violation for a tone which is associated with a position other than its input position.

NONFINALITY(FOOT') (NONFIN(FT')): The accented foot must not be final in the word.

Assign one violation for a final foot bearing accent.

ONEREGISTERTONE/MINPHRASE (ONEREGT): A minimal phrase may have at most one register tone.

Assign one violation for a minimal phrase which has more than one register tone.

WORDACCENT (WORDACC): A word must have accent.

Assign one violation for every word which does not have accent.

WORDMAXACCENT: A maximal word [+maximal, -minimal] must have accent.

Assign one violation for a maximal word lacking accent.

Appendix B: Full Candidate Sets

The Full Candidate Sets for the Syntax-Prosody Mapping of Mono-phrasal and Bi-phrasal Compounds

B.1. ^{L}*keizi-sosyoo'hoo* 'Code of Criminal Procedure' – mono-phrasal compounds with a compound N2

[$_{x}$^{0} [$_{x}$^{0} keizi][$_{x}$^{0} [$_{x}$^{0} sosyoo][$_{x}$^{0} hoo]]]	BINMAX-φ	WORDBIN	BINMAXHEAD ($\omega_{[+max, -min]}$)	MATCH (X^{0}_{head}, ω)	MATCH (X^{0}, ω)
a. [$_{\omega}$ [$_{\omega}$ keizi] [$_{\omega}$ sosyoo][$_{f}$ hoo]]				*! W	**
b. [$_{\omega}$ [$_{\omega}$ keizi] [$_{\omega}$ sosyoo][$_{\omega}$ hoo]]		*! W		* W	* L
c. [$_{\omega}$ [$_{\omega}$ keizi] [$_{\omega}$ [$_{\omega}$ sosyoo][$_{f}$ hoo]]]			*! W		* L
d. [$_{\omega}$ [$_{\omega}$ keizi] [$_{\omega}$ [$_{\omega}$ sosyoo][$_{\omega}$ hoo]]]		*! W	*! W		L
e. [$_{\omega}$ [$_{\omega}$ keizi][$_{f}$ so] [$_{f}$ syoo][$_{\omega}$ hoo]]		*! W		* W	**
f. [$_{\omega}$ [$_{\omega}$ keizi][$_{\omega}$ [$_{f}$ so] [$_{f}$ syoo][$_{\omega}$ hoo]]]		*! W	*! W		* L
g. [$_{\omega}$ [$_{f}$ kei][$_{f}$ zi] [$_{\omega}$ sosyoo][$_{f}$ hoo]]				*! W	*** W
h. [$_{\omega}$ [$_{f}$ kei][$_{f}$ zi] [$_{\omega}$ sosyoo][$_{\omega}$ hoo]]		*! W		* W	**
i. [$_{\omega}$ [$_{f}$ kei][$_{f}$ zi] [$_{\omega}$ [$_{\omega}$ sosyoo][$_{f}$ hoo]]]		*! W			**
j. [$_{\omega}$ [$_{f}$ kei][$_{f}$ zi] [$_{\omega}$ [$_{\omega}$ sosyoo][$_{\omega}$ hoo]]]		*! W			* L
k. [$_{\omega}$ [$_{f}$ kei][$_{f}$ zi][$_{f}$ so] [$_{f}$ syoo][$_{\omega}$ hoo]]		*! W		* W	*** W
l. [$_{\omega}$ [$_{f}$ kei][$_{f}$ zi][$_{\omega}$ [$_{f}$ so] [$_{f}$ syoo][$_{\omega}$ hoo]]]		*! W			**
m. [$_{\omega}$ [$_{f}$ kei][$_{f}$ zi][$_{f}$ so]				*! W	**** W

[$_f$ syoo][$_f$ hoo]]					
n. [$_\varphi$ [$_\omega$ keizi] [$_\omega$ sosyoo][$_f$ hoo]]				*! W	*** W
o. [$_\varphi$ [$_\omega$ keizi] [$_\omega$ sosyoo][$_\omega$ hoo]]	*! W	*! W		* W	**
→ p. [$_\varphi$ [$_\omega$ keizi] [$_\omega$ [$_\omega$ sosyoo][$_f$ hoo]]]					**
q. [$_\varphi$ [$_\omega$ keizi] [$_\omega$ [$_\omega$ sosyoo][$_\omega$ hoo]]]	*! W	*! W			* L
r. [$_\varphi$ [$_\omega$ keizi][$_f$ so] [$_f$ syoo][$_\omega$ hoo]]		*! W		* W	*** W
s. [$_\varphi$ [$_\omega$ keizi][$_\omega$ [$_f$ so] [$_f$ syoo][$_\omega$ hoo]]]		*! W			**
t. [$_\varphi$ [$_f$ kei][$_f$ zi] [$_\omega$ sosyoo][$_f$ hoo]]				*! W	**** W
u. [$_\varphi$ [$_f$ kei][$_f$ zi] [$_\omega$ sosyoo][$_\omega$ hoo]]		*! W		* W	*** W
v. [$_\varphi$ [$_f$ kei][$_f$ zi] [$_\omega$ [$_\omega$ sosyoo][$_f$ hoo]]]					***! W
w. [$_\varphi$ [$_f$ kei][$_f$ zi] [$_\omega$ [$_\omega$ sosyoo][$_\omega$ hoo]]]		*! W			**
x. [$_\varphi$ [$_f$ kei][$_f$ zi][$_f$ so] [$_f$ syoo][$_\omega$ hoo]]		*! W		* W	**** W
y. [$_\varphi$ [$_f$ kei][$_f$ zi] [$_\omega$ [$_f$ so][$_f$ syoo][$_\omega$ hoo]]]		*! W			*** W
z. [$_\varphi$ [$_f$ kei][$_f$ zi][$_f$ so] [$_f$ syoo][$_f$ hoo]]				*! W	***** W

B.2. *^{H}nairon-suto'kkingu* 'nylon stockings' – mono-phrasal compounds with a simplex N2

[$_{x^0}$ [$_{x^0}$ nairon][$_{x^0}$ sutokkingu]]	MATCH (ω, X^0)	BINMAX -φ	WORD BIN	BINMAX HEAD (ω$_{[+max, -min]}$)	MATCH (X$^0_{head}$, ω)	MATCH (X^0, ω)
a. [$_\omega$ [$_\omega$ nairon] [$_\omega$ sutokkingu]]				*! W		L
b. [$_\omega$ [$_\omega$ nairon] [$_f$ su][$_f$ tok][$_f$ kin] [$_f$ gu]]					*! W	*
c. [$_\omega$ [$_\omega$ nairon]	*! W			* W		L

[$_\omega$ [$_f$ su][$_\omega$ tokkin] [$_f$ gu]]]						
d. [$_\omega$ [$_\omega$ nairon] [$_\omega$ [$_\omega$ sutok] [$_\omega$ kingu]]	*!* W			* W		L
e. [$_\omega$ [$_f$ nai][$_f$ ron] [$_\omega$ sutokkingu]]				*! W		*
f. [$_\omega$ [$_f$ nai][$_f$ ron] [$_f$ su][$_f$ tok][$_f$ kin] [$_f$ gu]]					*! W	** W
g. [$_\omega$ [$_f$ nai][$_f$ ron] [$_\omega$ [$_f$ su][$_\omega$ tokkin] [$_f$ gu]]]	*! W			* W		*
h. [$_\omega$ [$_f$ nai][$_f$ ron] [$_\omega$ [$_\omega$ sutok] [$_\omega$ kingu]]	*!* W			* W		*
→ i. [$_\varphi$ [$_\omega$ nairon] [$_\omega$ sutokkingu]]						*
j. [$_\varphi$ [$_\omega$ nairon] [$_f$ su][$_f$ tok][$_f$ kin] [$_f$ gu]]					*! W	** W
k. [$_\varphi$ [$_\omega$ nairon] [$_\omega$ [$_f$ su][$_\omega$ tokkin] [$_f$ gu]]]	*! W					*
l. [$_\varphi$ [$_\omega$ nairon] [$_\omega$ [$_\omega$ sutok] [$_\omega$ kingu]]	*!* W	* W				*
m. [$_\varphi$ [$_f$ nai] [$_f$ ron] [$_\omega$ sutokkingu]]						**! W
n. [$_\varphi$ [$_f$ nai][$_f$ ron] [$_f$ su][$_f$ tok][$_f$ kin] [$_f$ gu]]					*! W	*** W
o. [$_\varphi$ [$_f$ nai][$_f$ ron] [$_\omega$ [$_f$ su][$_\omega$ tokkin][$_f$ gu]]]	*! W					** W
p. [$_\varphi$ [$_f$ nai][$_f$ ron] [$_\omega$ [$_\omega$ sutok][$_\omega$ kingu]]	*!* W					** W

B.3. ^{H}*ni'hon-*^{L}*buyookyo'okai* 'dance association of Japan' – bi-phrasal compounds

$[_{X^0}[_{X^0}$ nihon] $[_{X^0}[_{X^0}$ buyoo] $[_{X^0}$ kyookai]]]	MATCH (ω, X^0)	BINMAX-φ	WORDBIN	BINMAX HEAD ($\omega_{[+max, -min]}$)	MATCH (X^0_{head}, ω)	MATCH (X^0, ω)
a. $[_\omega[_\omega$ nihon] $[_\omega$ buyoo] $[_f$ kyoo]$[_f$ kai]]					*! W	** W
b. $[_\omega[_\omega$ nihon] $[_\omega$ buyoo] $[_\omega$ kyookai]]					*! W	*
c. $[_\omega[_\omega$ nihon] $[_\omega[_\omega$ buyoo] $[_f$ kyoo]$[_f$ kai]]]				*! W		*
d. $[_\omega[_\omega$ nihon] $[_\omega[_\omega$ buyoo] $[_\omega$ kyookai]]]				*! W		L
e. $[_\omega[_\omega$ nihon] $[_f$ bu]$[_f$ yoo] $[_\omega$ kyookai]]					*! W	** W
f. $[_\omega[_\omega$ nihon] $[_\omega[_f$ bu]$[_f$ yoo] $[_\omega$ kyookai]]]				*! W		*
g. $[_\omega[_f$ ni]$[_f$ hon] $[_\omega$ buyoo] $[_f$ kyoo]$[_f$ kai]]					*! W	*** W
h. $[_\omega[_f$ ni]$[_f$ hon] $[_\omega$ buyoo] $[_\omega$ kyookai]]					*! W	** W
i. $[_\omega[_f$ ni]$[_f$ hon] $[_\omega[_\omega$ buyoo] $[_f$ kyoo]$[_f$ kai]]]				*! W		** W
j. $[_\omega[_f$ ni]$[_f$ hon] $[_\omega[_\omega$ buyoo] $[_\omega$ kyookai]]]				*! W		*
k. $[_\omega[_f$ ni]$[_f$ hon] $[_f$ bu]$[_f$ yoo] $[_\omega$ kyookai]]					*! W	*** W
l. $[_\omega[_f$ ni]$[_f$ hon]				*! W		** W

[$_{\omega}$ [$_{f}$ bu][$_{f}$ yoo] [$_{\omega}$ kyookai]]]						
m. [$_{\omega}$ [$_{f}$ ni][$_{f}$ hon] [$_{f}$ bu][$_{f}$ yoo] [$_{f}$ kyoo][$_{f}$ kai]]					*! W	**** W
n. [$_{\varphi}$ [$_{\omega}$ nihon] [$_{\omega}$ buyoo] [$_{f}$ kyoo][$_{f}$ kai]]					*! W	*** W
o. [$_{\varphi}$ [$_{\omega}$ nihon] [$_{\omega}$ buyoo] [$_{\omega}$ kyookai]]		*! W			* W	** W
p. [$_{\varphi}$ [$_{\omega}$ nihon] [$_{\omega}$ [$_{\omega}$ buyoo] [$_{f}$ kyoo][$_{f}$ kai]]]						**! W
q. [$_{\varphi}$ [$_{\omega}$ nihon] [$_{\omega}$ [$_{\omega}$ buyoo] [$_{\omega}$ kyookai]]]		*! W				*
r. [$_{\varphi}$ [$_{f}$ ni][$_{f}$ hon] [$_{\omega}$ [$_{\omega}$ buyoo] [$_{f}$ kyoo][$_{f}$ kai]]]					*! W	*** W
s. [$_{\varphi}$ [$_{\omega}$ nihon] [$_{\omega}$ [$_{f}$ bu][$_{f}$ yoo] [$_{\omega}$ kyookai]]]						**! W
t. [$_{\varphi}$ [$_{f}$ ni][$_{f}$ hon] [$_{\omega}$ buyoo] [$_{f}$ kyoo][$_{f}$ kai]]					*! W	*** W
u. [$_{\varphi}$ [$_{f}$ ni][$_{f}$ hon] [$_{\omega}$ buyoo] [$_{\omega}$ kyookai]]					*! W	*** W
v. [$_{\varphi}$ [$_{f}$ ni][$_{f}$ hon] [$_{\omega}$ [$_{\omega}$ buyoo] [$_{f}$ kyoo][$_{f}$ kai]]]						**!* W
w. [$_{\varphi}$ [$_{f}$ ni][$_{f}$ hon] [$_{\omega}$ [$_{\omega}$ buyoo] [$_{\omega}$ kyookai]]]						**! W
x. [$_{\varphi}$ [$_{f}$ ni][$_{f}$ hon] [$_{f}$ bu][$_{f}$ yoo] [$_{\omega}$ kyookai]]					*! W	**** W
y. [$_{\varphi}$ [$_{f}$ ni][$_{f}$ hon] [$_{\omega}$ [$_{f}$ bu][$_{f}$ yoo] [$_{\omega}$ kyookai]]]						**!* W
z. [$_{\varphi}$ [$_{f}$ ni][$_{f}$ hon] [$_{f}$ bu][$_{f}$ yoo]					*! W	***** W

[$_{f}$ kyoo][$_{f}$ kai]]						
aa. [$_{\varphi}$ [$_{\varphi}$ [$_{\omega}$ nihon]] [$_{\varphi}$ [$_{\omega}$ buyoo] [$_{f}$ kyoo][$_{f}$ kai]]]					*! W	*** W
bb. [$_{\varphi}$ [$_{\varphi}$ [$_{\omega}$ nihon]] [$_{\varphi}$ [$_{\omega}$ buyoo] [$_{\omega}$ kyookai]]]					*! W	** W
cc. [$_{\varphi}$ [$_{\varphi}$ [$_{\omega}$ nihon]] [$_{\varphi}$ [$_{\omega}$ [$_{\omega}$ buyoo] [$_{f}$ kyoo][$_{f}$ kai]]]]						**! W
→ dd. [$_{\varphi}$ [$_{\varphi}$ [$_{\omega}$ nihon]] [$_{\varphi}$ [$_{\omega}$ [$_{\omega}$ buyoo] [$_{\omega}$ kyookai]]]]						*
ee. [$_{\varphi}$ [$_{\varphi}$ [$_{\omega}$ nihon]] [$_{\varphi}$ [$_{f}$ bu][$_{f}$ yoo] [$_{\omega}$ kyookai]]]					*! W	*** W
ff. [$_{\varphi}$ [$_{\varphi}$ [$_{\omega}$ nihon]] [$_{\varphi}$ [$_{\omega}$ [$_{f}$ bu][$_{f}$ yoo] [$_{\omega}$ kyookai]]]]						**! W
gg. [$_{\varphi}$ [$_{\varphi}$ [$_{f}$ ni] [$_{f}$ hon]] [$_{\varphi}$ [$_{\omega}$ buyoo] [$_{f}$ kyoo][$_{f}$ kai]]]					*! W	**** W
hh. [$_{\varphi}$ [$_{\varphi}$ [$_{f}$ ni] [$_{f}$ hon]] [$_{\varphi}$ [$_{\omega}$ buyoo] [$_{\omega}$ kyookai]]]					*! W	*** W
ii. [$_{\varphi}$ [$_{\varphi}$ [$_{f}$ ni] [$_{f}$ hon]] [$_{\varphi}$ [$_{\omega}$ [$_{\omega}$ buyoo] [$_{f}$ kyoo][$_{f}$ kai]]]]						**!* W
jj. [$_{\varphi}$ [$_{\varphi}$ [$_{f}$ ni] [$_{f}$ hon]] [$_{\varphi}$ [$_{\omega}$ [$_{\omega}$ buyoo] [$_{\omega}$ kyookai]]]]						**! W
kk. [$_{\varphi}$ [$_{\varphi}$ [$_{f}$ ni] [$_{f}$ hon]] [$_{\varphi}$ [$_{f}$ bu][$_{f}$ yoo] [$_{\omega}$ kyookai]]]]					*! W	**** W
ll. [$_{\varphi}$ [$_{\varphi}$ [$_{f}$ ni] [$_{f}$ hon]] [$_{\varphi}$ [$_{\omega}$ [$_{f}$ bu][$_{f}$ yoo]						**!* W

[$_{\omega}$ kyookai]]]]							
mm. [$_{\varphi}$ [$_{\varphi}$ [$_{f}$ ni] [$_{f}$ hon]] [$_{\varphi}$ [$_{f}$ bu][$_{f}$ yoo] [$_{f}$ kyoo][$_{f}$ kai]]]]					*! W	***** W	

Appendix C: List of Nakai Compounds

Compounds are listed in English alphabetical order, with the English meaning of the compound and the English meaning of each component of the compound. The components of a compound, i.e., the words corresponding to N1 and N2 (and in some cases, N3), are separated by a hyphen (-), as in the main text of the dissertation. This list includes all 114 items in Nakai (2002) with a prosodic pattern consistent with the word-phrase parse, including those which are not compounds, such as *uti no hito* 'my husband; one's family.' Non-word-phrase variant prosodic patterns are also given following the translation of each compound's parts. The prosodic types listed by Nakai (2002) are reported in terms of the labels used in this dissertation, e.g., word-phrase for ^{L}*otome-go'koro* 'girl's feelings' and mono-phrasal for compounds like ^{L}*keizi-sosyoo'hoo* 'Code of Criminal Procedure." Given the nature of the list, every compound has at least one word-phrase parse reported by Nakai, and thus this prosodic pattern is not listed below, unless it was the only parse reported. Additionally, some longer compounds have a tri-phrasal parse, which should be understood to be like a bi-phrasal compound, except with a third component showing the same characteristics as a component of a bi-phrasal compound.

bake-no-kawa 化けの皮 'disguise.' *bake* 'disguising oneself' + *no* 'genitive' + *kawa* 'skin; mask.' Word-word.

bankara-sutairu 蛮カラスタイル '*bankara* style (Japanese style of dress which emerged during the Meiji Era as a response to the growing popularity of *haikaraa*, Western dress and lifestyle).' *bankara* 'bankara' + *sutairu* 'style.' Mono-phrasal.

beruto-konbeaa ベルトコンベアー 'conveyer belt.' *beruto* 'belt' + *konbeaa* 'conveyor.' Mono-phrasal.

bitamin-biiwan ビタミン B1 (*B1)* 'vitamin B1.' *bitamin* 'vitamin' + *biiwan* 'B1.' Bi-phrasal.

bitamin-sii-iri (*C-iri*) ビタミン C 入り 'containing vitamin C.' *bitamin* 'vitamin' + *sii* 'C' + *iri* 'containing.' Bi-phrasal, mono-phrasal.

bizin-kontesuto 美人コンテスト 'beauty contest.' *bizin* 'beautiful person' + *kontesuto* 'contest.' Word-word, mono-phrasal.

bizyutu-tenrankai 美術展覧会 'fine arts exhibition.' *bizyutu* 'fine arts' + *tenrankai* 'exhibition.' Mono-phrasal.

bunka-daikakumei 文化大革命 'Cultural Revolution (China).' *bunka* 'culture' + *daikakumei* 'great revolution.' Bi-phrasal, mono-phrasal.

daiiti-doyoobi 第一土曜日 'first Saturday.' *daiiti* 'first' + *doyoobi* 'Saturday.' Bi-phrasal, mono-phrasal.

daini-doyoobi 第二土曜日 'second Saturday.' *daini* 'second' + *doyoobi* 'Saturday.' Bi-phrasal, mono-phrasal.

daini-kaigisitu 第二会議室 'second conference room.' *daini* 'second' + *kaigisitu* 'conference room.' Bi-phrasal.

dainizi-taisen 第二次大戦 'World War II.' *dainizi* 'second (in a sequence)' + *taisen* 'great war.' Bi-phrasal, word-word.

dainizi-taisen-go 第二次大戦後 'after World War II.' *dainizi* 'second (in a sequence)' + *taisen* 'the great war' + *go* 'after.' Bi-phrasal.

densi-kenbikyoo 電子顕微鏡 'electron microscope.' *densi* 'electron' + *kenbikyoo* 'microscope.' Bi-phrasal, mono-phrasal.

denwa-kookansyu 電話交換手 'switchboard operator.' *denwa* 'telephone' + *kookansyu* 'switcher, operator (e.g., telephone).' Mono-phrasal.

entyoo-zikkai-ura 延長十回裏 'bottom of the tenth inning.' *entyoo* 'overtime, extra inning' + *zikkai* 'tenth inning' + *ura* 'bottom, last half of an inning.' Tri-phrasal.

gasorin-sutando ガソリンスタンド 'gasoline station.' *gasorin* 'gasoline' + *sutando* 'stand.' Mono-phrasal.

gasorin-sutando-waki ガソリンスタンド脇 'next to a gasoline station.' *gasorin* 'gasoline' + *sutando* 'station' + *waki* 'next to.' Mono-phrasal.

gensiryoku-hatudensyo 原子力発電所 'nuclear power plant.' Bi-phrasal, mono-phrasal.

gizyutu-kateika 技術家庭科 'technology and home economics.' *gizyutu* 'technology' + *kateika* 'home economics.' Bi-phrasal, mono-phrasal.

gureepu-huruutu グレープフルーツ ‘grapefruit.’ *gureepu* + *huruutu* ‘fruit.’ Mono-phrasal.

hanbun-ika 半分以下 ‘less than or equal to half.’ *hanbun* ‘half’ + *ika* ‘less than or equal to…’ Mono-phrasal.

hannin-guruupu 犯人グループ ‘group of criminals.’ *hannin* ‘group’ + *guruupu* ‘group.’ Mono-phrasal.

han-seihu-katudoo 反政府活動 ‘anti-government activity.’ *han* ‘anti’ + *seihu* ‘government’ + *katudoo* ‘activity.’ Bi-phrasal, mono-phrasal.

hatizyuu-hakkasyo 八十八か所 ’88 temples (or or modeled after those in Shikoku).’ *hatizyuu* ‘80’ + *hakkasyo* ‘8 places.’ Word-phrase only.

hasiri-habatobi 走り幅跳び ‘running long jump.’ *hasiri* ‘running’ + *habatobi* ‘long jump.’ Word-word, mono-phrasal.

hasiri-takatobi 走り高跳び ‘running high jump.’ *hasiri* ‘running’ + *takatobi* ‘high jump.’ Word-word, mono-phrasal.

hitori-nokorazu 一人残らず ‘every person.’ *hitori* ‘one person’ + *nokorazu* ‘not remaining.’ Mono-phrasal.

huryoo-guruupu 不良グループ ‘group of delinquents.’ *huryoo* ‘delinquent’ + *guruupu* ‘group.’ Mono-phrasal, word-word.

hyaku-paasento 百パーセント ‘one hundred percent.’ *hyaku* ‘one hundred’ + *paasento* ‘percent.’ Mono-phrasal.

hyakunin-issyu 百人一首 ‘Hyakunin Isshu (a Classical Japanese collection of one hundred poems by one hundred poets).’ *hyakunin* ‘one hundred people’ + *issyu* ‘one [*syu*; counter for poems].’ Word-word, bi-phrasal.

ikkagetu-tarazu 一か月足らず ‘a bit less than one month.’ *ikkagetu* ‘one month’ + *tarazu* ‘a bit less than; no more than.’ Word-word, bi-phrasal.

isoppu-monogatari イソップ物語 ‘Aesop’s Fables.’ *isoppu* ‘Aesop’ + *monogatari* ‘story, legend, fable.’ Mono-phrasal.

issenman-en 一千万円 ’10,000,000 yen.’ *issenman* ‘ten million’ + *en* ‘yen.’ Word-word, mono-phrasal.

itiniti-zyoosyaken 一日乗車券 ‘all day passenger ticket.’ *itiniti* ‘one day, all day’ + *zyoosyaken* ‘passenger ticket.’ Mono-phrasal.

iti-rittoru-bin 一リットル瓶 ‘one litre bottle.’ *iti* ‘one’ + *rittoru* ‘litre’ + *bin* ‘bottle.’ Mono-phrasal.

kagaku-tyoomiryoo 化学調味料 ‘chemical seasoning, esp. monosodium glutamate.’ *kagaku* ‘chemistry’ + *tyoomiryoo* ‘seasoning.’ Mono-phrasal.

kage-hinata 陰日向 'double-faced.' *kage* 'shadow' + *hinata* 'sunny place' Word-word, Word-foot.

kasai-hootiki 火災報知器 'fire alarm.' *kasai* 'fire' + *hootiki* 'alarm.' Bi-phrasal.

kirikae-suitti 切り替えスイッチ 'selector switch.' *kirikae* 'change, exhange' + *suitti* 'switch.' Word-word, mono-phrasal.

kokka-koomuin 国家公務員 'government official.' *kokka* 'nation' + *koomuin* 'government worker.' Bi-phrasal, mono-phrasal.

kurisumasu-purezento クリスマスプレゼント 'Christmas present.' *kurisumasu* 'Christmas' + *purezento* 'present.' Mono-phrasal.

kyuuhyaku-sanzyuu 九百三十 '930.' *kyuuhyaku* '900' + *sanzyuu* '30.' Bi-phrasal.

kyuuhyaku-sanzyuu-roku 九百三十六 '936.' *kyuuhyaku* '900' + *sanzyuu* '30' + *roku* '6.' Tri-phrasal.

mainiti-sinbunsya 毎日新聞社 'The Mainichi Newspapers Co.' *mainiti* 'Mainichi, everyday' + *sinbunsya* 'newspaper company.' Word-phrase only.

metiru-arukooru メチルアルコール 'methyl alcohol.' *metiru* 'methyl' + *arukooru* 'alcohol.' Word-phrase, bi-phrasal.

minami-sinakai 南シナ海 'South China Sea.' *minami* 'south' + *sinakai* 'China sea.' Mono-phrasal.

minami-taiheiyoo 南太平洋 'South Pacific.' *minami* 'south' + *taiheiyou* 'Pacific Ocean.' Mono-phrasal.

minami-zyuuzisei 南十字星 'Southern Cross.' *minami* 'south' + *zyuuzisei* 'cross.' Mono-phrasal, bi-phrasal.

mokei-hikooki 模型飛行機 'model airplane.' *mokei* 'model' + *hikooki* 'airplane.' Mono-phrasal.

monbu-daizin-syoo 文部大臣賞 'Minister of Education, Science, and Culture Award.' *monbu* 'Ministry of Education, Science and Culture' + *daizin* 'minister' + *syoo* 'award.' Word-phrase only.

mukei-bunkazai 無形文化財 'intangible cultural assets.' *mukei* 'abstract, immaterial' + *bunkazai* 'cultural assets.' Bi-phrasal, mono-phrasal.

murasaki-sikibu-nikki 紫式部日記 'Murasaki Shikibu's Diary.' *murasaki* 'Murasaki' + *sikibu* 'Shikibu (Minister of Ceremonial Affairs)' + *nikki* 'Diary.' Mono-phrasal.

murasaki-tuyukusa 紫露草 'spiderwort (*Tradescantia ohiensis*).' *murasaki* 'purple' + *tuyukusa* 'dayflower (lit. dew herb, *Commelina communis*).' Word-word.

nairon-sutokkingu ナイロンストッキング 'nylon stockings.' *nairon* 'nylon' + *sutokkingu* 'stockings.' Mono-phrasal.

nama-konkuriito 生コンクリート 'ready-mixed concrete, liquid concrete.' *nama* 'raw, fresh' + *konkuriito* 'concrete.' Mono-phrasal.

nanahyaku-nizyuu-go 七百二十五 '725.' *nanahyaku* '700' + *nizyuu* '20' + *go* '5.' Tri-phrasal.

nibun no-iti-zutu 二分の一ずつ 'each one-half.' *nibun no* 'of two parts' + *iti* 'one' + *zutu* 'each, apiece.' Mono-phrasal.

nihon-budookan 日本武道館 'Nippon Budokan.' *nihon* 'Japan' + *budookan* 'martial arts hall.' Bi-phrasal, mono-phrasal.

nikai-tyuugaeri 二回宙返り 'double somersault.' *nikai* 'two times' + *tyuugaeri* 'somersault.' Bi-phrasal, mono-phrasal.

ningyoo-gekidan 人形劇団 'puppet theatre troupe.' *ningyoo* 'puppet' + *gekidan* 'theatre troupe.' Word-word.

niwaka-harisi にわか鍼師 'fairweather/bandwagon acupuncturist.' *niwaka* 'fairweather/jumping on the bandwagon' + *harisi* 'acupuncturist' Mono-phrasal, word-word.

niwaka-niwasi にわか庭師 'fairweather/bandwagon gardener.' *niwaka* 'fairweather/jumping on the bandwagon' + *niwasi* 'gardener.' Mono-phrasal.

ogura-hyakunin-issyu 小倉百人一首 'Ogura Hyakunin Isshu (alternate name for the Hyakunin Isshu). *ogura* 'Ogura' + *hyakunin* 'one hundred people' + *issyu* 'one [*syu*; counter for poems].' Mono-phrasal, tri-phrasal.

omosiro-hanbun 面白半分 'for fun, half in jest.' *omosiro* 'amusing, funny, interesting' + *hanbun* 'half.' Mono-phrasal.

ooame-tyuuihoo 大雨注意報 'storm warning.' *ooame* 'heavy rain' + *tyuuihoo* 'warning, advisory.' Mono-phrasal.

oote-denki-meekaa 大手電機メーカー 'major manufacturer of electrical appliances.' *oote* 'major, big company' + *denki* 'electricity' + *meekaa* 'manufacturer, maker.' Bi-phrasal.

rikugun-taisyoo 陸軍大将 'army general.' *rikugun* 'army' + *taisyoo* 'general.' Word-word, bi-phrasal.

ritomasu-sikensi リトマス試験紙 'litmus paper.' *ritomasu* 'litmus' + *sikensi* 'test paper.' Mono-phrasal.

roku-daigaku-yakyuu 六大学野球 'Big6 Baseball.' *roku* 'six' + *daigaku* 'university' + *yakyuu* 'baseball.' Mono-phrasal.

rookyuu-apaato 老朽アパート 'dilapidated apartment.' *rookyuu* 'dilapidated' + *apaato* 'apartment.' Mono-phrasal, bi-phrasal.

sei-sankakkei 正三角形 'equilateral triangle.' *sei* 'true' + *sankakkei* 'triangle.' Mono-phrasal, bi-phrasal.

sekitan-sutoobu 石炭ストーブ 'coal heater.' *sekitan* 'coal' + *sutoobu* 'heater, stove.' Mono-phrasal.

sekai-sensyuken 世界選手権 'world championship.' *sekai* 'world' + *sensyuken* 'championship.' Mono-phrasal, bi-phrasal.

sekai-sinkiroku 世界新記録 'new world record.' *sekai* 'world' + *sinkiroku* 'new world record.' Bi-phrasal.

sekai-tyanpion 世界チャンピオン 'world champion.' *sekai* 'world' + *tyanpion* 'champion.' Word-word, mono-phrasal, bi-phrasal.

sen'itiya-monogatari 千一夜物語 'One Thousand and One Nights.' *sen'itiya* 'one thousand and one nights' + *monogatari* 'story, legend, fable.' Bi-phrasal.

sessi-yonzyuu-do 摂氏四十度 '40 degrees Celsius.' *sessi* 'Celsius' + *yonzyuu* '40' + *do* 'degrees.' Bi-phrasal.

seto-naikai-tihoo 瀬戸内海地方 'Seto Inland Sea Region.' *seto* 'Seto' + *naikai* 'inland sea' + *tihoo* 'region.' Mono-phrasal.

simin-tosyokan 市民図書館 'citizens' library.' *simin* 'citizen' + *tosyokan* 'library.' Mono-phrasal, bi-phrasal.

singata-misairu 新型ミサイル 'new model of missile.' *singata* 'new model' + *misairu* 'missile.' Mono-phrasal, bi-phrasal.

sin-sekki-zidai 新石器時代 'Neolithic, New Stone Age.' *sin* 'new' + *sekki* 'stone' + *zidai* 'age, period.' Mono-phrasal, bi-phrasal.

siro-nagasukuzira シロナガスクジラ 'blue whale (*Balaenoptera musculus*).' *siro* 'white' + *nagasukuzira* 'fin whale (*Balaenoptera physalus*).' Mono-phrasal.

sirooto-kangae 素人考え 'layperson's opinion, amateur's thoughts.' *sirooto* 'amateur, layman, ordinary person' + *kangae* 'thought, thinking.' Mono-phrasal.

siteiseki-ryookin 指定席料金 'reserved seat fare.' *siteiseki* 'reserved seat' + *ryookin* 'fare, charge.' Mono-phrasal.

supesyaru-bangumi スペシャル番組 'special program.' *supesyaru* 'special' + *bangumi* '(television, radio) program.' Word-word, mono-phrasal.

sutoppu-uotti ストップウォッチ 'stopwatch.' *sutoppu* 'stop' + *uotti* 'watch.' Word-word, mono-phrasal.

syodai-tyanpion 初代チャンピオン 'first generation champion.' *syodai* 'first generation' + *tyanpion* 'champion.' Word-word, mono-phrasal, bi-phrasal.

syoomen-genkan-mae 正面玄関前 'in front of the front/main entrance.' *syoomen* 'front, main' + *genkan* 'entrance' + *mae* 'in front of.' Bi-phrasal, mono-phrasal.

syoo-tyuu-gakusei 小中学生 'elementary and middle school students.' *syoo* 'abbreviation for elementary school (小学校 *syoogakkoo*)' + *tyuu* 'abbreviation for middle school (中学校 *tyuugakkoo*)' + *gakusei* 'middle student.' Mono-phrasal.

syukuga-pareedo 祝賀パレード 'celebratory parade.' *syukuga* 'celebration' + *pareedo* 'parade.' Mono-phrasal, bi-phrasal.

terebi-bangumi テレビ番組 'television program.' *terebi* 'television' + *bangumi* '(television, radio) program.' Word-word, mono-phrasal.

tihoo-koohuzei 地方交付税 'tax allocated to local governments.' *tihoo* 'region' + *koohuzei* 'delivered tax.' – Mono-phrasal, bi-phrasal.

tihoo-koomuin 地方公務員 'local government employee.' *tihoo* 'region' + *koomuin* 'government worker.' Mono-phrasal, bi-phrasal.

to-doo-hu-ken-betu 都道府県別 'by prefecture.' *to* '*to* (Tokyo Metropolis administrative division)' + *doo* '*doo* (Hokkaido administrative division)' + *hu* '*hu* (Kyoto and Osaka urban prefectures) + *ken* '*ken* (the remaining 43 prefectures)' + *betu* '(separated) by.' Mono-phrasal.

tomato-ketyappu トマトケチャップ 'tomato ketchup.' *tomato* 'tomato' + *ketyappu* 'ketchup.' Word-word, mono-phrasal.

tosi-taikoo-yakyuu 都市対抗野球 'Intercity Baseball Tournament.' *tosi* 'municipal' + *taikoo* 'competition, rivalry' + *yakyuu* 'baseball.' Bi-phrasal, mono-phrasal.

tyokkaku-sankakkei 直角三角形 'right triangle.' *tyokkaku* 'right angle' + *sankakkei* 'triangle.' Bi-phrasal.

tyoo-kookookyuu 超高校級 'super high school level.' *tyoo* 'super' + *kookookyuu* 'high school level.' Bi-phrasal, mono-phrasal.

tyoo-onsoku-ryokakki 超音速旅客機 'supersonic airliner.' *tyoo* 'super' + *onsoku* 'speed of sound' + *ryokakki* 'passenger plane.' Tri-phrasal, mono-phrasal, bi-phrasal.

tyuuka-ryooriya 中華料理屋 'Chinese restaurant.' *tyuuka* 'Chinese' + *ryooriya* 'restaurant.' Mono-phrasal.

tyuuoo-iinkai 中央委員会 'central committee.' *tyuuoo* 'center' + *iinkai* 'committee.' Word-word, bi-phrasal.

tyuuoo-koominkan 中央公民館 'central public hall.' *tyuuoo* 'center' + *koominkan* 'public hall.' Bi-phrasal.

uti no-hito うちの人 'my husband; one's family.' *uti no* 'I (gen.)' + *hito* 'person.' Bi-phrasal.

utyuu-hikoosi 宇宙飛行士 'astronaut.' *utyuu* 'space' + *hikoosi* 'pilot.' Mono-phrasal.

wakate-kenkyuusya 若手研究者 'young researcher.' *wakate* 'young person' + *kenkyuusya* 'researcher.' Mono-phrasal, bi-phrasal.

yagai-konsaato 野外コンサート 'outdoor concert.' *yagai* 'outdoors, open-air' + *konsaato* 'concert.' Word-word, mono-phrasal.

zyooki-kikansya 蒸気機関車 'steam locomotive.' *zyooki* 'steam' + *kikansya* 'locomotive.' Mono-phrasal.

zyoonai-anaunsu 場内アナウンス 'announcement over the on-premises public-address system.' *zyoonai* 'on premises' + *anaunsu* 'announcement.' Mono-phrasal.

zyoonin-rizikai 常任理事会 'permanent governing body.' *zyoonin* 'permanent, regular, standing' + *rizikai* 'governing body, board of directors, board of trustees.' Mono-phrasal, bi-phrasal.

zyosei-doraibaa 女性ドライバー 'female driver.' *zyosei* 'woman' + *doraibaa* 'driver.' Mono-phrasal, bi-phrasal.

zyuuni-mai 十二枚 '12 [*mai*; counter for flat objects].' *zyuuni* '12' + *mai* '*mai* (counter for flat objects).' Word-phrase only.

zyuuni-mai-dori 十二枚撮り '12 exposures (photographs).' *zyuuni* '12' + *mai* '*mai* (counter for flat objects)' + *dori* 'exposure.' Mono-phrasal.

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