博士論文

Head-Dominancy Correspondence in Japanese Non-Simplex Word Accentuation

（日本語非単純語アクセントにおける主要部と優位性の対応関係）

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Abstract

Morphology and phonology have been contradicting each other in the definition of a 'compound,' in particular in Japanese compound accentuation. A compound in phonology might contain free morphemes, bound morphemes, or even affixes in morphology. This dissertation starts by challenging the definition of compound accent rules and systematically investigating the applicable scope of compound accent rules. A dominance–subordination model that describes and predicts the accentual type of non-simplex words is proposed, hypothesizing that the morphological head corresponds to prosodic dominancy, and that these two factors represent various morphophonological phenomena. Dominancy is a term that indicates the relative dominant relation between the two components in a non-simplex word, which is first proposed in this dissertation. By setting the new notion 'dominancy' apart from the head in a complex structure, the accentual pattern can be predicted with its morphological structure. Non-simplex words with left-headed structure and right-headed structure–including dvandva non-simplex words which have been viewed as double-headed–show four kinds of accentual patterns in terms of dominancy: left dominancy, right dominancy, zero dominancy, and accentual transfer. This dissertation shows that head dominancy is not a one-to-one correspondence; instead, the relation changes depending on the prosodic length and lexical information of the head element. A mapping model between morphology and phonology is proposed based on morphological complexity and the notion of mono-phrasal and bi-phrasal compounds, where a one-to-one correspondence of mapping between morphology and phonology can be assumed.

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Chapter 1: Introduction

1.1 Aim of the Study

This dissertation aims to unfold the effect of the head-dominant relation observed in compound accentuation in Tokyo Japanese. Compound accent rules (CAR) might be one of the most discussed topics in Japanese morphophonology. Most of the discussions have focused on syllabic structure, prosodic length, or the effect of lexical strata. However, the role of head-dependent structure has seldom been detected. Another problem in the literature is that the definition and explanatory scope of CARs vary to a large extent. A component that is viewed as a compound in some research might be excluded because of the definition disperses in other research. Notably, compound accentuation requires further research in the literature. This study also addresses head-dominancy relation in dvandva non-simplex words and proposes a hypothesis on the mapping between morphology and prosody.

This dissertation contributes to both morphology and phonology because of its merging view of the two subfields in linguistics. I emphasize the necessity to set the discussion of compound accentuation apart from pure morphology or phonology because compound accentuation is a phenomenon driven by morphophonology in which a morphological structure interacts with other phonological constraints. I demonstrate that prosody and morphological heads interact, creating abundant, intriguing phenomena in the world of words. This dissertation provides a consistent definition of head and dominancy and categorizes the various patterns of compound accent using the head-dominancy

relation. It also bridges the theoretical gap between morphology and phonology in terms of compounds by dichotomizing words only into ‘simplex’ and ‘non-simplex’ categories and proposes a new morphology-phonology mapping model based on morphological complexity.

1.2 Background

Various Japanese dialects have a distinctive accentual system where each word has a lexically assigned accentual type that corresponds to its syllable amounts. The realization of an accent in Tokyo Japanese, a standardized Japanese dialect mainly used around the Tokyo area and in public scopes across Japan, is a dramatic pitch fall in the syllable, and this language also allows words without a pitch fall, generally called ‘unaccented.’ This language only has high (H) and low (L) in its accentual system. Every accented word in Tokyo Japanese contains a pitch fall that can be described as a high-low (HL) suprasegmental sequence. By contrast, unaccented words do not contain HL. The accentual type of a given word includes two factors: presence of an accent and position of the accent. If a given word composed of N syllable(s) is accented, there are theoretically N types of possible accentual positions. Therefore, a sequence such as /ha.shi/, which contains two syllables, has three possible accentual types; that is, theoretically, two with an accent in different positions and one without an accent as shown in (1):

(1) Theoretical possibilities of accentual type in Tokyo Japanese (’ indicates the accentual fall HL and - at the word-end indicates unaccentedness)

[ha’shi] 箸 ‘chopsticks’

[hashi’] 橋 ‘bridge’

[hashi-] 端 ‘edge’

The examples in (1) are words in Tokyo Japanese and illustrate that simplex words in Tokyo Japanese are almost unpredictable. Minimal pairs with a slight accentual difference are observed in Tokyo Japanese. According to a survey in Sibata and Shibata (1990), approximately 14 percent of minimal pairs in Tokyo Japanese are distinguished by their accentual pattern. The accentual pattern of a word is also correlated to its syllabic structure and prosodic length, which is observed in Sino-Japanese and foreign words (Ogawa 2004, 2006; Kubozono 2006); however, this does not mean that the accentual type of a given Sino-Japanese word and foreign words is completely predictable merely by its phonological structure. Despite the relatively higher predictability of accents in these two lexical strata, I must continue to assume that the presence and position of an accent are lexical, because there are patterns that cannot be predicted by its phonological structure alone:

(2) Sino-Japanese minimal pairs with an accent

a. [ka'n] 缶 'can'

b. [kan-] 勘 'intuition'

c. [ki'] 機 'chance'

d. [ki-] 気 'mood'

The examples in (2) are Sino-Japanese morphemes: (2a, c) are accented and (2b, d) are unaccented. Additionally, some Sino-Japanese words are distinctive based on their different accentual position (3):

(3) Sino-Japanese minimal pairs with different accentual positions

a. [yaku'] 厄 'evil, disaster'

b. [ya'ku] 約 'about'

c. [shaku'] 尺 '(Japanese scale unit for length)'

d. [sha'ku] 勺 '(Japanese scale unit for volume)'

By contrast, simple foreign words in Tokyo Japanese are not as unpredictable as the other lexical strata. Many foreign words are accented, and the accentual position usually falls in the syllable containing the antepenultimate mora, which is called 'antepenultimate accent rule'. However, this does not mean that accent of foreign words is not lexical. Some

words have an accentual position on a syllable other than the antepenultimate syllable, and this might be caused by the preservation of the prominance pattern in the original language (See Mutsukawa 2006 for a profound theoretical discussion) or a specific interaction of syllabic structure and other phonological constraints (Ito and Mester 2016).

(4) Foreign words with an accented position that is not the syllable containing the antepenultimate mora to the last

a. [a'kusento] アクセント 'accent' *[akuse'nto]

b. [pi'kunikku] ピクニック 'picnic'

c. [amerika-] アメリカ 'America'

If the accent of a given simplex word is unpredictable in most cases, I must ask this question: Would the accentual type remain in compounding if all the simplex words in this language have a lexically assigned accentual type? The answer might not be *yes*. Notably, the accentual system in Tokyo Japanese differs in simplex words and non-simplex words. Simplex words are formed by one morpheme in Japanese. Although the accent of simplex words is largely unpredictable, compound words (or non-simplex words) are not unpredictable in terms of the position or the presence of an accent. (The difference between these two terms and the reason why non-simplex words could be more accurate are explained in the next sections.) When two lexical constituents form a complex or a compound word, the accent of the new word is predicted by either the left or right

constituent. In many cases, the right member determines the accentual type of the complex or compound word.

Here, a question is as follows: To what extent can the accent of a complex or a compound word be predicted? Many studies have proposed that different second members carry various pieces of accent information that determine the accent of the compound based on the assumption that only the second member has the power to determine the accent and that the accent of the first member would be diminished (e.g., McCawley 1968, Poser 1990, Kubozono 1995, 1997); however, this story of accentual determination is incomplete. Recently, studies have observed that some words in Tokyo Japanese are left-dominant instead of right-dominant; thus, the right member does not determine the accent, and its accent is neglected such as the left member does in right-dominant words (Huang 2017, 2018a, 2018b). Although these so-called left-dominant words are not as frequently used as right-dominant words in terms of type frequency, most are of high productivity, and some have a high token frequency. Thus, they might not be single exceptions in this language. Instead, a broader and more accurate generalization and analysis should be conducted to better understand the dominance relation in Tokyo Japanese compounds.

In line with this goal, this dissertation carefully makes a statement and conducts analysis in favor of left dominance and right dominance. Concerning left dominance in Tokyo Japanese, it has been observed in a large part of the population in the nation's various regions. Unlike right-dominant words, which have been a major focus in the literature, words that are not right-dominant have no accurate description, definition, or

theoretical criteria that can be used to judge whether a word is right-dominant, and so forth. To fill this gap in the literature, this dissertation elaborates on every notion that might be used to account for a dominance relation, based on the existing data in the target language.

1.3 Compound accent in Japanese

Compounding is a word-formation process based on a combination of lexical elements and has been observed in many natural languages (ten Hacken 2017). In Japanese, the prosodic pattern that results from compounding deeply depends on the prosodic patterns (i.e., accentual types) of the components. Compared with some simple words whose accentual type is determined lexically and cannot be predicted, for example, [ha'shi](‘chopsticks’) versus [hashi'](‘bridge’), the accentual type of a word that contains more than one morphemes can be basically predicted by CARs (Kubozono 1995). This rule predicts the accentual type of a compound or a complex word by its second member. The literature has proposed various CARs. McCawley (1968) proposed that the prosodic length of the second morpheme in a compound determines the accentual type. When the second morpheme of a compound is less than or equal to two morae, the accent of the compound is determined by the category to which it belongs. Three categories have been proposed (5):

(5) McCawley's CAR for compounds with short second members

a. Pre-accenting morphemes

[e'ki] 駅 'station'

[chi'ba] + [e'ki] → [chiba'eki]

[tookyoo-] + [e'ki] → [tookyo'oeki]

b. Initially-accented morphemes

[i'to] 糸 'yarn'

[tsumugi-] + [i'to] → [tsumugii'to][1]

[u'chi] + [i'to] → [uchii'to]

c. Deaccenting morphemes

[se'i] 性 'characteristic'

[hitsuyoo-]+ [se'i] → [hitsuyoosei-]

[ke'izai] + [se'i] → [keizaisei-]

McCawley's generalization is based on the assumption that the accentual type of a compound is determined by its second member. [e'ki] in (5a) is a pre-accenting morpheme. If the second member of a non-simplex word belongs to this category of morphemes, the compound is predicted to be accented, and the location of the accent nucleus is the syllable directly before the morpheme boundary. [i'to] in (5b) is an initially-accented morpheme

[1] There are also some variations observed where the accent nucleus is put on the antepenultimate syllable.

that determines the accent nucleus to be present and located at the first syllable of the second morpheme, which is [i] of [i'to]. The third type is called a deaccenting morpheme and assigns no accent nucleus to the compound, making it unaccented. In all examples, the first accentual type of the first morpheme does not determine the accent of the compound. Regardless of the different accentual status of the first morpheme in terms of the presence of the position of accent, the accentual type of compound can be predicted only by the accentual type of the second morpheme.

Kubozono (1995) and a number of his following works have basically agreed with McCawley's idea that the prosodic length of the second member in a compound plays a vital role in accent determination. However, Kubozono has attempted to account for short compounds, of which the second components are less than or equal to two morae, and long compounds, of which the second element exceeds two morae by the same constraint that would be violated when the accent nucleus of the second morpheme is not preserved in the compound. Kubozono (1995, 1997) has also proposed that universal constraints based on the framework of Optimality Theory (OT) can account for the dispersing characteristics of three types of second morphemes. Despite some exceptions, he claimed that the accentual type of the second morpheme would be basically preserved except for the condition where preserving the accent of the second morpheme would violate other constraints in higher positions, with a higher priority not being violated compared with the constraint preserving the accent. This assumption has widely been adopted in the CAR literature (Kubozono 1995, 1997, Alderete 2001, Tanaka 2001). The constraints that have been proposed in these

studies interact with faithfulness constraints that refer to the accent of the second member of compounds.

Notably, regarding CARs, Kubozono (1995, 1997) has mentioned two types of compound accent generalization: the accentual type of the second member is preserved, or the accent nucleus is at the boundary between the two morphemes. In Tokyo Japanese, these two variations of compound accents are observed in a part of words. Most of words are only natural with either one, but some words have variations that possess two prosodic forms (6):

(6) Variations of CARs

a. [tsumugi-] + [i'to] → [tsumugii'to] ~ [tsumugi'ito]

b. [na'ma] + [tama'go] → [namatama'go] ~ [namata'mago]

On the one hand, this condition complicates the generalization because I observe no clear tendency in terms of which rule should be applied to a given non-simplex word. On the other hand, this linguistic fact implies that CAR, even for right-dominant non-simplex words, might contain more than one subrule in the framework of any rule-based theory. To solve the problem, a rule-based model must pose two rules: one for the pre-accenting accent, and one to preserve the accentual type of the second morpheme.

OT differs from other rule-based theories and can be used to account for the variation by re-ranking the constraints. Tanaka (2001) first addressed this variation issue

by suggesting that short second morphemes that are initially-accented morphemes are still at work and their accentual type would be preserved. However, a markedness constraint that will be violated when the final foot contains an accent nucleus is adjacent to the aforementioned faithfulness constraint. Re-ranking these two constraints would result in the other prosodic form, appearing as its variation. He also mentioned that these variations do not occur in all lexical strata. Among all lexical strata, foreign loanwords seem to be immune from the re-ranking. His analysis is consistent with later works such as Ito and Mester (2008), which have claimed that lexical classes in Tokyo Japanese are indexed and that each lexical stratum forms a co-grammar. The impact of lexical classes in Japanese is also addressed in the following chapters.

For words that have prosodic variations, I temporarily adopt Tanaka's (2001) idea that variation is the result of re-ranking faithfulness and markedness constraints. By adopting this idea, I assume that even in cases where the accentual type of the second morpheme is not 'preserved' in the surface, the constraint that will be violated when the accent of the second morpheme is not preserved is still assumed to be somewhere in the ranking but just below the markedness constraint that requires no accent in the final foot. Except for exceptional cases such as words ending with specific morphemes such as [hi'me] (Kubozono 1997), this analysis successfully accounts for many right-dominant non-simplex words.

Thus far, I have introduced the basic ideas of the Japanese compound accent, especially literature on right-dominant non-simplex words. Before I examine the cases that

are non-right-dominant, in the next section, I explain the reason why the term 'non-simplex word' has been used.

1.4 Complex words and compound accent

Most studies in phonology have not differentiated complex words and compound words when eliciting CARs, including all the literature review thus far. In morphology, by following Kageyama's (1993, 2001) assumption, four classes in word-formation can be observed in Japanese: root, stem, word, and word^{+}. A root is a unit that contains only one morpheme and cannot be further analyzed into smaller meaningful units; it is morphologically simple by definition. A stem, by contrast, might contain one or more morphemes on which an inflectional affix can be attached (Sugioka and Ito:2016, 348). A word is a unit that can stand independently, and a word^{+}, according to its initial definition proposed by Kageyama (2001), is a unit that is larger than a word but not a syntactic phrase. In terms of complexity, except for roots, the other three types of units might be complex, containing more than one component.

Both compound words and complex words are defined as words that can independently stand as a unit. Among the four categories, a stem does not reach the premise of being a word. Even a stem can be composed of more than one component, and it is neither a compound word nor a complex word because of this definition. By contrast, words and word^{+}s can be complex words or compound words. The difference between a complex word and a compound word, according to the morphological or syntactic view, is

the characteristics of the components that form a word. If a word is composed of two free morphemes, it is a compound; by contrast, if a word is composed of one bound morpheme and one free morpheme, or two bound morphemes, it is a complex word. Both complex words and compound words are morphologically complex. If we define complex word as a word that is morphologically complex, a so-called 'complex word' would be a superset of a 'compound word'. This dissertation refers to morphologically complex words that are not compound words as 'complex words' in order to supervise the ambiguity.

Thus, two questions remain: Do compound and complex words have different accentual patterns in Tokyo Japanese? and What has the phonology literature discussed that corresponds with the same class in morphology? Based on my review of the early literature such as McCawley (1968), a differentiation between the two is not proposed when discussing their accentual pattern. Instead, only prosodic length is used to predict the aforementioned pattern: words in which the second morpheme does not exceed two morae follow one rule, and the words with a longer second morpheme follow the other rule. The morphological status does not determine the accent. Poser (1990) and Kubozono (1995, 1997) have basically followed this categorization. Later works, such as Alderete (1999), Tanaka (2001), and Kurisu (2001), have mixed complex words and compound words with the morphological definition. In other words, these studies potentially show that the correlation between the accentual pattern and whether a word is a complex word or a compound is unclear. Complex words and compound words are discussed on the same basis, which is different than the morphological or syntactic view.

(7) Examples from the literature on compound accents

a. /oo/	大	+	/kamakiri/	カマキリ	→	[oo ka'makiri]
	'big'			'mantis'		
b. /kensetsu/	建設	+	/shoo/	省	→	[kensetsu' shoo]
	'construction'			'ministry'		
c. /hitsuyoo/	必要	+	/teki/	的	→	[hitsuyoo teki-]
	'necessary'			'(like)'		
d. /kamera/	カメラ	+	/man/	マン	→	[kamera' man]
	'camera			''man''		

In (7), /oo/, /teki/, and /man/ are bound morphemes in Japanese; thus, it means they cannot be independently used and only appear with other morphemes. However, they do not have a different status in terms of compound accent. Instead, they behave similar to other free morphemes, for example, /hitsuyoo/, /kensetsu/.

The crucial evidence that there is no difference between free morphemes and bound morphemes in terms of compound accents is from the rich variety of Chinese morphemes in Japanese. Japanese has mainly three lexical strata: native stratum, ancient Chinese stratum, and loanwords. Japanese borrowed many Chinese morphemes. Each Chinese character can be considered a morpheme because every character has a meaning and is the

smallest unit of meaning that cannot be analyzed. The lexical stratum borrowed from ancient Chinese is called Sino-Japanese; an example of this is [dansei-] (男性, 'male'), a complex formation of two Sino-Japanese characters that contains a bound morpheme and a free morpheme. Despite having a similar phonological and orthographical structure, Sino-Japanese characters can be divided into bound morphemes and free morphemes as shown in (8):

(8) Bound morpheme and free morpheme of Sino-Japanese characters

a. Bound morphemes

[su'] 須 'must,' [ki'] 喜 'joy', [da'n] 男 'men'

b. Free morphemes

[yo'o] 要 'key point,' [se'i] 性 'gender,' [hitsu'] 筆 'pen,'

Despite the different morphological status, no accentual difference has been found between the bound morphemes and free morphemes of Chinese characters. Sino-Japanese complex words basically follow CARs, but in many cases, the components are not free morphemes but bound morphemes. No Chinese characters exceed two syllables. By following McCawley's categorization of three types of short morphemes, I found that bound morphemes and free morphemes behave the same when it comes to the accentual pattern when compounding with other characters:

(9) Accent of bound morphemes and free morphemes of Sino-Japanese initially-accented morpheme

[su'u] 数 'number'

a. [ke'i] 係 + [su'u] 数 →[kei su'u] 係数 'a coefficient'

b. [ka'] 仮 + [su'u] 数 → [ka su'u] 仮数 'mantissa'

c. [ku'] 句 + [su'u] 数 → [ku su'u] 句数 'phrase number'

d. [gyaku-] 逆 + [su'u] 数 → [gyaku su'u] 逆数 'a reciprocal'

Examples in (9) all have the second morpheme [su'u], an initially-accented morpheme. Non-simplex words with [su'u] combined with other initially-accented morphemes have an accent nucleus on [su] of [su'u] regardless of whether the first Sino-Japanese character is a bound morpheme such as [kei], or a free morpheme such as [ku] and [gyaku]. By contrast, examples of native Japanese and loanwords are also necessary to exclude the possibility that Sino-Japanese and words in the other two lexical strata demonstrate this tendency. Similar to Sino-Japanese morphemes, no accentual difference has been found between words containing bound morphemes and words containing free morphemes of native words and foreign loanwords:

(10) Accent of bound morphemes and free morphemes of other lexical strata

[ka'sa] 傘 'umbrella'

a. When the first morpheme is a bound morpheme

[a'ma] + [ka'sa] → [amaga'sa]

雨 'rain' 傘 'umbrella' 雨傘 'umbrella'

b. When the first morpheme is a free morpheme

[a'o] + [ka'sa] → [aoga'sa]

青 'blue; indigo' 傘 'umbrella' 青傘 'indigo sun umbrella'

Thus, I appropriately suggest that complex words and compound words have no difference in accentual pattern. The so-called CARs can account for both units. A morphologically-complex word is a word that contains more than one minimum morphological unit, namely, a morpheme. In this dissertation, the morphological view of categories is adopted. Except for customary usage such as CARs, the term 'non-simplex word' is used to indicate the target scope of CARs.

1.5 Dominancy

Most of the aforementioned literature has adopted a viewpoint that only the second member determines the accentual type of a compound. This perspective is unsurprising because of the many right-dominant non-simplex words. So-called right-dominant is assumed based on a binary inner structure; thus, there would be only two members: the left and the right. However, some words cannot be predicted by the right-dominant rules, and the left member instead of the right member in these cases seems to determine the accentual type of a compound. A theoretical problem remains how this phenomenon should be

explained where one of the members dominates the accentual type in a morphologically complex structure. A possible candidate is to use the term ‘dominance’. However, this term has been used in different ways, which can lead to ambiguity.

The term ‘dominance’ is used in many contexts: it refers to prosodic dominance where the prominence is located at. While in morphology, the dominant morpheme and the recessive morpheme are two notions that have been proposed and are observed in some languages. According to Inkelas (1998), dominant affixes often cause the deletion of elements, usually suprasegments, such as stress or accent of the attached base morpheme. By contrast, recessive morphemes are subordinated. Dominant and recessive morphemes are morphologically conditioned and driven by the lexical information of the morphemes. For example, in Hausa, the tonal behavior of affixes and its interaction has been reported to have two types of affixes: recessive affixes integrate their underlying tonal information to the base form they attach to, and dominant affixes replace the tonal type of the base (Example 11, where L indicates low tone, H indicates high tone, and tonal representation corresponds to the syllable in number.)

(11) Recessive and dominant affixes in Hausa (Inkelas: 1998: 27. Original data are from Newman 1986, 2000)

a. Recessive affix

i. ba-goobir + -ii → bagoobirii

L L H H L L HH

'from Gobir' ethonym 'a Gobir man'

ii. ba-zamfara + -ii → bazamfarii

L L L L H L L LH

'from Zamfara' ethonym 'a Zamfara man'

b. Dominant affix

i. ba-katsina + -ee → bakatsinee

L L HL HL H H H L

'from Katsina' ethonym 'a Katsina man'

ii. ba-zamfara + -ee → bazamfaree

L L L L HL H H H L

'from Zamfara' ethonym 'a Zamfara man'

In (11), /-ii/ in (11a) does not change the tonal form of the first member it attaches to, and *ba-goobir* and *ba-zamfara* preserve their tonal form. By contrast, /-ee/ dominates

the tonal form, resulting in the same tonal pattern as the complex form. Both *ba-katsina* and *ba-zamfara* ‘lose’ their original tone type.

The notions of dominant and recessive morphemes were applied to Japanese accents as well to account for the accent of affixes (Alderete 1999, Kurisu 2001). For example, /-ppoi/ is a dominant suffix that triggers an accent on the syllable /ppo/ regardless of the first morpheme.

(12) The dominant suffix and its accentuation in Tokyo Japanese

/-ppoi/

a.	[abura-]	+	-ppoi	→	[abura ppo’i]
	‘oil’		-ish		‘greasy’
b.	[otoko’]	+	-ppoi	→	[otoko ppo’i]
	‘male’		-ish		‘masculine’
c.	[a’ware]	+	-ppoi	→	[aware ppo’i]
	‘sorrow’		-ish		‘pitiful’

Notably, the difference between compound and complex words is assumed to have no relationship with the accentual difference. Hence, words such as [abura ppo’i] are non-simplex words, which is also in the scope of compound accents. However, the analysis in which suffixes such as /-ppoi/ follow would result in some theorical problems. Because the recessive or dominant differentiation is assumed to be assigned in the lexical information

of these affixes and these complex words are also the target on which CARs function, an explanation of the interaction is required between the effect of dominant/recessive affixes and compound accent computation if a suggestion is that the morpheme dominating the accentuation can also be explained in the same manner with the notion of dominant and recessive morphemes.

An overt problem of this account is that non-simplex words in Japanese do not always have a patterned directionality as affixes do. As in many other languages, directionality plays a critical role in Japanese affixes. For example, regarding the aforementioned suffix /-ppoi/, Japanese does not allow it to be a prefix. Thus, /-ppoi/ should always be a suffix that only appears as the second member in a non-simplex word. In this case, the model with dominant and recessive morphemes is able to account for the accent of the words derived from an affix. Nevertheless, some morphemes comprising non-simplex words in Japanese have no fixed position. A morpheme in the position of the second member might be the first member in other non-simplex words. A morpheme such as *ito* can be the second morpheme in a non-simplex word such as *tsumugi-ito* (紬糸, 'silk yarn'), but *ito* might also appear as the first morpheme such as in *ito-guchi* (糸口, 'thread end'). If I claim that *ito* in *tsumugi-ito* dominates the accentual type and therefore is a dominant suffix such as *-ppoi*, I would also predict that *ito* would be dominant in *ito-guchi* because whether or not a morpheme is a dominant or recessive, lexical information is presented without directionality. This prediction with the idea of dominant or recessive

morpheme, however, does not correspond to the linguistic fact. The word *ito-guchi* is pronounced with an antepenultimate accent [ito'guchi] instead of [i'toguchi]. This pronunciation implies the necessity to propose a notion that can indicate the dominance relationship that subsumes directionality instead of using the existing notions. Thus, the term 'dominance' in this case does not indicate the dominant morphemes, such as in Inkelas (1998) and other related studies. Notably, the idea of dominant and recessive affixes is not denied.

In order to solve the ambiguity, this dissertation will use the term 'dominancy' instead of 'dominance' to indicate the prosodic asymmetry in which one of the members determines the accentual pattern of a complex structure. This notion is applied to all non-simplex words including derived words, complex words, and compound words. In the next chapter, I elaborate on the notion of dominancy in this dissertation and demonstrate that the cases that have been accounted for by dominant and recessive affixes can also be explained by 'dominancy' proposed in this dissertation.

1.6 Summary

This dissertation comprises five chapters. Chapter 1 has introduced the basic description and definition for each term, including analysis of compound accents in the literature, and elaborates on the research target, based on which I demonstrate that CAR should be assumed to be applied to non-simplex words instead of compound words, which indicates words composed of two free morphemes in morphology. The compound status

and the scope of application of the so-called CAR have been neglected in the literature. I also stated that a compound in some phonological literature differs from a compound in syntax or morphology by definition. To solve this naming problem, which sometimes contains essential differences among theoretical fields, I supported that the scope of the CAR that has been discussed in phonology should be enlarged to subsume all complex words instead of compound words. By extending the scope of the application of CAR, the divergence between phonology and morphology could be solved.

In Chapter 2, a closer view of dominance relation is presented where each notion is illustrated and the basic assumptions of dominance–subordination relation are explained. Using this notion, right dominance and other types can be defined. I also propose that there should be an assumed category called ‘zero dominancy’ and discuss the relation between dominance and head position. Despite the vague definition of head among the subfields of linguistics, I demonstrate that a new type of head, a prosody-dominating head, should be assumed. This head differs from the prosodic head in that it usually indicates the high tone in a continuous tone sequence and the other types of heads including a categorical head, syntactic head, and semantic head. This chapter suggests that the prosody-dominating head can be determined by morphological evidence, namely, whether either one member in a non-simplex word has the power to determine the accentual type of the compound, and this notion cannot be substituted by other existing notions of head even though they might be related to some extent.

In Chapter 3, the morphology–phonology interface is addressed. Because the basic assumptions of this dissertation based on the idea that all non-simplex words are in the scope of CAR, this chapter discusses further how a non-simplex word is mapped onto phonology. In addition to left-dominant words and right-dominant words, words without clear dominance are also discussed.

In Chapter 4, opaque cases are discussed. Studies have mentioned multiple 'exceptional' cases of CAR. This chapter shows that these words can also be accounted for by figuring out the dominance relation of these exceptional cases. Also, a theoretical analysis based on Optimality Theory is demonstrated. Chapter 5 concludes this dissertation.

Chapter 2: Dominance and Subordination

2.1 Preliminary

If we define dominance as a notion that one component instead of the other determines the prosodic pattern of a non-simplex word, a variety of dominance relations can be found among Japanese dialects. Some dialects such as Nagasaki Japanese and Kagoshima Japanese are close to purely left-dominant, indicating that the left component of a non-simplex word can in most cases determine the prosodic pattern (Kubozono 2004, Matsuura 2009); some dialects are right-dominant such as Tokyo Japanese; and some dialects such as many Kansai dialects are both. I do not apply the traditional usage of the term 'dominance;' by contrast, I use the term 'dominancy' to refer to the phenomenon in which one component determines the type of prosodic dominance of the non-simplex word it affiliates.

Because the binary structure in this study is assumed to be applicable in Japanese non-simplex words, every word is and can only contain two components. The component that determines the prosodic pattern is dominant, and the other is subordinated. Here are some examples of the prosodic dominance and subordination of non-simplex words in three dialects:

(13) Dominant relation in compounding among Japanese dialects (Uwano 1997)

a. Left-dominant: Nagasaki, Kagoshima (Kubozono, 2004)

b. Right-dominant: Tokyo (Akinaga 2001)

c. Both: Osaka, Kyoto (Nakai 2005)

There is a dialectal difference among languages and dialects. For example, for the compound accentuation, dialects including the Kagoshima dialect are said to be left-dominant, in which the accentual type of the left member determines the accent of the word.

Except for Kansai dialects in which the right member determines the accent nucleus while the left member determines the tonal type (式保存, i.e., preservation of tonal type), other dialects mostly have a directionality that seems to be apodictic, which is shown later in this chapter.

In some typical left-dominant dialects such as Kagoshima dialect, each morpheme belongs to either Type A or Type B in a two-pattern tone system. Type A morphemes are penultimately accented, and Type B morphemes are ultimately-accented. The accent of compounds is determined by the first morpheme. If the first morpheme is a Type A morpheme, the compound is penultimate as the first morpheme is. Otherwise, the compound would be ultimately accented (Kubozono 2004).

(14) Kagoshima dialect

a. Type A

[ha'na]	+	[wa-]	→	[hana'wa]
鼻 'nose'		輪 'ring'		鼻輪 'nose ring'
Type A		Type B		Type A

b. Type B

[hana-]	+	[wa-]	→	[hanawa-]
花 'flower'		輪 'ring'		花輪 'flower ring'
Type B		Type B		Type B

Some dialects have both dominant types. Most Kansai dialects, for instance, preserves the tonal type of the first member and the accent nucleus of the second member (Wada 1942). In Kansai dialect, both tone and accentual type are assigned to every word. There are two tonal types in Kansai dialects: high tone and low tone. As for the accentual type, such as Tokyo Japanese, Kansai dialects also have different accentual types, whose number of possible locations of accent is theoretically equal to the number of syllables plus one type without any accent nucleus (unaccented). When two words combine, the left member determines whether the word starts with a high tone, and the second member determines the location of the accent nucleus if the second member is accented.

In many Keihan dialects of Japanese, the first component of a compound determines its *shiki* (tonal pattern), and the second morpheme determines its position of accent fall (Wada 1942, Hirayama 1960, Uwano 1997). The Kyoto dialect is one of the typical dialects that contains both right-dominant words and left-dominant words. Tonal type is determined by the left, and accentual type is determined by the right. Given any new word, both tonal type and accentual type can be predicted separately. Examples in (15) both have the same second member, which results in an accent fall in the pre-antepenultimate mora. However, the tonal type of the compound is determined by the first member: the first member in (15a) starts with a low tone, which causes a low tone in the compound, while the first member of (15b) begins with a high tone, which causes a high tone in the compound.

(15) Compound accent in Kyoto dialect, one of Keihan dialects

a.	[shakai]	+	[mondai]	→	[shakai mondai]
	LHL		LLLH		LLLHLLL
	社会 ‘society’		問題 ‘problem’		社会問題 ‘social problem
b.	[seiji]	+	[mondai]	→	[seiji mondai]
	HHH		LLLH		HHHHLLL
	政治 ‘politics’		問題 ‘problem’		政治問題 ‘political problem

By contrast, in Tokyo Japanese, a right-dominant dialect, the right member is the member that determines the accentual type of the compound word in many cases. The left member loses its accent nucleus if there is one, which is the reason why this accentual determination has been called ‘right-dominant,’ because the right member dominates the accent:

(16) Right-dominant accent in Tokyo Japanese

a. [hana-] + [wa’] → [hanawa-]
鼻 ‘nose’ 輪 ‘ring’ 鼻輪 ‘nose ring’

b. [hana’] + [wa’] → [hanawa-]
花 ‘flower’ 輪 ‘ring’ 花輪 ‘flower ring’

c. [hana-] + [a’rashi] → [hana a’rashi]
鼻 ‘nose’ 嵐 ‘storm’ 鼻嵐 ‘snorting’

b. [hana’] + [a’rashi] → [hana a’rashi]
花 ‘flower’ 嵐 ‘storm’ 花嵐 ‘flowery storm’

2.2 Dominancy relation in Tokyo Japanese

2.2.1 Left dominancy and right dominancy

Left dominancy and right dominancy are two different types of dominancy. I define dominancy as a relation observed in non-simplex words, in which one member has the power to determine the accentual type of the word. Languages might prefer one dominancy type in compounding or derivation.

Tokyo Japanese, however, is a more complicated case. Although the aforementioned examples of Tokyo Japanese are right-dominant, other examples are difficult to analyze whether they are right-dominant or not.

In some morphologically complex words, the right member seems to lose its power to determine the accentual type. Instead, the accent of the left member is preserved in the complex word (McCawley 1968, Alderete 1999, and Kurisu 2001, Matsumori 2016, Huang 2017, 2018, 2020)

(17) Examples of left-dominant non-simplex words

[ya] 屋

a. [kutsu'] + [ya] → [kutsu'ya]

靴 'shoe' 屋 'house' 靴屋 'shoe store'

b. [ame-] + [ya] → [ameya-]

飴 'candy 屋 'house' 飴屋 'candy shop'

The definition of dominancy becomes crucial in this case because Tokyo Japanese is not as coherent as Kansai dialect, in which the accentual type can still be predicted by the right member in most cases. In the following sections, the definition of dominancy is discussed.

Matsumori (2016) reviewed studies and listed some words as the left-dominant cases and claimed that the left-dominant type is a historical trace of old Japanese. In her assumption, Tokyo Japanese had been a left-dominant language, in which the left member in a non-simplex word determined the accentual type as modern Kagoshima dialect does in (18).

(18) ‘Left-dominant’ morphemes in Kubozono (2017)[2]

a. [ya] 屋

[kutsu’]	+	[ya]	→	[kutsu’ya]
靴 ‘shoe’		屋 ‘house’		靴屋 ‘shoe store’
[ame-]	+	[ya]	→	[ameya-]
飴 ‘candy		屋 ‘house’		飴屋 ‘candy shop’

b. [cho’o] 町

[ogawa-]	+	[cho’o]	→	[ogawachoo-]
小川 ‘Ogawa’		町 ‘town’		小川町 ‘Ogawa Town’
[hama’matsu]	+	[cho’o]	→	[hamamatsu’choo]
浜松 ‘Hamamatsu’		町 ‘town’		浜松町 ‘Hamamatasu Town’

In (18), the presence of the accent nucleus determines the accentual type of the word. If the left member is accented, the word is accented; if the left member is unaccented, the word is unaccented. Dominancy in these cases might be to find out which component preserves its accent in the non-simplex word. However, in these cases, I observed that this so-called left-dominant type of accent only cooccurs with some specific second members.

[2] The second morphemes in this example are cited from Kubozono (2017) and the words are arranged by the author. For more information about ‘left-dominant’ morphemes, please refer to Akinaga (2001), Matsumori (2016), and Kubozono (2017). The definition of ‘left-dominant accentuation’ is different from it in this dissertation, which will be illustrated later.

If the second member is another morpheme, left dominancy does not predict the accentual type (19).

(19) Hypothetical examples with other morphemes[3]

[cho'o] 町

a. [ogawa-] + [cho'o] → [ogawachoo-]
小川 'Ogawa' 町 'town' 小川町 'Ogawa Town'

b. [ogawa-] + [ke'n] → [ogawa'ken]
小川 'Ogawa' 県 'prefecture' 小川県 'Ogawa Prefecture'

c. [hama'matsu] + [cho'o] → [hamamatsu'choo-]
浜松 'Hamamatsu' 町 'town' 浜松町 'Ogawa Town'

d. [hama'matsu-] + [ke'n] → [hamamatsu'ken]
浜松 'Hamamatsu' 県 'prefecture' 浜松県'Hamamatsu Prefecture'

I might appropriately suggest that the examples in (19) are triggered by its second member. However, a question remains: Which component should be dominant if dominancy is defined as the status that determines the accentual type of the non-simplex word? Because 'left-dominant' cases only occur with specific morphemes; this type of word is regarded as right-dominant here. These cases are observed to be left-dominant

[3] Some of the examples do not exist in Tokyo Japanese, such as [ogawa'ken] and [hamamatsu'ken], but they are also possible and grammatical combinations in Tokyo Japanese.

cases because the right member, which is dominant, somehow refers to the accentual type of the left member. The aforementioned examples might still be dominated by the right member. However, the right member seems to yield its determining power to the left member. I discuss this accentual type in the following chapters.

The determiner and numeral cases also seem to be exceptional for right-dominant generalization. In Uwano (1997) and Huang (2017a, 2017b, 2018), cases that start with a determiner, or a Sino-Japanese or native numeral such as *ichi* (一, 'one') are left-dominant. Unlike the examples in (19), words starting with a numeral or a determiner in (20) can be predicted by its left member.

(20) Accent of numerals and determiners

a.	[ichi’]	+	[gyo’o]	→	[ichi’gyoo]
	一		行		一行
	‘one’		‘row’		‘one row’
b.	[ichi’]	+	[o’ku]	→	[ichi’oku]
	一		億		一億
	‘one’		‘hundred million’		‘one hundred million’
c.	[ka’ku]	+	[gyo’o]	→	[ka’ku gyoo][4]
	各		行		各行
	‘every’		‘row’		‘every row’
d.	[ka’ku]	+	[e’ki]	→	[ka’ku eki][5]
	各		駅		各駅
	‘every’		‘station’		‘every station’

The accentual type where the accent of the left member is preserved are also observed when the second member is longer than two morae. However, in these cases, although the accentual type of the left member is preserved, the right member does not lose its accent. In other words, both accentual types are preserved in the non-simplex word.

[4] [ka’ku gyo’o] is also a probable variation for some speakers.
[5] /kakueki/ has three accentual variations: [ka’ku eki] and [ka’ku e’ki]. The unaccented variation is used as an adverb instead of a noun so it will not be discussed here.

(21) Long numeral words and short numeral words

a.	[ichi’]	+	[gyo’o]	→	[ichi’gyoo]
	一		行		一行
	‘one’		‘row’		‘one row’
b.	[ichi’]	+	[o’ku]	→	[ichi’oku]
	一		億		一億
	‘one’		‘hundred million’		‘one hundred million’
c.	[ichi’]	+	[kenkyu’usha]	→	[ichi’ kenkyu’usha][6]
	一		研究者		一研究者
	‘one’		‘researcher’		‘(as) a researcher’
d.	[ichi’]	+	[kyo’oshi]	→	[ichi’ kyo’oshi]
	一		教師		一教師
	‘one’		‘teacher’		‘(as) a teacher’

Huang (2017a, 2017b, 2017d) discussed the numeral cases including some words that have an ultimate accent, which also looks exceptional because it does not simply

[6] The variation of [i’chi kenkyu’u sha] is also observed in some speakers. This accentual pattern might originate from the accentual variation of /ichi/. Some speakers pronounce /ichi/ as [i’chi] while counting consecutive numbers, e.g. [i’chi, ni’i, sa’n, yo’n, go’o…], which is similar to using recitation patterns (Ito 1990). The description here adopts the accentual pattern in *Sanseido Daijirin*. Variations with [i’chi] will not be discussed here.

preserve the accentual type of the numeral on the surface. However, the ultimate accentual pattern can be predicted by proposing a constraint that is violated when the first member loses its accent. The strong evidence of the existence of this faithfulness constraint is that numeral and determiner cases are still accented, which is different from the other four-mora non-simplex words, which are the most common phonological structure to be deaccentuated (Ogawa 2004, Ito and Mester 2016) as shown below:

(22) Three-mora two-character Sino-Japanese non-simplex words (Ogawa 2004)[7]

	μ'μ μ	**μ μ' μ**	**μ μ μ'**	**μ μ μ**
HL	1750(78%)	N.A.	13(1%)	494(22%)
LH	230(15%)	44(3%)	N.A.	1298(83%)
LLL	187(50%)	48(13%)	6(2%)	134(36%)
LLL	138(19%)	7(1%)	4(1%)	586(80%)
Total	2305(47%)	99(2%)	23(0%)	2512(51%)

(23) The relation between four-mora two-character accent (Ogawa 2004)

	μ'μ μ μ	**μ μ'μ μ**	**μ μ μ'μ**	**μ μ μ μ'**	**μ μ μ μ**
HH	326(8%)	N.A.	169(4%)	N.A.	**3832(89%)**
HLL	156(10%)	N.A.	2(0%)	10(1%)	**1460(90%)**
LLH	6(1%)	41(7%)	13(2%)		**488(89%)**
LLLL	0(0%)	16(4%)	0(0%)	1(0%)	**381(96%)**
Total	488(7%)	57(1%)	184(3%)	11(0%)	**6161(89%)**

[7] H=heavy syllable; L=light syllable.

Ogawa (2004)'s survey indicates that the accentual type of both three mora words and four mora words in Sino-Japanese is correlated to the syllabic structure, including prosodic length and syllabic structure.

Compared to other Sino-Japanese non-simplex words, non-simplex words with a disyllabic numeral, including *ichi* (一, 'one'), *roku* (六, 'six'), *shichi* (七, 'seven'), *hachi* (八, 'eight'), show a similar tendency.[8] The syllabic structure is correlated with the accent: three light syllables with a penultimate accent, e.g. [ichi'ri], and heavy light with an accent on the first syllable from the left, such as [i'kki] (Huang 2017a).

(24) Accent of numeral non-simplex words with three morae (all disyllabic numerals)

	μ'μμ	**μμ'μ**	**μμμ'**	**total**
LLL	0(0%)	50(100%)	0(0%)	50(100%)
HL	53(98.1%)	0(0%)[9]	1(1.9%)	54(100%)
total	53(51%)	50(48%)	1(1%)[10]	104(100%)

Almost 90% of four-mora two-character Sino-Japanese words are unaccented regardless of their different prosodic structures according to Ogawa's survey. However, the

[8] The reason why Huang (2017a) only took disyllabic numerals into consideration is because Sino-Japanese disyllabic numerals are ultimately accented. As for the initially-accented numerals like [ni'], [kyu'u], and [ju'u], the accent preserving hypothesis would predict these words to be initially-accented, which corresponds to the overall tendency shown in Ogawa (2004).

[9] The second mora of a heavy syllable, e.g. nasal, geminate, or the second mora of a long vowel, cannot trigger an accent nucleus in most cases.

[10] The only word with an ultimately accent in our data is [hakka] '八卦', which has a special reading and is seldom used in modern Japanese.

ratio of being unaccented is lower in the group of non-simple words with a Sino-Japanese disyllabic numeral.

(25) Two-character four-mora Sino-Japanese numerals' deaccentuation ratio (light-light syllable words only)

	accented	**unaccented**	**both**	**total**
ichi	42(21.9%)	106(55.2%)	44(22.9%)	192(100%)
roku	14(29.2%)	28(58.3%)	6(12.5%)	48(100%)
shichi	15(31.3%)	22(45.8%)	11(22.9%)	48(100%)
hachi	18(31.6%)	28(49.1%)	11(19.3%)	57(100%)
total	89(25.8%)	184(53.3%)	72(20.9%)	345(100%)

2.2.2 Zero dominancy

If I assume that the observation and the generalization of left-dominant in Huang (2017a, 2017b, 2017d, 2018, 2020) is correct, one problem is the definition of the term 'dominance.' First, I ask the reader to accept that a word such as *tsumugi-ito* is right-dominant because *ito* determines the accentual type of the newly formed non-simple word, whereas *ichi-gyoo* is left-dominant because *ichi* determines its accentual type. The next case that must be considered might be cases where both elements appear with the original accentual type of the elements. In studies such as Huang (2017a, 2017b, 2018), cases in (21) are all defined as left-dominant, because the accentual type of the left member is preserved. Although the generalization in those studies might account for these cases, the

categorization should be performed more accurately. In other words, this question remains: Should the examples in (21c, d) also be categorized as left-dominant cases? The definition of the term ‘dominant’ inevitably implies the dominance–subordination relation. More specifically, to form a dominance–subordination relation, the necessary and sufficient condition should contain one element that has more power—in other words, is more dominant than the other in terms of accentual determination—and one subordinate element. Asymmetric power of accent determination serves as a premise. A condition where both elements have equal dominance might collapse the dominance relation.

This dilemma also causes some explanatory issues because the accentual pattern in (26) occurs not only in numeral words or determiners but also in other non-simplex words.

(26) Other longer non-simplex words

a. [tookyoo da’igaku] + [komaba kya’npasu]

東京大学 ‘UTokyo’ 駒場キャンパス ‘Komaba Campus’

→ [tookyoo da’igaku komaba kya’npasu]

東大駒場キャンパス ‘Komaba Campus of UTokyo’

b. [niho’n] + [gakujutsu shinko’okai]

日本 ‘Japan’ 学術振興会‘Society for the Promotion of Science’

→ [niho’n gakujutsu shinko’okai]

日本学術振興会 ‘Japan Society for the Promotion of Science’

Once the cases in (21c, d) where the accentual patterns of both components are preserved are defined as left-dominant, cases such as (26) should be also defined as the same because there is no difference in terms of preserving both accentual types. One possible solution to this is to suggest that both cases (21c, d) and (26) belong to the same categorization because of neutralization that results from some other factors such as prosodic length; however, this does not provide a solution to the issue that dominance is defined by an observation of the surface accentual distribution.

Due to the aforementioned reasons, I might more appropriately consider them as having no clear dominance or as equally dominant words. Here, I assume 'zero dominancy' which is a subset of dominancy, but this subset is an empty one. This pattern is triggered by the prosodic length and the morphological structure of a non-simplex word.

(27) Zero dominancy

a. [ichi'] + [kenkyu'usha]

一 'one' 研究者 'researcher'

→ [ichi' kenkyu'usha]

一研究者 '(as) a researcher'

b. [tookyoo da'igaku] + [komaba kya'npasu]

東京大学 'UTokyo' 駒場キャンパス 'Komaba Campus'

→ [tookyoo da'igaku komaba kya'npasu]

東大駒場キャンパス 'Komaba Campus of U Tokyo'

2.2.3 Overt dominancy and covert dominancy

Dominancy in Japanese non-simplex words can be divided into two types—*overt dominancy* and *covert dominancy*—according to how the accentual pattern of the dominating component is reflected on the surface form of a non-simplex word. Overt dominancy refers to dominancy where the accentual pattern of the dominating component including the presence of accent and accentual position is preserved. Covert dominancy refers to dominancy where the dominating component assigns one accentual type to the newly formed non-simplex word. Studies such as Kubozono (1995) and his further work published in 1997 on CAR have addressed this issue but it did not provide an integrated account. In this subsection, the two notions are discussed.

Realization of overt dominancy in non-simplex words is intuitive. The accentual pattern of the component responsible for accentual determination remains unchanged in the complex form (28):

(28) Overt dominancy

a.	[tsumugi-]	+	[i'to]	→	[tsumugii'to]
	紬		糸		紬糸
	'pongee'		'yarn'		'silk thread'
b.	[kika'i]	+	[i'to]	→	[kikai i'to]
	機械		糸		機械糸
	'machine'		'yarn'		'machine thread'
c.	[ya'mato]	+	[nade'shiko]	→	[yamato nade'shiko]
	大和		撫子		大和撫子
	'Yamato'		'Nadeshiko'		'traditional ideal woman'
d.	[jakoo-]	+	[nade'shiko]	→	[jakoo nade'shiko]
	麝香		撫子		麝香撫子
	'musk'		'Nadeshiko'		'carnation'

In all examples in (28), the accentual pattern that includes the accentual position and the presence of accent is preserved in the complex form. Notably, words such as (28c) do not exemplify zero dominancy because the first syllable [na] in [nade'shiko] does not

undergo initial lowering (Selkirk and Tateishi 1988), indicating that two components are in one boundary of a non-simplex word, instead of in separate boundaries.[11] [12]

This does not hinder the premise of 'preserving' the whole pattern in the complex form, because an assumption is that only the position where the accentual nucleus is located is specified.

By contrast, examples of covert dominancy do not show direct preservation of the accentual type. Instead, the dominating part of a non-simplex word results in an accentual pattern that is not the original accentual type of the determining component.

[11] Initial lowering is a tonal phenomenon in Japanese where a phrase-initial LH rise appears when the first mora is not accented (Selkirk and Tateishi 1988). The domain of initial lowering is viewed as a minor accentual phrase (or Minor Phrase, see Ito and Mester 2009). Initial lowering serves as cue of accentual preservation when the first member in non-simplex words is unaccented or ultimately-accented, and the second member is not initially-accented. In words with an unaccented first member like *Yamada-Masahiro* (a hypothetical Japanese name), the presence and the position of accent can be predicted by both accentual preservation or no preservation. In this case, *masahiro* is antepenultimately accented and *ma* undergoes initial lowering; therefore, it is proper to view it as that both the accentual types of members are preserved instead of other hypotheses.

[12] Whether or not initial lowering is applied is not the sufficient and necessary condition of being zero-dominant, neither is the necessary of being morphologically phrasal. Words starting with a heavy syllable, mostly a long vowel, is possibly pronounced with no initial lowering (Haraguchi 1977, Vance 1987). In this dissertation, I adopt the analysis in which initial lowering is viewed as a phonological phrasal tone (Kawakami 1961). When it appears within a morphological unit instead of the initial segments, I define it as zero-dominant. On the other hand, words without initial lowering within the word are not seen as non-phrase.

(29) Covert dominancy

a.	[funa'bashi]	+	[e'ki]	→	[funabashi' eki]
	船橋		駅		船橋駅
	'Funabashi'		'station'		'Funabashi station'
b.	[shibuya-]	+	[e'ki]	→	[shibuya' eki]
	渋谷		駅		渋谷駅
	'Shibuya'		'station'		'Shibuya station'
c.	[genki'n]	+	[furikomi-]	→	[genkin fu'rikomi]
	現金		振込		現金振込
	'cash'		'transfer'		'cash transfer'
d.	[denshin-]	+	[furikomi-]	→	[denshin fu'rikomi]
	電信		振込		電信振込
	'telegraph'		'transfer'		'wire transfer'

In (29), the second component of all examples determines the accentual type, (29a) and (29b) trigger an accent just before the second morpheme, and (29c) and (29d) trigger an accent located on the initial syllable of the second morpheme. Notably, the accentual pattern of the second morpheme is not directly preserved in the output. Unlike overt dominancy cases, the effect of covert dominancy can only be observed when comparing other non-simple words with the identical morpheme in the second position.

The distinction between overt dominancy and covert dominancy has been indirectly discussed, and some studies have regarded this as an unclarified issue. The literature on CAR that mentions this issue has been retroactive to Kubozono (1995, 1997). In these two papers, the term 'compound accent' has a slightly different indication, which is the notion of overt dominancy and covert dominancy. In the previous literature, overt dominancy had been viewed as an intuitive phenomenon where the accentual pattern of either or the element is preserved, whereas covert dominancy has been granted with different analyses. Kubozono's term for covert dominancy is 'boundary accent,' which is from the observation that the accent nucleus is near the morphological boundary.

Overt dominancy and covert dominancy cause free variations. They can coexist in one word synchronically, resulting in prosodic variations. [tama'go] (卵, 'egg') is an instance of coexisting dominancy. In (30), [tama'go] has two variational prosodies when it serves as the second component in a non-simple word according to *Sanseido Daijirin 2nd Edition.*

(30) Variations of overt and covert dominancy

[tama'go]　卵 'egg'

a. [na'ma] + [tama'go] → [nama ta'mago]

~ [nama tama'go]

生　卵　生卵

'raw'　'egg'　'raw egg'

b. [onsen-] + [tama'go] → [onsen ta'mago]

~ [onsen tama'go]

温泉　卵　温泉卵

'hot spring'　'egg'　'hot spring egg'

c. [i'ri] + [tama'go] → [iri ta'mago]

~ [iri tama'go]

炒り　卵　炒り卵

'fried'　'egg'　'fried egg'

Despite the difference in how dominant member reflects the accentual type of the determining morpheme, both overt and covert dominancy follows the accentual pattern the dominating morpheme assigns. In a theoretical framework such as OT, both overt and covert dominancy can be accounted for by a common universal constraint that is violated when the accentual pattern of the 'head' part is not preserved, but this constraint might

interact with another markedness constraint that requires an accent near the boundary. It is the constraints, if there are to compute compound accent, that are present in both overt and covert dominancy cases, and a dramatic operation of re-ranking is not needed to predict both cases separately.

2.3 Head and Dominancy

2.3.1 Head

Head might potentially be the most notorious notion that does not have an firmly-established definition in morphological literature. However, head is most likely to correlate with dominancy, namely, the directionality in non-simplex words. Huang (2017a, 2017b, 2018, 2020) has summarized that numerals and determiners cause left dominance and proposed that its unusual dominancy might be from the left-headed structure. This analysis assumes that determiners and numerals are left-headed in morphological structure. For instance, [ho'n koo] ('this school'), [ka'ku eki]('every station'), and [ichi'gyoo]('one row') are non-simplex words, in which the accent nucleus of the first constituent is preserved in the compound form. Huang (2017, 2018a) investigated words that begin with the first member in these words and concluded that these words are not right-dominant but left-dominant, by comparing them to words composed of the same first component and words with the same right component. Huang further proposed that these words have a left-headed structure because the left constituent of these words are mostly determiners and some of them are numerals that might have a unique status, which results in left dominancy.

Although this claim provides a strong motivation for left dominancy, the definition of head should be further elaborated.

The notion of 'head' is way more complicated than how to define a word. There are different means to test whether a component is head in compounds. The notion 'head' was first proposed in Bloomfield (1933), in which the notion 'head' is used to account for the distinction between endocentric compounds and exocentric compounds (Namiki and Kageyama 2016). The original notion of head proposed by Bloomfield is based on morphological and semantic considerations.

The categorical method is one of the approaches to determine the head. The basic assumption of the categorical view is that head in a given structure determines the category of a phrase (Williams 1981). Part of speech is one of the criteria for whether a component is head when the two components of a compound differ in part of speech. Williams' approach also proposed that all complex words including roots and affixes are in the scope of the assumption. This approach is illustrated again when I discuss the accentuation of roots and affixes in Tokyo Japanese. Many languages have a relatively consistent head position. For instance, English is known as a right-headed language, which indicates that the lexical category of the form, as a whole, matches that of its final constituent (Aronoff and Fudemann 2012:113). The consistent head position helps language users predict semantic information when they encounter a new word. In this sense, Japanese is analyzed to be right-headed, based on the observation of linguistic tests including a nonce word test

(cf. Kageyama 2009)[13]. When presented with a word composed of two elements that a language user has never encountered before, the belief is that she or he would take the explanation with the righthand side element as the head and predict the semantic information on the basis of it. The part of speech of non-simplex words also hints at Japanese right-headed structure. In (31), the morphological category of the first component varies. I observed that this language manifests by the second component categorically.

(31) Right-headed evidence by category in Japanese (Namiki and Kageyama 2016: 203)

a. naki-gao [cry-face] 'a tearful face'

b. huru-gao [old-face] 'an old face, an old member'

c. hen-gao [funny-face] 'a funny face intentionally disfigured to make people laugh'

d. doya-gao [see.how.I.did.it-face] 'a self-satisfied look'

e. ma-gao [serious-face] 'a serious look, a straight face'

f. yoko-gao [side-face] 'a profile, a side view of a face'

[13] Japanese compounds contain different syntactic and lexical categories. In Kageyama (2009)'s analysis, Noun-noun compounds are right headed while verb-noun compounds like *yude-tamago* ('egg-boiling') and *soo-kin* ('send money, transfer') could be left headed or right headed, depending on whether the compound is nominal or verbal.

The examples in (31) show a variety of categories of the first component, including verb, adjective, adjective-noun, prefix, and noun. Regardless of the variety, all words in (31) are categorically nouns, which is consistent with the category of the second member. Thus, I should be able to appropriately claim that Japanese is consistently right-headed in most cases. This claim does not indicate that Japanese 'only' has right-headed structure, although a pure categorist might prefer a single direction over suggesting that a diversity-headed structure exists in one language. Directionality of head position and its correlation to accentuation are discussed in the latter parts of this dissertation.

By contrast, a semantic approach has been proposed to judge headedness (Haspelmath and Sims 2013). For example, in compounds composed of two nouns, the distinction between the two is the relation between the meaning and categorical information of the compound (i.e., non-simplex words in this dissertation) and those of the two elements. If I assume that X and Y comprise a compound XY, then if XY is an instance of Y, XY is an endocentric compound because XY and Y shares the identical categorical information. By contrast, if XY is neither X nor Y but related to X and Y to some extent, XY is an exocentric compound (32).

(32) Endocentric compounds and exocentric compounds

a. endocentric compounds

strawberry (straw + berry) is an instance of berry (instead of straw)

bookshelf (book + shelf) is an instance of shelf (instead of book)

b. exocentric compounds

red skin (red + skin) is neither an instance of red nor skin

skinhead (skin + head) is neither an instance of skin nor head

Another category of compounds is copulative compounds (also called appositive compounds or coordinative compounds), in which the two elements equally contribute to the meaning of the compound. For instance, the word *owner-builder* is an instance of owner and also an instance of builder. Because there are more issues related to this coordinative structure, I first discuss the other two types of compounds. To distinguish endocentric compounds and exocentric compounds, a semantic test demonstrated in (32) can be applied.

Based on the semantic approach, if I focus on endocentric compounds—and assume two components A and B that form a compound—the head determines the semantic category of the word by their definition. If AB is one type of A, I can say that A is the head of the compound; if AB is one type of B, B is the head. With this semantic test, I can easily determine the semantic head in a 'general' compound.

The critical evidence of the relation between head and dominancy can be found in non-simplex words that possess a head-initial inner structure. Despite the many head-final structures in Japanese, some words are inevitably not right-headed:

(33) Head-initial non-simplex words and their accentuation in Tokyo Japanese

a.	[ho'teru]	+	[ikebu'kuro]	→	[ho'teru ikebu'kuro]
	ホテル 'hotel'		池袋 'Ikebukuro'		'Hotel Ikebukuro'
b.	[kare'tta]	+	[shiodome-]	→	[kare'tta shiodome-]
	カレッタ (store name)		汐留 'Shiodome'		'Karetta in Shiodome'

Using the semantic method to test headedness, the head of [ho'teru ikebu'kuro] ('Hotel Ikebukuro') should be the first component [ho'teru] rather than the second component [ikebu'kuro]. Although the categorical test of part of speech does not work critically because both components are nouns, a truism might be that [ho'teru ikebu'kuro] is not an instance of [ike'bukuro] but an instance of [ho'teru] ('hotel'), according to the semantic test, resulting in no ambiguity. Similar to (33a), [kare'tta shiodome-] comprises one building name that serves as the first component. The second member is a place name where the building is located. Using the same method, I observe that [kare'tta shiodome-] is not a right-headed non-simplex word such as [ho'teru ikebu'kuro]. In addition, the examples in (33) do not show right dominancy but zero dominancy, which implies that there should be a correlation between head position and dominance–subordination relation.

If a non-simplex word is right-headed and does not violate the constraint of prosodic length mentioned in the previous section or other constraints, I predict it will be right-dominant. By contrast, if a non-simplex word is not right-headed, which would theoretically contain two possibilities, either left-headed or neither, it is more likely to be not right-dominant, which also includes left-dominant or zero-dominant. As the definition that left dominancy only holds when the left component has the power to determine the accentual pattern than the right component as I stated in Section 2.2, the words in (33) are zero-dominant words.

However, for shorter left-dominant non-simplex words, no existing semantic category subsumes all left-dominant words including numerals and determiners. The semantic judgment encounters a problem when applied to words such as [ichi'gyoo] ('one row'). One question remains: Is [ichi'gyoo] an instance of [gyo'o] or an instance of [ichi']? For example, in a situation where someone is counting how many rows she or he has written and uttering [ichi'gyoo], the meaning would be likely to cause an inclination to [ichi'] instead of [gyo'o]. However, in a situation where someone is asked about the unit and the other answers [ichi'gyoo] instead of [ichi'moji] (一文字, 'one word'), [ichida'nraku] (一段落, 'one paragraph'), or responds with other units, the inclination might be [gyo'o] instead of [ichi']. In either case, a semantic test might be an unreliable method to make that decision.

Alternatively, the categorical test that relies on part of speech or another morphological view seems to be valid. Huang (2018b) proposed a determiner-as-head hypothesis and suggested that determiners are left-headed, following the syntactic proposal

in Abney (1987). This proposal is based on the idea that morphological inner structure reflects the syntactic head-dependent structure and the assumption where determiners are heads. In this sense, determiners can be predicted in the same manner as the left-headed examples in (33). However, a problem would occur in numerals because no clear evidence demonstrates that numerals are left-headed. By contrast, studies mentioned that numerals have a right-headed structure, indicating that the classifier that serves as the right member is the head. This disperse of head position of determiners and numerals undoubtedly results in a theoretical dilemma and is related to theorical prediction in the framework of OT and in other phonological models. I assume that the compound accent in non-simplex words refers to head position, and this is realized as a universal constraint, For example, if a faithfulness constraint is violated when the accentual pattern of 'head' is not accessed overtly to an observable level, it might appear arbitrary because the so-called head is a semantic head in some cases but a categorical head in determiners. These views are summarized in (34):

(34) Head defined with various criteria:

categorical	Williams (1981)
syntactic	(e.g. Abney 1987 which views determiners as head)
semantic	Haspelmath and Sims 2013
mixed view	mixture of more than one of the other categories in (29)

Notably, a view without a purely determining factor such as the aforementioned points of view is unequal to estrangement toward the fact. Mixed views have been proposed in the literature. Arnoff and Fudeman (2012) adopted a mixed view of the definition of head, that is, assorted with semantics and category. Other factors such as morphological features have also been considered (Scalise, Fábregas, and Forza 2009, Fábregas and Masini 2015). A criterion consistently used to decide head that is dependent on duplicability and eliminates arbitrariness and subjectiveness is required.

This question remains: How does directional dominance, which determines accentual type and headedness, interact? As aforementioned, an explanation for the left-dominant non-simplex words collected in Huang (2017a, 2017b, 2018) might require more than a single perspective and theoretical framework. In other words, dominancy in non-simplex words might contain multiple factors, interacting with the main morphological or phonological effects. One of the main effects should be the categorical or morphological factor, which can be proven in right-dominant words and determiners assumed to be left-headed. For numerals, what is unnecessary is to postulate headed status based on what determines have. Alternatively, the reason why numerals are left-dominant can still be the headedness, and its left-headedness might be from semantics. If I assume that headedness includes multiple factors rather than one factor, a reasonable result would also be that the head of some frequently used words or words out of a special lexical group might be determined by semantics. This kind of head is called ‘morphological head’ because it is neither a purely semantic head, a categorical head, nor a phonological head, despite the

deep correlation with prosody. To prove the hypothesis above, I review the [ho'teru] examples:

(35) Head-initial non-simplex words and their accentuation in Tokyo Japanese

a.	[ho'teru]	+	[ikebu'kuro]	→	[ho'teru ikebu'kuro]
	ホテル 'hotel'		池袋 'Ikebukuro'		'Hotel Ikebukuro'
b.	[kare'tta]	+	[shiodome-]	→	[kare'tta shiodome-]
	カレッタ (store name)		汐留 'Shiodome'		'Karetta in Shiodome'

In the definition that might be able to test the headedness proposed in Williams (1981), head would encompass the categorical information of the word in an upper structure containing the head component. However, in (35), both words are composed of two nouns; thus, a morphological category (here, i.e., part of speech) is no longer a valid cue for that decision. To judge the headedness, a cinch would be that the first morpheme in these words is the semantic head, by using the aforementioned semantic test. [ho'teru ikebu'kuro] is one type of [ho'teru] instead of [ikebu'kuro], and [kare'tta shiodome-] is one type of [kare'tta] instead of [shiodome-]. The example implies that the semantic approach could be vital in dominancy determination, and it manifests the pluralistic nature of the notion 'head.'

2.3.2 Interaction between head and dominancy

Thus far, I have introduced dominancy and the notion 'head.' Dominancy in Tokyo Japanese does not hold independently; instead, it is believed to interact with head. Notwithstanding the absence of a clear statement on morphological structure, many studies have made a basic assumption that only the accentual pattern of the right component should be considered in compound accentuation (e.g., McCawley 1968, Poser 1990, Alderete 1999, 2001, Kubozono 1995, 1996, 1997, 2001, Tanaka 2001). Except for Alderete's work where affix accentuation, which is left-dominant-orientated, is discussed, most other studies have focused on right-dominant non-simplex words.

In regard to the theoretical analysis of dominancy, a constraint-based model is used (Kubozono 1995, 1997, 2001, Tanaka 2001). Faithfulness constraints are violated when 'N2,' namely, the second noun, does not preserve its accentual position or presence in the output form. This analysis has resulted in several debatable issues. First, the existence of left dominance and zero dominancy has been neglected. Thus, in most studies, left-dominant non-simplex words such as numerals and determiners, and zero-dominant words such as longer non-simplex words were silently excluded. Some works have focused on either; for example, Kubozono et al. (1997), who discussed zero dominancy and claimed that zero dominancy (i.e., 'phrasal accent' in this study) originates in second morphemes with a longer prosodic length that exceeds two feet. However, these studies did not compare zero-dominant non-simplex words with other non-simplex words on the same foundation of the compounding process. Second, the constraint in those studies is

faithfulness that requires the accentual pattern of the output form to be faithful to N2. In other words, only non-simplex words with a noun–noun structure are assumed. Notably, even if the second morpheme is not a typical noun, the accentual pattern can be predicted, which I address later. Many of these studies did not directly mention 'head.' Poser (1990b) focused on Japanese compounds with some specific affixes called 'Aoyagi prefixes' and concluded that Aoyagi prefixes are not as other 'nominal modifiers' in general compounds, which indirectly indicated that compounds are right headed. Ito and Mester (2007: 99) also generalized compound accent as '[the] accent on the first (non-head) member is lost,' despite the lack of further investigations or follow-up of the definition of 'head.' I might appropriately assume that the aforementioned studies might covertly take a view of a compound accent with the notion 'head' in a categorical sense, such as that proposed in Williams (1981), because the constraint takes an absolutely directional view and only refers to the accentual pattern of the right component. The constraint also corresponds to the basic idea of the righthand head rule proposed in Williams (1981):

(36) Righthand Head Rule

In generative morphology, the righthand head rule exists in languages that always assign the rightmost morpheme in a morphological structure as the head.

The righthand head rule has strong empirical grounds and correctly predicts head position and morphophonological or morphosyntactic function in words. Similar to English,

Japanese is said to be a right-headed language, which follows the righthand head rule (e.g., Selkirk 1982, Di Sciullo and Williams 1987, Namiki 2001, Tokizaki 2011). Additionally, the righthand head rule makes incorrect predictions in some data in languages such as Italian (Scalise 1992) or Vietnamese (Lieber 1980), and the righthand head rule cannot predict the prosodic directionality (i.e., dominancy) in non-right-dominant non-simplex words, which is why the definition of head does not only rely on categorical information but should also contain other information such as semantic information.

Thus far, I have introduced three types of dominancy—right, left, and zero—and the following three types of head-dependent structure in a non-simplex word can be assumed: right-headed, left-headed, and headless (or double-headed). Theoretically, there are nine possible combinations if each dominancy matches one head position. Nevertheless, the correlation between the two factors seems to not be a one-to-one correspondence. Because headless or double-headed structure is addressed further in Chapter 4, I now focus on the two structures with one and only one head.

Right-headed non-simplex words are typically right-dominant. Notably, this generalization is based on the premise that the second component, namely, the head, according to the assumption here, does not exceed the critical length. Regarding the critical length, Kubozono et al. (1997) argued that four morae are the critical points. If the second member in a non-simplex word exceeds four morae or two feet, the whole word would take a phrasal accent instead of a word accent. A phrasal accent preserves both accentual patterns of elements. Therefore, this type of accent has zero dominancy in my terminology.

If the observation is true, the generalization of the correlation between head and dominancy can be summarized as in (37):

(37) Generalization of the accent of right-headed non-simplex words

a. Short second member (which does not exceed two binary feet or four morae)

[kyo'oto]	+	[daigaku-]	→	[kyooto da'igaku]
京都 'Kyoto'		大学 'university'		京都大学 'Kyoto University'
[tookyoo-]	+	[daigaku-]	→	[tookyoo da'igaku]
東京 'Tokyo'		大学 'university'		東京大学 'Tokyo University'

b. Long second member[14]

[kyo'oto]	+	[bunka ka'ikan]	→	[kyo'oto bunka ka'ikan]
京都		文化会館		京都文化会館
'Kyoto'		'cultural hall'		'Kyoto cultural hall'
[tookyoo-]	+	[bunka ka'ikan]	→	[tookyoo bunka ka'ikan]
東京		文化会館		東京文化会館
'Kyoto'		'cultural hall'		'Tokyo cultural hall'

[14] Besides the length factor discussed here, the accentual type of non-simplex words with larger prosodic length might also be correlated with branching constraints. See Kubozono et al. (1997), Ito and Mester (2007) for further detail.

In (37), if the second component exceeds the critical length, the accentual pattern becomes the zero-dominant type, where both accentual patterns of components are preserved regardless of the presence or position of accents. The reader might think that the example of [tookyoo bunka ka'ikan] in (37b) seems controversial in the context of the aforementioned statement. However, this example does show ambiguity because the first component [tookyoo-] is unaccented. The only difference between a right-dominant 'Tokyo cultural hall' and a zero-dominant version is that zero dominancy forms an accentual boundary between two components to preserve both accentual patterns. This boundary allows and sometimes causes initial lowering on the first syllable of the second morpheme. In other words, the first syllable of the second component [bun] in [tookyoo bunka ka'ikan] can be realized with either a high tone or a low tone, although initial lowering is optional in some conditions where words begin with a heavy syllable (Haraguchi 1977, Pierrehumbert and Beckman 1988, Kubozono et al. 1997). However, for a right-dominant word, there is no accentual boundary in-between two components. The boundary cannot be observed in [tookyoo da'igaku] because the first syllable of the second component is originally accented. Right-dominant words such as [nama tama'go] (生卵, 'raw egg') might illustrate this. The first syllable of the second component [ta] in [nama tama'go] is an obligatorily a high tone. Initial lowering cannot be applied, which illustrates the difference between right-dominant words and zero-dominant words.

2.4 Accentual transfer

One main claim in this chapter is that an accent of non-simplex words can mostly be predicted by its head position. The literature has pointed out constraints that preserve the accent nucleus of the right constituent in Japanese, and the right constituent is the head in most non-simplex words because Japanese non-simplex words are head-final in most cases, namely, right-dominant. By contrast, non-simplex words with a left-headed structure tend to preserve the accent nucleus of the left member, namely, left-dominant. The aforementioned analysis is summarized in (38):

(38) Head-dominancy summary

	Constituent determining the accent	*Head position*
Right-dominant	Right	Right
Left-dominant	Left	Left

An expectation might be to observe a correspondence between the constituent that determines the accentual type of a compound and its head position. If a non-simplex word is right-headed, the right constituent is then predicted to determine the accentual type of the complex output.

However, the explanatory power of the aforementioned analysis remains restricted to a small number of words in which the head constituent does not determine the accentual

type of the compound. In these cases, the head constituent does not determine the final accent directly and somehow yields its determining power to the other constituent (39):

(39) Comparison of three types of dominancy

Right-dominant	*Left-dominant*	*Accentual transfer*
[hama'matsu] + [e'ki]	[ka'ku] + [e'ki]	[hama'matsu] + [cho'o]
→ [hamamatsu' eki]	→ [ka'ku eki]	→ [hamamatsu' choo]
浜松駅	各駅	浜松町
[ogawa-] + [e'ki]	[ka'ku] + [cho'o]	[ogawa-]+ [cho'o]
→ [ogawa' eki]	→ [ka'ku choo]	→ [ogawa choo-]
小川駅	各町	小川町

[e'ki] (駅, 'station') is a pre-accenting morpheme when it is the second morpheme of non-simplex words. When [e'ki] is the morphosyntactic head of a non-simplex word, the accent nucleus comes to the syllable right before the second constituent and the accentual type of the left constituent does not play any role in accentual determination. By contrast, when [e'ki] is combined with a typical determiner [ka'ku] (各, 'every'), it would become the dependent in its morphosyntactic structure, which is the reason why the accent

nucleus does not come to the second mora [ku] that is right before the second constituent but to the first mora [ka], because the accent of the head constituent [ka'ku] is preserved.

Unlike right-dominant words and left-dominant words, [cho'o] neither preserves its accent nor shows the identical pattern despite its headedness. Although [cho'o] is the morphosyntactic head in these words, the accent of these non-simplex words is determined by the presence of an accent of the left constituent. This disagreement between head position and the constituent that determines the accent is called 'accentual transfer' because the head constituent might still have the power to determine the accentual type, but it merely refers to the accent of the other constituent. [hamamatsu'choo] and [ogawa choo-] are not left-dominant cases, although on the surface of these two words, the accentual characteristics of the left constituent is referred. If these two words are left-dominant, words starting with [hama'matsu] and [ogawa-] would be predicted to be antepenultimate and unaccented. However, [hamamatsu' eki] and [ogawa' eki] remain right-dominant. Thus, the notion of accentual transfer would be necessary to account for this observation in this paper. There are other examples, such as [cho'o] cases.

(40) Accentual transferring cases

a. [mono’] ~ [mono-] もの

i. [nomi’] + [mono’] → [nomimo’no] ~ [nomi’mono] 飲み物

ii. [tabe’] + [mono’] → [tabemo’no] ~ [tabe’mono] 食べ物

iii. [nori-] + [mono’] → [norimono-] 乗り物

b. [ya] 屋

i. [kutsu’] + [ya] → [kutsu’ya] 靴屋

ii. [ame-] + [ya] → [ameya-] 飴屋

c. [cho’o] 町

i. [ogawa-] + [cho’o] → [ogawachoo-] 小川町

ii. [hama’matsu] + [cho’o] → [hamamatsu’choo-] 浜松町

Accentual transfer can be viewed as an effect caused by recessive morphemes. So-called dominant morphemes and recessive morphemes are widely observed in many languages. In many morphological studies, dominant affixes have been defined as affixes that delete the accent nucleus or other phonological material in the base, and recessive affixes are affixes that concatenate without deleting the accent from the base (Inkelas 1998). However, accentual transfer should be differentiated from the notions ‘dominant morpheme’ and ‘recessive morpheme,’ although accentual transfer could also be viewed as one dominance effect. Examples of accentual transfer in (40) can also be viewed as that

of [cho'o], as a recessive morpheme, but this analysis does not mention the head-dependent status of a non-simplex word. In other words, a morpheme that triggers accentual transfer might also be defined as a recessive morpheme that is the head constituent in word-formation. If I assume that all non-simplex words are binary in terms of the inner structure and composed of constituent α and constituent β, the head-dominant correspondence can be summarized as in (41):

(41) Head-dominant correspondence

	Constituent determining the accent	*Head position*
Right-dominant	β	β
Left-dominant	α	α
Accentual transfer	α	β
	β	α

Thus far, the cases of accentual transfer are simple to generalize: the head constituent, usually the right member, triggers accentual transfer and refers to the other constituent. If the referee is accented, the compound is accented; if not, the compound is unaccented. In other words, the value of the presence of an accent is correspondent. This fact is similar to the accent of adjective and verb conjugations. As aforementioned, complex words and compounds might follow the same CAR in Tokyo Japanese. The conjugation suffix in Japanese usually refers to the accent of the base stem in (42):

(42) Accent of conjugation suffixes in Japanese

a. [tabe’] + [ru] → [tabe’ru] 食べる ‘eat (infinitive)’

b. [mage-] + [ru] → [mageru-] 曲げる ‘bend (infinitive)’

c. [uma’] + [ku] → [u’maku] うまく ‘deliciously’

d. [ama-] + [ku] → [amaku-] あまく ‘sweetly’

Based on the definition that head is the constituent that determines the syntactic category of the compound, the suffixes in (42) are all in the head position. In the same manner as non-simplex nouns, these suffixes refer to the first constituent and result in an output form with the same accent feature ([+accent] or [-accent]) as the accentual transferee.

Unlike right-dominant and left-dominant words, the accent position of accented accentual transfer is identical. For example, in verb conjugation, accented infinitive verbs always have the same accented position. Not every syllable can be accented. Noun cases such as [cho’o] also have a fixed accented position:

(43) Tentative generalization of accentual transfer

Assume a non-simplex word x is composed of two constituents: the dependent α and the head β. β is an accentual transfer morpheme.

If α is accented, x is accented. Otherwise, x is unaccented.

The generalization in (43) can be accounted for by positing a faithfulness constraint that requires the accent feature to have the same value, either [+accent] or [-accent]. However, this account encounters a problem in the examples in (44) and (45):

(44) [ta'ra] たら '(conditional suffix in Japanese)'

a. [mage-] + [ta'ra] → [mage ta'ra]

b. [tabe'] + [ta'ra] → [ta'be tara]

c. [ne-] + [ta'ra] → [ne ta'ra]

d. [nagare'] + [ta'ra] → [naga're tara]

(45) [shi] 氏 'clan'

a. [ono-] + [shi] → [ono'shi]

b. [u'ra] + [shi] → [u'ra shi]

c. [yoshida-] + [shi] → [yoshida' shi]

d. [mu'raki] + [shi] → [mu'raki shi]

In (44), the examples have been viewed as examples where a recessive suffix is attached to a verb stem. These suffixes 'lose its[their] accent if attached to an accented root' (Kawahara 2015: 468). In this traditional point of view, [ta'ra] is an initial-accented morpheme that loses its accent when the verb stem is accented (Alderete 1999, 2001,

Kurisu 2001). The examples in (45) show the so-called recessive pre-accenting morphemes, but these examples cannot be explained in a manner that is used to account for the examples in (44), because the accentual nucleus of the first member is preserved rather than shifted to another syllable like the examples in (44). It can be assumed that [shi] is potentially pre-accented and that the pre-accenting accent only occurs when attached to an unaccented stem. However, these examples have to be regarded as exceptional cases that differ from the accentual transferring cases, because of the disagreement of the featural value of the accent. In (44) and (45), unaccented stems do not result in unaccented output in the complex form, which differs from the accentual transferring examples.

These examples can be explained by the same account of accentual transfer. Compared with the examples of the accentual transferring cases, these examples have mainly two elements in common: First, in terms of head position, the examples in (44) and (45) are right-headed based on the definition used in previous sections that head is the constituent that determines the syntactic category of the non-simplex word. Second, the accentual type of these non-simplex words only shows two patterns regardless of the various accent positions.

A question remains: Can the accentual transferring examples and the examples in (44) and (45) be analyzed with the same generalization? A possibility is that accentual transfer cases do not require the value to be the same in the accentual feature, but just a morphological template that refers to the presence of accent of non-head constituent and assigns it a specific accentual pattern. In that case, the generalization could be revised:

(46) Generalization of accentual transfer

Assume a non-simplex word x is composed of two constituents: the dependent α and the head β. β is an accentual transfer morpheme. γ and δ are accentual patterns assigned by the lexical information in β.

If α is accented, x = γ. Otherwise, x = δ.

The difference between the generalization in (46) and the aforementioned generalization is whether a constraint that requires the same value of accentedness is posited. In other words, this generalization does not predict the cases with an accentual transferring head to be either accented or unaccented. This generalization only predicts that the accentual type of words with an accentual transferring morpheme correlates to the presence of an accentual nucleus of the referred element. This constraint that requires the same value of accentedness is absent because of the following reasons: First, a group of constraints that refer to the accentual position of the head constituent has been proposed to predict many right-dominant non-complex words (e.g., Kubozono 1995, Tanaka 2001). However, because these constraints only examine at accentual pattern of the head constituent (also called N2 in some studies, as mentioned in the previous section), it is not valid to account for accentual transfer cases. Of course, a possibility is to propose a new constraint that refers to the accentual type of the non-head constituent and asks for correspondence of presence of accent. However, cases that can be predicted are limited.

Some other constraints that refer to the accentual type of the non-head constituent but result in fixed accentual patterns should be proposed to explain the examples in (44) and (45).

Instead, these accentual transfer examples might be the result of morphological templates, and the accentual type might be from their lexical information stored in speakers' mental lexicon. The evidence might be the small number of accentual transfer cases. In present-day Japanese, right-dominant cases are the most common, followed by left-dominant cases. The number of accentual transfer cases is extremely low. Among the accentual transfer cases, they all refer to the accentual status of the non-head constituent and show two accentual patterns according to the presence of an accent of the non-head constituent, and the assigned accent position varies from morpheme to morpheme. Thus, a reasonable proposal might be that this information is lexical.

This section attempted to account for the accent of non-simplex words based on the head-dominancy correspondence. By analyzing the head position and accentual transfer, non-simplex words including words with an affix can be categorized into three groups: left-dominant, right-dominant, and accentual transfer. Using this categorization, various accentual types of compounds and words with affixes can be generalized. This study also examined various types of accentual transfer cases that also showed different accentual patterns. A finding was that the presence of an accent of the constituent that receives the determining power of accent and the non-simplex word is not always correspondent. A revised generalization that abandons the correspondence of accent presence was proposed in (46). Unlike left-dominant and right-dominant, accentual transfer is likely lexical in

terms of the grammar because of its small number in the lexicon. Except for the accentual transferring cases, the accent of other words could mostly be predicted by the head position, which indicates that the predictability of head-dominancy correspondence remains high. Furthermore, the analysis in this study that used head-dominancy correspondence can be applied to not only compound words in a morphosyntactic sense but also complex words.

2.5 Summary

In this chapter, the definition of head and the notion of dominancy used is reconsidered and elaborated with evidence. To create an interim summary, head should be defined with both categorical and semantic characteristics. For those cases that do not have an undebatable status to be defined as head such as numerals and determiners, they are assumed to be the semantic head. Alternatively, dominancy refers to the phenomenon in which one of the components in a non-simplex word overtly or covertly determines the accentual pattern of the non-simplex word. Overt dominancy indicates the dominancy in which the determining element preserves the accentual pattern. In overt dominant cases, presence of the position of the accent of the determining element remains unchanged in the complex form. By contrast, in covert dominant cases, the determining element determines an accentual pattern that differs from the accentual pattern of the determining element in the presence or position of the accent nucleus. Head and dominancy should be correlated according to the data; however, it should not be one-to-one correspondence because both left-dominant non-simplex words and right-dominant non-simplex words become zero-

dominant when the dominating part exceeds the critical prosodic length, which is proposed to be two feet or four morae.

In addition to the three types of dominancy, there is one type of accentual phenomenon where the determining element transfers the determining power to the other element. As a result, the accentual pattern of these cases seems to be determined by the other element. By enumerating and analyzing words with an identical element, I observed that the accentual pattern is not determined by the element in which the accentual pattern is inherited in the non-simplex word. Instead, the element that decides seems to transfer the accentual determination to the other element, resulting in accentual transfer. Accentual transfer is observed in some affix cases. However, separating affixes from other non-affix morphemes is unnecessary because some non-affix cases with bound morphemes exist, where accentual transfer can be observed, which is also consistent with the claim in the previous chapter that the explanatory scope of compound accent can be applied to both morphological compounds and complex words.

Chapter 3: Morphological Status and Prosodic Mapping

Chapter 2 suggested that prosodic dominancy interacts with the head in a non-simplex word, which is morphologically based. This also results in this fundamental question: Whether and how does prosody interact with morphosyntactic structure in a non-simplex word? As for whether prosody interacts with morphosyntax, the answer should be positive because morphological word structure plays a role in phonology, because 'the proper phonetic realization of morpheme sequences may depend, directly or indirectly, on their morphological structure' (Booij 2015: 111), and there are sufficient cases shown in previous chapters that the morphological head correlates with dominancy, which determines the accentual pattern of a non-simplex word. In this chapter, the question of how they correlate is addressed.

3.1 Models of morphological mapping

The idea that syntactic constituents are systematically made to correspond to phonological domains forms much of match theory, proposed in Selkirk (2009). This idea is a stronger assumption regarding mapping between phonology and adjacent fields like morphology or syntax, since the correspondence has been viewed as being violated. Evidence that morphological constituents systematically correspond to phonological domains can be found in many languages. However, the literature has reported that some

morphological words[15] in Tokyo Japanese, a pitch accent language, are not realized as prosodic words but phonological phrases, and vice versa. This dilemma is based on the basic assumption from the oft-cited criterion that every prosodic word can only have at most one accent. Constituents that have more than one accent are viewed as phonological phrases. I first consider the realization of a word and a phrase in phonology and morphology.

(47) Prosodic realization of morphological words

a.	[kansu’u]	関数	‘function’
b.	[nihon gi’nkoo]	日本銀行	‘Japan Bank’
c.	[ka’ku e’ki] ~ [ka’ku eki]	各駅	‘every station’
d.	[ze’n daito’oryoo]	前大統領	‘ex. President’

In (47), all are considered words instead of phrases in morphology. Except for (b), which is composed of the two free morphemes [niho’n] and [ginkoo-] and can thus be considered a morphological compound, the other three examples contain at least one bound morpheme; thus, it would be more appropriate to view them as complex words. (47c)

[15] The definition of a word is a fuzzy issue which can be judged by its semantic structure, morphological structure, speaker intuition, or phonology (Haspelmath 2011). I adopt the following criteria of a ‘morphosyntactic word’ which is summarized in Haspelmath (2011): Potential pauses, free occurrence, external mobility and internal fixedness, uninterruptibility, non-selectivity, non-coordinatability, anaphoric islandhood, nonextractability, morphophonological idiosyncrasies, and deviations from biuniqueness. This dissertation takes morpho-syntactic words and morphological words to be synonymous and does not distinguish the two.

contains the other frequently observed alternative form of [ka'ku eki]. Regarding prosody, (47a, b) contain one accent fall, and (47c, d) have two. This observation is a critical cue to decide whether they are prosodic words or phonological phrases, based on the following assumption made by Hyman (2005). Hyman (2005) summarized the typology of word-prosodic systems and claimed that the following two factors are generally observed universally:

(48) Two universal factors of word-prosodic systems (following Hyman 2006, 2011)

a. **OBLIGATORINESS**: every lexical word has at least one syllable marked for the highest degree of metrical prominence (primary stress).

b. **CULMINATIVITY**: every lexical word has at most one syllable marked for the highest degree of metrical prominence.

In the application of the criteria in (48) to a pitch accent language such as Japanese, obligatoriness requires every word to have at least one accent fall and culminativity constrains the number of accent nuclei and allows only one in a word. As mentioned in Chapter 1, Tokyo Japanese allows an unaccented word that violates obligatoriness. Notably, some languages such as Basque also have unaccented words (Elordieta 1997a, 1997b). However, this observation does not mean that obligatoriness does not work in these languages. Ito and Mester (2016) used a constraint, 'WordAccent,' which is violated when

a word does not contain an accent fall in their constraint groups to illustrate loanword accentuation in Tokyo Japanese and also successfully predicts unaccented loanwords by the ranking. By contrast, culminativity holds in Tokyo Japanese with less dispute in compound accentuation. Most studies of the compound accent in Tokyo Japanese are based on the basic assumption that a word can at most contain one accent nucleus, and that is the reason why either the left member or the right member loses its accent when two accented components are combined. Culminativity is also a cue for wordness. In the prosodic hierarchy proposed in Ito and Mester (2006), accent culminativity is the criterion to judge whether a prosodic unit is a prosodic word or phonological phrase. Prosodic words can only carry at most one accent, whereas phonological phrases do not have this limitation. With this criterion, the examples in (49) can be categorized into prosodic words and phonological phrases by the number of accents they contain, in (49):

(49) Prosodic words and phonological phrases

a. [kansuʼu] 関数 PROSODIC WORD

b. [nihon giʼnkoo] 日本銀行 PROSODIC WORD

c. [kaʼku eʼki] 各駅 PHONOLOGICAL PHRASE

d. [zeʼn daitoʼoryoo] 前大統領 PHONOLOGICAL PHRASE

Thus, a key question remains: What causes this difference between morphological words realized as prosodic words and those realized with phonological phrases? Based on a strict version of match theory, the optimal form of morphological words would be undoubtedly prosodic words.

Possible factors of the mismatch between phonological structure and morphological structure have been investigated from different points of view. Kubozono et al. (1997) and Ito and Mester (2007) have suggested the prosodic length of the second member of a compound is relevant. If the second member is more than four morae or two feet, it would likely be realized as phrasal. Their analysis is compatible with the analysis in the previous chapter, where zero dominancy was discussed.

Prosodic length as the only factor seems unlikely. The morphological status also plays a role in this mapping gap (Kageyama 1982, Poser 1990). These studies implied that the first member is a prefix that belongs to a special category (e.g. Aoyagi prefixes) and would affect the accentual realization. If the first member is a so-called Aoyagi prefix, the word would be realized phrasally. The name of Aoyagi prefixes originates from prefixes that are listed in Aoyagi (1969) and analyzed later in Poser (1990b). Typical Aoyagi prefixes form an accentual boundary, which results in phrasal accent.

Another possible factor is the morphosyntactic structure of a non-simplex word (Shibatani and Kageyama 1988, Kageyama 1993). These studies have claimed that the morphosyntactic argument structure could cause a phrasal accent. For example, in ‘post-syntactic compounds’ (e.g., in the sense of Shibatani and Kageyama [1988]), phrasal

accentuation seems to be more likely to occur in conditions where a verbal noun[16], namely, a Sino-Japanese verbal noun predicate serves as the right component, and extra information such as tense suffix is added, as in (50):

(50) Word accent vs. phrasal accent of 'Europe-traveling' and its related words

a. [yooroppa-ryo'koo] ヨーロッパ旅行 'Europe-traveling'

b. [yooro'ppa o ryokoo chuu-] ヨーロッパを旅行中 'while traveling in Europe'

c. [yooro'ppa ryokoo chuu-] ヨーロッパ旅行中 'while traveling in Europe'

(50a) contains only one accent, and the first component [yooro'ppa] has lost its accentual pattern in the non-simplex word; thus, it is by definition stated above a prosodic word. The morphological status of (50a) is also a compound word. Therefore, this case is an example of a morphological word being realized as a prosodic word. By contrast, (50b) and (50c) show no semantic difference, and its appearance is such as that the example in (50c), which is merely a form in which the accusative particle [o] is omitted. Both words show two accentual falls in their domain; thus, they are phonological phrases instead of prosodic words. In this case, an argument could be that the example in (50b), a syntactic phrase, is also realized as phonological phrase. If I only examine (50a, b), a one-to-one

[16] A verbal noun is a noun that is formed from a verb in languages. Japanese has a nominal class which is called 'verbal noun class' (Martin 1975). Words in verbal noun class, such as *shutchoo* or *ryuugaku*, can take arguments and assign theta roles like a verb does (Uchida and Nakayama 1993).

correspondence should intuitively come to mind. However, Shibatani and Kageyama (1988) also posed a theoretical problem, which is the third example: the particle-omitted example. The difference between (50b) and (50c) is that (50b) shows a clear phrasehood. A typical syntactic phrase should be able to be intervened with other elements, and a morphological word cannot.

In (51a), adverbs can intervene in the position in-between the object and the predicate in one, but not in the other, which implies that (50c) might not be merely the derived form of (50b) (Shibatani and Kageyama 1988).

(51) 'While traveling in Europe'

a. [yooro'ppa o nonbi'ri ryokoo chuu-]

ヨーロッパをのんびり旅行中 'while traveling in Europe at leisure'

b. *[yooro'ppa nonbi'ri ryokoo chuu-]

*ヨーロッパのんびり旅行中 'while traveling in Europe at leisure'

The fourth factor that might result in phrasal accent is the head position of a non-simplex word (Huang 2017b, 2018). Left-headed non-simplex words such as *kaku-eki* (every station) can be realized as phrasal, such as [ka'ku e'ki]. The effect of the left-headed structure is frequently observed in cases where: **(i)** the first component is a left-headed structure that triggers element such as [ka'ku], [ichi'], [ho'n], and so forth, resulting in zero dominancy or left dominancy depending on its prosodic length, and where **(ii)** the second

component is any other morpheme instead of morphemes that cause dominancy competition (See Chapter 4 for further discussion).

All the aforementioned four factors partly account for the difference between the morphological form and phonological form, but I found no explanation of the primary reason why this gap occurs. This problem might be solved theoretically. For phrasal noun phrases, Kageyama proposed a new morphological category: Word^{+} (Kageyama 1993). This new category is a constituent assumed to exist between the phrase and word level and behaves such as a morphological word, but it is phonologically phrasal. The correspondence between morphology and phonology would be in a relationship, as in (52). In this case, the prosodic hierarchy in the righthand phonological side adopts that in Selkirk (2009, 2011a):

(52) Kageyama's Word^{+} and its corresponding hierarchy

SYNTAX		**PHONOLOGY**
PHRASE	—	PHONOLOGICAL PHRASE
WORD^{+}	—	PHONOLOGICAL PHRASE
WORD	—	PROSODIC WORD

The critical problems with the aforementioned analysis might be the circular reasoning problem and the predictability problem. The evidence of Word^{+} is from phrasal prosody, and it is there to explain why these words are phrasal. The reason why these words

are phrasal is related to the predictability problem, that is, the accentual type of a Word^{+} cannot be predicted because Word^{+} is a morphological category that behaves morphologically such as a word but has a different accentual type from a prototypical morphological word. Additionally, this account also cannot explain why a special category occurs between a word and a phrase instead of at other levels.

3.2 Prosodic hierarchy model in phonology

One theoretical solution to the gap is to make the one-to-one matching correspondence violable by using frameworks compatible with violable constraints such as OT. In OT, all constraints can be violated. The diversity of output and differences between languages are because of the different ranking of constraints. MATCH constraints require that an input be matched to the categories of the output form. MATCH constraints have variations. MATCH-XP-TO-φ (Ito and Mester 2013) is a constraint that has been used to explain morphology-prosody mapping. In the next sections, this idea is further explained.

The idea of violable constraints might be usable, but other possibilities might be worth consideration. Notably, no established theory has been proposed for prosodic hierarchy.

Before exploring the core issue of a mapping gap, I must mention that the notion of prosodic hierarchy has no common composition. Related theories can be divided into two types by whether there is another category between phonological phrases and prosodic words. In match theory, the correlation between syntax or morphology and phonology is

single. A syntactic category is mapped onto phonology with a corresponding category that is exclusive to other categories (Selkirk 1978, 1980, Nespor and Vogel 1986). This hypothesis is called the 'syntax-prosody mapping hypothesis (SPMH)' (Ito and Mester 2013). In SPMH, a prosodic word should be related to a syntactic category, and it is often defined as a morphological word, namely, a noun, verb, or adjective. By contrast, a phonological phrase is the corresponding category related to a syntactic phrase. The correlation between syntax and the prosody assumed in SPMH is shown in (53):

(53) Syntax-prosody mapping hypothesis

SYNTAX		**PHONOLOGY**
PHRASE (XP)	—	PHONOLOGICAL PHRASE
WORDS (N, V, A)	—	PROSODIC WORD

By contrast, some studies have claimed that a universal hierarchy in which phonological phrases dominates prosodic words might be insufficient to account for the Japanese pitch accent system (See Ito and Mester 2013). In terms of the possible categories that can be added, many early studies have made contributions to the new proposal of categories between phonological phrases and prosodic words (e.g., Martin 1952 and McCawley 1968, Poser 1984, Kubozono 1988, Pierrehumbert and Beckman 1988, Ito and Mester 2013). The name of the new categories varies by study, for example, major phrase, minor phrase, intermediate phrase, and accentual phrase.

Regardless of the name of the intermedial category between phonological phrase and prosodic word, posing a morphological category that corresponds with the intermedial prosodic category remains a challenge. For instance, if I assume a category minor phrase exists between phonological phrases (or 'major phrase' in studies adopting the category of minor phrase), the corresponding relation will be as in (54):

(54) Corresponding relation of prosodic hierarchy, assuming minor phrase

SYNTAX		**PHONOLOGY**
PHRASE (XP)	—	MAJOR PHRASE (PHONOLOGICAL PHRASE)
?	—	MINOR PHRASE
WORD (N, V, A)	—	PROSODIC WORD

In frameworks that adopt minor phrase, the definition of a minor phrase is usually defined as the domain of an initial lowering. Minor phrase is also viewed as the domain of accent culminativity, which allows at most one accent nucleus in the domain. Major phrase, by contrast, is viewed as the domain as downstep. [17]

Theoretically, there are solutions to solve the aforementioned problem. One solution is to assume an intermedial category such as minor phrase in prosodic hierarchy. However, Word^{+} does not seem to be embeddable because of the circular reasoning. As

[17] Initial lowering is a sufficient condition of being a Minor Phrase. Minor Phrase does not necessarily undergo initial lowering.

aforementioned, Word^{+} is proposed purely by its prosodic characteristic but without any independent evidence in syntax.

Another solution is to propose that minor phrase is an independent category that has no corresponding category in syntax. Selkirk and Tateishi (1988) used the perspective of neglecting the direct correspondence of minor phrase. Similar to Word^{+} proposed by Kageyama, the constraints claimed by Selkirk and Tateishi included the accent condition or ternary branching condition, to define minor phrase, and found that its corresponding categories in syntax are all phonological. As a result, they claimed that minor phrase has no strict correspondence with a specific morphological category, which differs from phonological phrase and prosodic word.

By contrast, Ito and Mester (2013) proposed a prosodic hierarchy that contains no intermedial category between phonological phrase and prosodic word. In this hierarchy, major phrase and minor phrase belong to the same category but with a different projection. The basic idea is that a prosodic category such as phonological phrase is recursive (Ito and Mester 2007, 2009a, 2009b). This idea is compatible with a stronger version of SPMH, claiming that the correspondence holds in hierarchy. The so-called major phrase is the maximal projection of a phonological phrase, dominating other minimally projected phonological phrases called minor phrases. Projection of phonological phrase is recursive and tree-structural. Because a head-dependent relation is assumed in branching, initial lowering can also be accounted for by this claim. The analysis in (55) is compatible with match theory, as in (56).

(55) Corresponding relation of prosodic hierarchy proposed by Ito and Mester

SYNTAX		**PHONOLOGY**
PHRASE (XP)	—	PHONOLOGICAL PHRASE
WORD (N, V, A)	—	PROSODIC WORD

(56) Match Theory

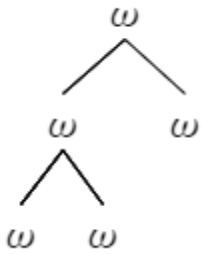
SYNTAX		**PHONOLOGY**
CLAUSE (CP)	—	PHONOLOGICAL CLAUSE
PHRASE (XP)	—	PHONOLOGICAL PHRASE
WORD (N, V, A)	—	PROSODIC WORD

Ito and Mester's proposal solves the problem of match theory and also accounts for where the difference between a minor phrase and a major phrase is from; however, this does not account for zero dominancy (i.e., phrasal accent) of morphological compounds. Ito and Mester proposed an explanation of phrasal compounds. Regarding the compound accent in Tokyo Japanese, Ito and Mester (2007) claimed that juncture accent is a valid cue to decide the status of Japanese compounds. Juncture accent only occurs in word compounds and is the means used to differentiate word compounds and phrasal compounds, as in (57). Notably, 'deaccenting,' in this case, means the accentual type of the first member has not remained in the compound.

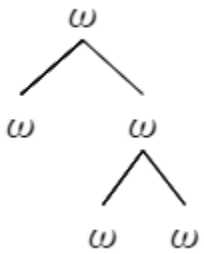
(57) Word compounds and phrasal compounds by Ito and Mester (2007)

a. word compounds

i. [hokengaisha ba’nare]



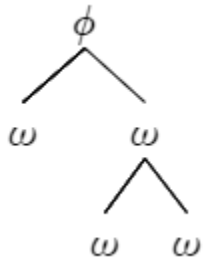
ii. [genkin fu’rikomi]



b. phrasal compounds

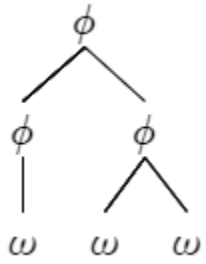
i. mono-phrasal

[hatsu kaoa'wase]



ii. bi-phrasal

[ze'nkoku kaisha a'nnai]



The difference between the leftmost word compound and the second word compound to the left is rendaku, which occurs in left-branching compounds. Both types of word compounds show junctural accentuation where the accent moves to the morphological boundary. By contrast, phrasal compounds can be divided into two types: mono-phrasal and bi-phrasal compounds. Mono-phrasal compounds deaccentuate the

accent of the first component and preserve the accentual type of the second component, whereas bi-phrasal compounds preserve the accentual pattern of both components.

Although a string of Ito and Mester's studies have demonstrated that there is no need to add a new category in SPMH and that there are compounds that show different characteristics; additionally, the compound analysis also results in several empirical and theoretical problems. First, the prediction of a prosodic structure of a given morphological word is almost impossible. The second problem is that SPMH would be challenged if the categorization of the compound is correct, because the examples in (57) are all morphological words instead of phrases. Nevertheless, morphological words such as [hatsu kaoa'wase] and [ze'nkoku kaisha a'nnai] are phonological phrases. Thus, why morphological words do not correspond to prosodic words remains an unanswered question.

3.3 Proposal for mapping with morphological complexity

Most studies have focused on the morphological characteristics and the prosodic forms of words. However, morphology might also play a role in accentual determination, as claimed in Chapter 2. In this subsection, I claim that morphological characteristics and morphological complexity should be considered in hierarchy. There are theoretically three morphological types of a morphological word: simplex words, complex words, and compound words. These three morphological categories might not map onto phonology in the same manner.

First, I examine the accent of the three morphological categories. In Japanese, the accent of simple words is lexical. Although there should be predictability of the accentual pattern to some degree in Japanese loanwords, there are exceptions. Loanwords are neither accented in all cases nor can always predict the accentual position by the so-called 'default accent rule' (e.g., Kubozono 1997, Kawahara 2015). Even if the accent of a part of loanwords can be predicted, the cues used to predict are their phonological—not morphological—structure, including syllabic structure or prosodic length. However, morphological simplex words do show the same tendency that all morphological simplex words are prosodic words, which could be distinct from the other two categories: complex words and compound words. Alternatively, complex words and compound words contain words realized as phonological phrases. Thus, I should be able to claim that morphologically simplex words absolutely correspond to prosodic words.

By contrast, most Japanese complex words and compound words (non-simplex words) follow CAR, and there is no clear evidence that Japanese prosody distinguishes between the two morphological categories. I assume that most non-simplex words belong to the same category. In this category, some words behave like simplex words in terms of accentuation, while the other words follow the typical compound accent rules. However, the difference between words that behave like simplex words and the other words cannot be generalized with their morphological category. Instead, the difference possibly comes from other morphological or phonological factors, such as frequency, syllabic structure, etc.

Notably, longer non-simplex words tend to be zero-dominant or phrasal. However, short non-simplex words can also be phrasal, as in the following examples. The argument that short non-simplex words can be phrasal does not deny that prosodic length plays a role in zero dominancy, but it should be less critical than the other factors. Following Ito and Mester (2007)'s definition, mono-phrasal compounds are a minimal phonological phrase and prohibit more than one pitch fall in the domain, namely, accent culminativity. In other words, non-simplex words are assumed to correspond to phrasal compounds. For example, in [yakooba'su], this non-simplex word is composed of two free morphemes [yakoo-] (夜行, 'night') and [ba'su] (バス, 'bus'); because it is a non-simplex word that corresponds to phonological phrasal, it is realized as a mono-phrasal compound [yakoo ba'su]. Some might argue that [yakooba'su] might also be analyzed as a word compound because [ba] is a syllable at the morphological boundary. However, [ba] is also the original accent position of [ba'su]; thus, it can also be viewed as preserving the original accentual pattern of [ba'su]. Regardless of the explanation, both lead to the same accent position. In other words, a word like [yakoo ba'su] can be a word compound or a mono-phrasal compound because the critical criterion to distinguish these two categories does not contribute. Nevertheless, if I assume [yakoo ba'su] is a word compound, SPMH is violated again, which also requires an explanation.

Another piece of evidence that shows the multiple explanatory possibilities of complex words and compound words is that some syntactic phrases such as postpositional

phrases are not phonologically phrasal. For instance, particle phrases in Tokyo Japanese are not ‘phonological phrases’ by the traditional definition, as in (58):

(58) Particle phrases and their prosodic forms in Tokyo Japanese

a. locative prepositional phrase[18]

[ie’] + [de] → [ie’de]

家 ‘house’ で -LOC 家で ‘house-LOC’

[ho’teru] + [de] → [ho’terude]

ホテル ‘hotel’ で -LOC ホテルで ‘hotel-LOC’

[daigaku-] + [de] → [daigakude-]

大学 ’university’ で -LOC 大学で ‘university-LOC’

b. nominative prepositional phrase

[ie’] + [ga] → [ie’ga]

家 ‘house’ が -NOM 家が ‘house-NOM’

[ho’teru] + [ga] → [ho’teruga]

ホテル ‘hotel’ が -NOM ホテルが ‘hotel-NOM’

[daigaku-] + [ga] → [daigakuga]

大学 ‘university’ が -NOM 大学が ‘university-NOM’

[18] LOC=locative; NOM=nominative

(58a) and (58b) demonstrate two types of prepositional phrases and their accent in Tokyo Japanese. Every example contains a noun on the left side and a particle on the right side. The accentual pattern of the first component, namely, the noun, is preserved in the output form. There are two possible means to account for the accentuation, based on the theoretical framework posed in Chapter 2: assume that these prepositional phrases are right-dominant and that the particles in these examples undergo accentual transfer, accessing the accentual pattern of the first component, or assume that these words are left-dominant. Because some particles show clear right dominancy where the accentual pattern of a particle is preserved such as [ma'de] (まで, 'until') or complex particles are combined with two particles such as [de'wa] (では, and then a topicalized locative particle), it is difficult to imagine that headness transfers particle to particle or that head position is changed by adding another particle[19]; thus, accentual transfer might be preferred. Regardless of which theoretical account should be used, these examples are typical syntactic phrases. None of these examples, however, is phonologically 'phrasal' by the traditional definition. If I adopt the traditional definition of phonological phrases and prosodic words, I would be forced to resolve two major problems: morphological words that are phonological phrases, and syntactic phrases that are prosodic words. However, the composition of the theoretical account becomes intuitive if I accept the idea of mono-phrasal and adapt it to the aforementioned examples. Thereby, prepositional phrases are

[19] Particle phrases with [de'wa] have two accentual variations according to an individual survey done by the author. For example, [otoko'] + [de'wa] could be either [otoko'dewa] or [otoko de'wa].

mapped onto phonology as mono-phrasal compounds, which preserves the accentual pattern of either component. SPMH does not have to be violated in this example, either.

Otherwise, a one-to-one correspondence of a word between morphology and phonology is assumed. Information of morphological complexity is accessed in mapping between morphology and prosody and also in accentual computation. Every non-simplex morphological word is assumed to be mapped as a phonological phrase because of its morphological complexity, whereas every simplex morphological word is mapped as a prosodic word. That is, in this framework, only simplex morphological words are prosodic words by default.

The accentual type of particle phrases is determined by particles in Tokyo Japanese. For example, [ma'de] is another locative particle which means 'until' and triggers initial accent. Examples with [ma'de] are accentual transfer of right dominancy when the modifier is unaccented and zero dominancy when the modifier is accented. The accentual type also corresponds to the head position because particles determine grammatical case.

(59) [ma’de] and their prosodic forms in Tokyo Japanese

a. [ho’teru] + [ma’de] → [ho’teru ma’de]

ホテル ‘hotel’ まで -LOC ホテルまで ‘hotel-LOC’

b. [daigaku-] + [ma’de] → [daigaku ma’de-]

大学 ’university’ まで -LOC 大学まで ‘university-LOC’

On the other hand, the genitive particle [no] shows multiple conditioned accentual transfers. In most cases, particle phrases are realized as mono-phrasal which is defined above, and the accentual type of the modifier noun is preserved. However, when the modifier is two mora long and ultimately accented, [no] is realized with a high tone:

(60) [no] and their prosodic forms in Tokyo Japanese

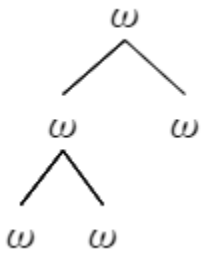
[ie’]	+	[no]	→	[ie no-]
家 ‘house’		の -GEN		家の ‘house-GEN’
[kaki-]	+	[no]	→	[kaki no-]
柿 ‘persimmon’		の -GEN		柿の ‘persimmon-GEN’
[ka’ki]	+	[no]	→	[ka’ki no]
牡蠣 ‘oyster’		の -GEN		牡蠣の ‘oyster-GEN’
[ho’teru]	+	[no]	→	[ho’teru no]
ホテル ‘hotel’		の -GEN		ホテルまで ‘hotel-GEN’
[daigaku-]	+	[no]	→	[daigaku no-]
大学 ’university’		の -GEN		大学まで ‘university-GEN’

Now, I review examples of word compounds and phrasal compounds.

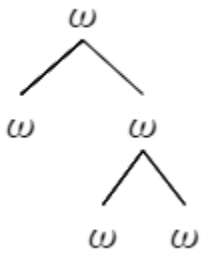
(61) Word compounds and phrasal compounds by Ito and Mester (2007) (=57)

a. word compounds

i. [hokengaisha ba'nare]



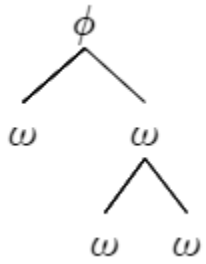
ii. [genkin fu'rikomi]



b. phrasal compounds

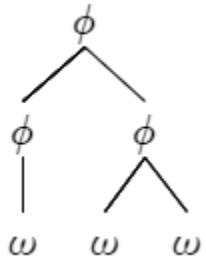
i. mono-phrasal

[hatsu kaoa'wase]



ii. bi-phrasal

[ze'nkoku kaisha a'nnai]

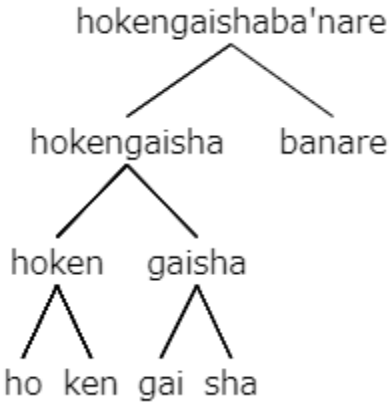


In (61), the difference between the word compound and phrasal compound has two aspects according to Ito and Mester (2007): first, it seems that only word compounds undergo rendaku, but phrasal compounds never undergo rendaku, even when the branching structure allows it to occur; and second, junctural accent is only observed in word compounds. In Ito and Mester (2007)'s assumption, rendaku and junctural accent are both

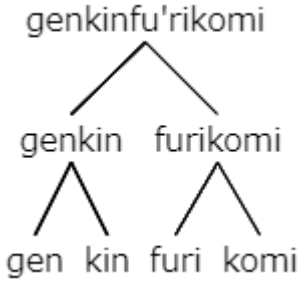
assumed to occur in word compounds instead of phrasal compounds. Notably, non-simplex words are treated as one category, in contrast to the simplex words in Chapter 2. In addition, all non-simplex words are mapped as phrasal compounds as the default, according to the aforementioned argument. Regarding the word compound examples in (61), [hoken gaisha ba'nare] and [genkin fu'rikomi] are non-simplex words. Both words are composed of two words that are also complex, as in (62):

(62) Morphological structure of the examples

a. [hoken gaisha ba'nare]



b. [genkin fu'rikomi]



The problem is how to account for rendaku and junctural accent and the unprecise prediction of these words that are supposed to be mono-phrasal. For rendaku, many studies have pointed out that the process of rendaku might not be phonological but lexical (e.g., Kawahawa 2015a, Vance 2017). Rendaku is also known for its narrow applicability because it only occurs in a part of native words and a small number of words in other lexical strata. A possibility is that rendaku is a phonology-based allomorph selection instead of a productive phonological rule-based phenomenon (See Navins 2010 for further information on phonology-based allomorph selection and Kawahara 2015a for problems in the analysis rendaku as a productive process). Recent studies such as Zamma and Asai (2017) and Asai (2018), on the other hand, showed that rendaku is significantly applied in both existing words and pseudo words in surnames, but most items were native words or native-like pseudo words.

Rendaku also interacts with the accent to some extent. The literature has reported that words that undergo rendaku tend to be unaccented, and words where rendaku does not occur tend to be accented (Sugito 1965, Zamma 2005, Yamaguchi 2011). However, this interaction might only be observed in some limited cases. In other words, rendaku only occurs only in a small number of words in one specific lexical stratum, and the correlation between rendaku and accent is not well-proved.

The domain of rendaku is another issue. Rendaku is known to occur within a prosodic word (Ito and Mester 1986, Kubozono 2005), and has never been observed in a phonological phrase. In this sense, rendaku is more like a subset to prosodic words, because

rendaku only occurs in a prosodic word but a prosodic word does not necessarily undergo rendaku. Furthermore, being a prosodic word is not a necessary and sufficient condition of being a morphological word. A prosodic word might be a syntactic phrase with a particle such as [ho'teru ga] (ホテルが, 'hotel'SUBJECTIVE). Thus, rendaku is not a valid cue to decide morphological wordness.

If rendaku is an invalid cue to decide wordness, [hoken gaisha ba'nare] can be viewed as a mono-phrasal compound instead of a word compound because the accentual pattern can also be interpreted as that the accentual pattern of the second component [ha'nare] is preserved. Whether a word undergoes rendaku or not is an independent argument from wordness. A mono-phrasal compound can also undergo rendaku. Returning to the intriguing question of how [genkin fu'rikomi] 'becomes' prosodic words (based on my assumption that all non-simplex words are mapped as phonological phrases as default), one possible reason that accounts for words like [genkin fu'rikomi], considering that the absolute SPMH holds and these words are originally mapped as phonological phrases, might lie in the characteristic of the accent these words possess. Words like [genkin fu'rikomi] are still right-dominant because [fu'rikomi] assigns an accent to [fu] in other non-simplex words such as [denshin fu'rikomi] or [kyuufukin fu'rikomi]. The accent in [genkin fu'rikomi] might not be the product of the right component but is assigned by other prosodic processes such as default accent, because [furikomi-] is an unaccented word. Therefore, 'preservation' of the accentual type it is theoretically impossible. A possibility is that components without an accent are more likely to undergo an accent assignment and

be re-projected as prosodic word. Different from unaccented second components, in non-simplex words where the second component is accented, its accent is preserved in many cases, as in (63), and is realized as mono-phrasal or bi-phrasal compounds:

(63) Words with an accented second component are more likely to be phrasal compounds

a. [tookyoo-]	+	[saibansho']	→	[tookyoo saibansho']
東京		裁判所		東京裁判所
'Tokyo'		'court'		'Tokyo court'
b. [sa'nkaku]	+	[kansu'u]	→	[sankaku kansu'u][20]
三角		関数		三角関数
'triangle'		'function'		'trigonometric function'

In (63), the first component of both examples loses its accent and the accent position of the second component is preserved, which implies that these words are mono-phrasal compounds.

Even [genkin fu'rikomi] is assumed to undergo an accent assignment or similar process, but there is still no explanation as to why it has to undergo this. [genki'n furikomi-], in which the accentual pattern of both components is preserved, is also a possible variation

[20] [sankaku ka'nsuu] is also a possible variation.

which does not violate any known constraints. The word is theoretically as possible as [kogi'tte doofuu-] (小切手同封, 'check enclosed') in terms of prosodic length. A possibility is that some particular words have less to do with phonology but might be related to the lexicon. For those frequently used words often accessed from the lexicon, language users might build rapid access to them. This frequency issue might correlate with the aforementioned prosodic factors. If a word has a second component that is unaccented, which means it cannot preserve the position and a higher frequency in actual language use, it is more likely to be realized as prosodic words, such as with simplex words. This perspective also accounts for other unaccented words or words with junctural accent where the second morpheme is unaccented. Another potential account for the difference between [genkin fu'rikomi] and [kogi'tte doofuu-] is that the accentual pattern of words that do not exceed a certain prosodic length would more likely contain one accentual nucleus compared to long words when these words have a similar morphological inner-structure such as a combination of a noun and a verbal noun, because prosodic length is correlated to the appearance of bi-phrasal accentuation in some cases (Kubozono et al. 1997). However, I will reject this hypothesis due to the reason that [furikomi-] and [doofuu-] do not show variation when they appear as the second member in a non-simplex word:

(64) Accentuation of [furikomi-] and [doofuu-]

a. [genki'n] + [furikomi-] → [geikin fu'rikomi]
現金 'cash' 振込 'transfer' 現金振込 'cash transfer'

b. [nyuugakukin-] + [furikomi-] → [nyuugakukin fu'rikomi]
入学金 'enrollment fee' 振込 'transfer' 入学金振込 'enroll transfer'

c. [kyuufukin-] + [furikomi-] → [kyuufukin fu'rikomi]
給付金 'benefits' 振込 'transfer' 給付金振込 'benefit transfer'

d. [genki'n] + [doofuu-] → [genki'n doofuu-]
現金 'cash' 同封 'enclosed' 現金同封 'cash enclosed'

e. [nyuugakukin-] + [doofuu-] → [nyuugakukin doofuu-]
入学金 'enrollment fee' 同封 'enclosed' 入学金同封 'fee enclosed'

f. [kogi'tte] + [doofuu-] → [kogi'tte doofuu-]
小切手 'enrollment fee' 同封 'enclosed' 小切手同封 'check enclosed'

Examples above show that non-simplex words with [furikomi-] and [doofuu-] do not show the same accentual pattern despite the same prosodic length and morphological structure. Furthermore, all words in (64) are composed of an accusative noun and a verbal noun. The difference is that words with [furikomi-] are mono-phrasal in the definition above, while words with [doofuu-] are bi-phrasal. These examples also support that being bi-phrasal is lexical.

Based on the information provided thus far, I can provide the following summary: The notions of word compounds and mono-phrasal and bi-phrasal compounds are adopted, except for the idea that rendaku is phonological. For non-simplex words whose second constituent is a pre-accenting morpheme, they are similar to simplex words in terms of prosodic mapping. The difference between being realized as a mono-phrasal compound or a bi-phrasal compound might come from the accentual information in the lexicon.

3.4 Case illustration

In this subsection, various types of words defined in a morphological sense are analyzed in the context of my proposal, including simplex words, complex words, and compound words.

3.4.1 Simplex words

Simplex words such as [ha'to] are assumed to be mapped as words in both the morphological and prosodic senses. In the assumption of this study, only words such as [ha'to] that cannot be separated into small units are mapped as prosodic words. The accentual type of simplex words is lexical, and information on presence and position (if there is an accent) is assumed to be stored in the mental lexicon of Japanese language users.

(65) Mapping of simplex words

a. [ha'to] 鳩 'pigeon' → [ha'to]

SIMPLEX WORD PROSODIC WORD

b. [tama'go] 卵 'egg' → [tama'go]

SIMPLEX WORD PROSODIC WORD

c. [amerika-] アメリカ 'America' → [amerika-]

SIMPLEX WORD PROSODIC WORD

d. [kan-] 勘 'sense; tuition' → [kan-]

SIMPLEX WORD PROSODIC WORD

3.4.2 Complex words

Next, I discuss complex words.

(66) Mapping of complex words

a. [ka'n] + [su'u] → [kansu'u]

関 'door' 数 'number' 関数 'function'

bound morpheme free morpheme Mono-phrasal compound

b. [ji'n] + [gu'u] → [jingu'u]

神 'spirit; god' 宮 'shrine' 神宮 'shrine'

bound morpheme bound morpheme Mono-phrasal compound

The word [kansu'u] in (66a) is a complex word composed of a bound morpheme [ka'n] and a free morpheme [su'u]. Despite being controversial and ambiguous in many Sino-Japanese cases regarding whether a morpheme is bound or free, [su'u] is defined as a free morpheme because it can occur as an independent morphological unit in the following examples. The judgment in this case uses *Sanseido Daijirin 2nd Edition* to assess whether a word can be independently used.

(67) [su'u] (数, 'number') (*Sanseido Daijirin 2nd Edition*) [21]

a. [riyo'osha-no su'u-wo kazoe'ru]
   利用者の 数を 数える
   User-POSS number-ACC count
   'count the number of users'

b. [su'u-ni akaru'i]
   数に 明るい
   Number-DAT bright
   'good at numbers'

[21] POSS=possessive, ACC=accusative, DAT=dative.

Notably, even a non-free morpheme such as [ka'n] has a lexical accent. Notably, many Sino-Japanese bound morphemes have a lexical accentual type. This type can be found in Japanese dictionaries that contain accentual information. However, not all bound morphemes have a lexical accentual type. I can neither find the accentual type of [ko], which serves as a prefix meaning 'tiny,' nor how to pronounce [o], the honorific prefix, in a dictionary. Due to the aforementioned reasons, I might appropriately assume that [ka'n] has its lexical accent despite its morphological status as a bound morpheme. [kansu'u] is a non-simplex word; thus, it would be mapped as a phonological phrase according to the theoretical mapping assumptions in the previous section. The evidence is that the accentual type of [su'u] is preserved. Although words like [kansu'u] can also be explained by the junctural accent that comes to the syllable to the right of the boundary; notably, in a four mora word, the boundary accent usually comes to the syllable left of the boundary instead of the right.

The aforementioned examples are mostly words with an initially-accented second morpheme, because this is the most typical and clear evidence of being realized as mono-phrasal compound. However, neglecting the number of pre-accenting morphemes and deaccenting morphemes is impossible, and in particular for the cases where the second component does not exceed two morae.

(68) Lexical unaccentedness

a.	[to'o]	+	[kyo'o]	→	[tookyoo-]
	東 'East'		京 'capital'		東京 'Tokyo'
	bound morpheme		bound morpheme		word compound
b.	[ke'n]	+	[kyu'u]	→	[kenkyuu-]
	研 'enhance'		究 'reserach'		研究 'research'
	bound morpheme		bound morpheme		word compound

These unaccented words share common features: They relatively have no transparent meaning, and most are frequently used words in modern Japanese. I claim that these words are lexicalized and not represented as complex in the mental lexicon and—of course—in morphology. Because a compound accent is morphology-driven, once a word is not complex in morphology, the status of morphological complexity also changes. As a result, these lexicalized words are realized as a 'prosodic word compound' in phonology.

3.4.3 Emerging accent

By contrast, the compound words in (69) are morphologically complex. However, these words do not seem to be realized as phrasal; instead, they should be word compounds. Thus, this question remains: Why are these apparently morphological complex words not mono-phrasal? The reason might be because the second morpheme in these words has no

original accent to be preserved. Thereby, an emerging accent is assigned to a junctural syllable. Junctural accent is frequently observed in all lexical strata. As for tendency, it is more often to be found in native words and Sino-Japanese words than loanwords.

(69) Non-simplex words with an unaccented second component

a. [tookyoo-] + [daigaku-] → [tookyoo da'igaku]
   東京 'Tokyo' 大学 'Univeristy' 東京大学 'The Univ. of Tokyo'

b. [denshin-] + [furikomi-] → [denshin fu'rikomi]
   電信 'wire' 振込 'transfer' 電信振込 'wire transfer'

In Tokyo Japanese and Sino-Japanese, four mora words are observed to be more likely to be unaccented (Ogawa 2004, 2006). Therefore, the number of the examples in which the second morpheme is unaccented shown in (69) is large. If the second morpheme of a non-simplex word is an accented word, the accentuation would preserve the accentual pattern of the second component, as predicted even when the second component is a Sino-Japanese word, resulting overt right dominancy, as in (70):

(70) Sino-Japanese non-simplex words with an accented second component

a.	[i'se]	+	[jingu'u]	→	[ise jingu'u]
	伊勢		神宮		伊勢神宮
	'Ise'		'shrine'		'Ise Shrine'
b.	[me'iji]	+	[i'shin]	→	[meiji i'shin]
	明治		維新		明治維新
	'Meiji (era)'		'restoration'		'Meiji Restoration'
c.	[ka'n-i]	+	[saibansho']	→	[kan-i saibansho']
	簡易		裁判所		簡易裁判所
	'simplified'		'court'		'simplified court'

3.4.4 Zero-dominant non-simplex words

The last cases in this section are zero-dominant cases where both accentual patterns of the components are preserved. As mentioned in Chapter 2, zero dominancy is correlated with non-right-headedness. Because the accent of both components is preserved, and there is more than one accent in a single domain, zero-dominant words should be analyzed as bi-phrasal compounds. By adopting the mapping model mentioned in previous sections, which is based on SPMH, proposing any operation regarding the mismatch between a 'morphological word' and a 'phonological phrase' is unnecessary. Instead, this case should

be the simple case where non-simplex words correspond to phonological phrases. No categorical change should be posed in this case.

(71) Zero-dominant cases

a. [ka'ku] + [e'ki] → [ka'ku e'ki]
   各 'every' 駅 'station' 各駅 'every station'

b. [ho'teru] + [chi'ba] → [ho'teru chi'ba]
   ホテル 'hotel' 千葉 'Chiba' ホテル千葉 'Hotel Chiba'[22]

3.5 Summary

Under the view proposed in this chapter, the effects of prosodic length, lexical status of exceptional prefixes, and head position are factors that might result in bi-phrasal accentuation instead of 'phrasal accent,' because all non-simplex words are supposed to be phrasal as their default type. Mapping between morphology and prosody follows the principle of SPMH. Last but not least, I claim that morphology should be considered. Morphological complexity is assumed to play a role in compound accentuation. The revised ranking where 'syntax' is substituted with 'morphology' is shown in (72):

[22] [ho'teru chi'ba] is a hypothetical name of a hotel.

(72) Proposed mapping model

MORPHOLOGY		**PHONOLOGY**
PHRASE	—	PHONOLOGICAL PHRASE
NON-SIMPLEX WORDS	—	PHONOLOGICAL PHRASE
SIMPLEX WORDS	—	PROSODIC WORD

Chapter 4: Dominancy and Head

Dominancy and head interact. Based on SPMH, I proposed a new mapping model (Chapter 3), where a one-to-one correspondence between morphology and phonology is made: simplex words are realized as prosodic words, whereas non-simplex words including complex words and compound words are realized as phonological phrases in principle. In this chapter, several issues regarding dominancy and head in Tokyo Japanese are discussed. In the first and second subsections, I address the dvandva non-simplex words and Japanese conjugations in the framework of dominancy and head proposed in the previous chapters. In Section 3, the opaque cases summarized in Kubozono (1998) are further analyzed. I will be demonstrating that most cases can be predicted by dominancy and head.

4.1 Dvandva non-simplex words

4.1.1 Preliminary

This subsection investigates the correlation between prosodic structure and the head-dependent structure of Japanese dvandva compounds. The goals of this section are to provide an accent description of dvandva compounds in Japanese and to analyze dvandva compounds with head-dependent structure. A new analysis with the coordinating feature **[+and]**, which forms the head together with the first component, is used to predict the accent of dvandva compounds

Chapter 2 demonstrated that dominancy has three types: *left dominancy*, *right dominancy*, and *zero dominancy*. The existence of zero dominancy implies that directional dominancy is not a required condition in non-simplex words. Antagonistically, only two types of head were discussed in Chapter 2: left-headedness and right-headedness. Thus, this question remains: Must headedness be directional in the same manner as dominancy?

4.1.2 Head of dvandva words

From the viewpoint of morphology, words with two heads or no head are also possible structures. A compound word composed of two or more members that function as heads is called a 'coordinate compound' or 'dvandva compound.' Again, the term 'compound' used in the literature of both morphology and phonology and is incompatible with the general definition of compound in morphology, which defines it as a word comprising two free morphemes. Therefore, in this chapter, I use the term 'dvandva non-simplex words' as a substitute for 'coordinate compounds' used in the literature, such as in Kageyama (1982, 2009), Namiki, and Kegaya (2016).

Dvandva non-simplex words are observed in Japanese and have various lexical categories. Regardless of lexical categories, dvandva non-simplex words have several features: first, the lexical category of left component should correspond to the lexical category of second component, and also to that of the dvandva non-simplex word; second, any member in dvandva non-simplex words should not have semantic preponderance. The

two components of dvandva non-simplex words should have an equal morphosyntactic category and semantic footing, as in (73):

(73) Dvandva non-simplex words should have an equal morphosyntactic category and semantic footing

a.	[yama']	+	[kawa']	→	[yama'#kawa][23]
	山 'mountain'		川 'river'		山川 'mountain and river'
	noun		noun		noun
b.	[yomi']	+	[kaki']	→	[yomi'#kaki]
	読み 'reading'		書き 'writing'		'reading and writing'
	verbal noun		verbal noun		verbal noun
c.	[hoso']	+	[naga'i]	→	[hoso#naga'i]
	細 'thin'		長い 'long'		細長い 'thin and long'
	adjective		adjective + adj. suf.		adjective
d.	[i'mi]	+	[kirau-]	→	[i'mi#kirau-]
	忌み 'hate'		嫌う 'dislike'		忌み嫌う 'hate and dislike'
	verb		verb		verb

[23] # shows the morphological boundary.

Verb and adjective cases are not discussed in this section because they involve conjugation. Because two components in non-simplex words are equal in morphosyntax and semantics, there might be two options to generalize them in terms of head: to claim there is no head in dvandva non-simplex words, or to claim that both components serve as heads. Comparing these two hypotheses, I observed that the former supporting no head is excluded because of the following two reasons: First, the aforementioned examples show high semantic transparency. Unlike typical headless or exocentric non-simplex words, the examples in (73) do not involve any metaphoric or metonymic process; the reason for this phenomenon is from a theoretical assumption that supposes every complex structure should have head, which is called 'omniheadedness:'

(74) Definition of omniheadedness (Hoeksema 1985, 1992: 121)

Omniheadedness: every complex structure has a head (overtly or covertly)

I now temporarily assume dvandva non-simplex words are double-headed. Based on a head-dominancy correlation where head in a non-simplex word determines the accentual pattern, both components should be dominant. This prediction is consistent with the observation of non-simplex words in (75):

(75) Dvandva non-simplex words where the accent of both components is preserved

a.	[doyo'o]	+	[nichiyo'o]	→	[doyo'o#nichiyo'o]
	土曜		日曜		土曜日曜
	'Saturday'		'Sunday'		'Saturday and Sunday'
b.	[che'ko]	+	[suroba'kia]	→	[che'ko#suroba'kia]
	チェコ		スロバキア		チェコ・スロバキア
	'Czech'		'Slovak'		'Czech and Slovak'
c.	[oosutora'ria]	+	[nyuujiira'ndo]	→	[oosutora'ria#nyuujiira'ndo]
	オーストラリア		ニュージーランド		オーストラリアとニュージーランド
	'Australia'		'New Zealand'		'Australia and New Zealand'

So-called double-headed non-simplex words seem to correspond to zero dominancy, where there is no outstanding component that overtly or covertly determines its accentual pattern. However, the dvandva cases show a directional preserving effect similar to left-dominant cases:

(76) Directional dominancy in dvandva non-simplex words

a.	[yama’]	+	[kawa’]	→	[yama’#kawa]
	山		川		山川
	‘mountain’		‘river’		‘mountain and river’
b.	[te’]	+	[ashi’]	→	[te’#ashi]
	手		足		手足
	‘hand’		‘foot’		‘hand and foot’
c.	[chichi’]	+	[ha’ha]	→	[chichi’#haha]
	父		母		父母
	‘father’		‘mother’		‘father and mother’
d.	[oya’]	+	[ko’]	→	[o’ya#ko]
	親		子		親子
	‘parent’		‘child’		‘parent and child’
e.	[eda-]	+	[ha’]	→	[eda#ha-]
	枝		葉		枝葉
	‘branches’		‘leaves’		‘branches and leaves’

f.	[yomi’]	+	[kaki’]	→	[yomi’#kaki]
	読み		書き		読み書き
	‘reading’		‘writing’		‘reading and writing’
g.	[iki-]	+	[kaeri’]	→	[iki#kaeri-][24]
	行き		帰り		行き帰り
	‘go’		‘return’		‘go and return’
h.	[toshi’]	+	[tsuki’]	→	[toshi’#tsuki]
	年		月		年月
	‘year’		‘month’		‘year and month’
i.	[a’sa]	+	[ban-]	→	[a’sa#ban]
	朝		晩		朝晩
	‘morning’		‘evening’		‘morning and evening’

In terms of accent, all the non-simplex words in (76) share one common feature: none of these words has more than one accent in its word domain, which means they are all counterexamples of the examples in (75). The accentual pattern of dvandva non-simplex words has been generalized in the literature. Kageyama (2009) and Namiki and Kageyama (2016: 213) have categorized dvandva non-simplex words into three types: holistic, relational, and separate-reference. For the separate-reference type, in which ‘each of the

[24] Another variation [iki’kaeri] is also observed.

coordinated elements has its own referent' such as *oyako* and *asaban*, the first component contains a high pitch and the second loses its accent. Their generalization points out left dominance; however, their generalization also leads to imprecision because the position of the accent is not mentioned. In addition, some of the aforementioned examples are not accented such as [edaha-], which implies that this analysis might have problems.

By contrast, Nishimura (2013) discussed the effect of syllabic structure and prosodic length in dvandva non-simplex words and claimed that Japanese dvandva compounds only preserve the accent position of the left component. Despite the detailed description of the accent of non-simplex words, head-dependent structure and its effect were not discussed. Next, I first generalize the aforementioned non-simplex words, present other examples to verify whether Nishimura (2013)'s generalization is correct and assess if there is directional dominancy. If his claim is correct, the implication is that short dvandva simplex words are not zero-dominant but left-dominant, which also needs to be addressed.

4.1.3 Where does the accent come from?

Several analyses can be used to predict the accent of dvandva non-simplex words: default accent rule, juncture accent, and left dominancy. These rules are not mutually exclusive; instead, they might predict the same position of the accent in some conditions. Their predictions are presented in (77):

(77) Prediction of each hypothesis in terms of accent

a. Default accent rule: a given word is accented, and its accent is located at the syllable that contains antepenultimate mora. If the word is shorter than three morae in total, the accent is on the first syllable.
b. Juncture accent: a given word has an accent that comes to the morphological boundary of two components, namely, the ultimate syllable of the first component or the initial syllable of the second component.
c. Left dominancy: a given word has an identical accentual pattern as the left component.

Counterexamples of the default accent rule are words in which accent is not on the syllable containing the antepenultimate mora, for instance, [edaha-], [ikikaeri-], and [a'saban]. In addition to the aforementioned examples, there are counterexamples such as [ku'roshiro] (黒白, 'black and white'), [yo'shiashi] (良し悪し, 'good and bad'), and [suki'kirai] (好き嫌い, 'like and dislike'), [a'mekaze] (雨風, 'rain and wind'). Many of these counterexamples are also the counterexample of juncture accent, including [edaha-], [ikikaeri-], [a'saban], [ku'roshiro], [yo'shiashi], and [a'mekaze]. Among the aforementioned examples, only [suki'kirai] can be predicted by juncture accent. However, juncture accent cannot predict which syllable should be accented, because two syllables could be accented.

Antithetically, left dominancy correctly predicts all the aforementioned case. An argument could be that the data collection shown here is biased. This argument is partly true because there is no dataset or corpus where words with dvandva structure are marked. However, as long as I have analyzed the data in studies such as Nishimura (2013) and Namiki and Kageyama (2016: 213), I should be able to appropriately claim that left dominance should be the most-promising hypothesis. Notably, claiming left dominance does not deny the other two hypotheses, because left dominance does not explain a small number of words. This issue is addressed later in this section.

Suppose left dominance holds and successfully accounts for the accent of dvandva non-simplex words, the question remains: Why does a structure that is supposed to be 'double-headed' result in left-dominant accentuation? If I accept that dominancy reflects head position, dvandva non-simplex words might not be double-headed. Regarding the prosodic presentation, dvandva non-simplex words show no differences when compared with the left-headed words in (78):

(78) Dvandva non-simplex words and left-headed compounds

a. Shorter dvandva non-simplex words

[yama’]	+	[kawa’]	→	[yama’#kawa]
山		川		山川
‘mountain’		‘river’		‘mountain and river’

b. Longer dvandva non-simplex words

[che’ko]	+	[suroba’kia]	→	[che’ko#suroba’kia]
チェコ		スロバキア		チェコ・スロバキア
‘Czech’		‘Slovak’		‘Czech and Slovak’

c. Shorter left-headed non-simplex words

[ka’ku]	+	[ji’n]	→	[ka’ku#jin]
各		人		各人
‘every’		‘person’		‘everyone’

d. Longer left-headed non-simplex words

[ka’ku]	+	[kenkyu’usha]	→	[ka’ku#kenkyu’usha]
各		研究者		各研究者
‘every’		‘researcher’		‘every researcher’

As shown in (78), dvandva non-simplex words and left-headed non-simplex words only preserve the accent of the left component when the total prosodic length does not

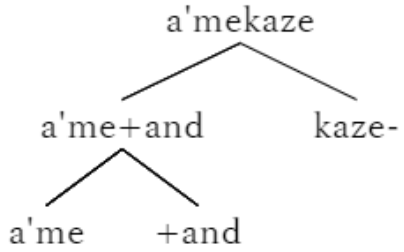
exceed four morae, according to the data. By contrast, when the prosodic length exceeds the critical length, both words become zero-dominant, preserving both accentual patterns, which results in a 'phrasal accent' in traditional terms. In other words, preserving both accentual types is insufficient to claim double-headness. If words with more than one accentual nucleus are all double-headed, longer right-dominant non-simplex words could also be 'double-headed' such as [niho'n hoosookyo'okai] (日本放送協会, 'NHK'). However, words like [niho'n hoosookyo'okai] cannot be double-headed according to the semantic and morphological views. This question remains: Which component should be viewed as the head in dvandva non-simplex words if they are not double-headed? Based on the omniheadedness principle, a belief is that dvandva non-simplex words have head. There are only two possibilities for single headedness: left or right. From the aforementioned data, dvandva structure seems to lead to left dominancy; thus, dvandva words could be left-headed. However, explanations are necessary for these two questions: Why does single headedness occur in a structure where two components are applicable for head? and Why does the left component instead of the right component determine its accentual pattern?

4.1.4 Coordinating feature

Regarding single headedness, a traditional definition provided by Bloomfield (1933) claimed that only one of the components can act as the head. Based on that claim, Bisetto and Scalise (2005: 327) claimed that the two components in a dvandva compound

are tied by the conjugation **[+and]**. Although Bisetto and Scalise (2005) continued to view both components as head from the viewpoint of semantics because of its coordinating relation, another possibility might be that the conjugation feature **[+and]** becomes the head.[25]

(79) Tree structure of a dvandva non-simplex word with an assumed feature [+and]

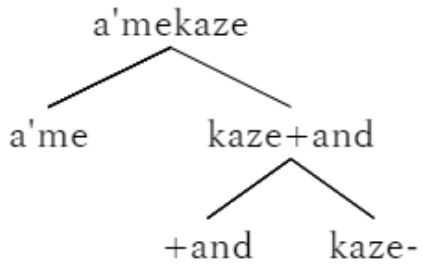


In this assumed morphophonological structure of [a'mekaze], an invisible semantic feature **[+and]** is attached to the left component, forming the head of a dvandva compound. This feature serves as the head, dominating the morpheme [a'me]. Because this semantic feature has no phonological form, it refers to the prosodic information of the dependent [a'me]. As a result, the word [a'mekaze] preserves the accentual type of the head branching [a'me].

[25] The [+and] feature assumed includes the semantic feature of *or* since Japanese dvandva compounds do not differentiate coordinate structure from exclusive disjunction. [ka'hi] ('yes-no') can be *yes and no* or *yes or no*.

Readers of this paper might doubt the position of the semantic coordinating feature **[+and]**. In this assumption, **[+and]** can be either in the right branch or the left branch in the bottom layer because this feature has been assumed to be the head regardless of its position. By contrast, another structure, as in (80), can also be assumed:

(80) Alternative tree structure of a dvandva [a'mekaze]



The reason why the alternative tree structure in (80) is not adopted is because this structure does not correspond to the implicit morphological structure of dvandva words, while the tree in (79) does. Suppose compounding corresponds to the morphosyntactic structure of a word, the non-simplex word [a'mekaze] can be viewed as being derived from [a'me to kaze] ('雨と風,' rain and wind). The omitted postpositional particle /to/ forms a boundary both in syntax and phonology. Thereby, the tree structure in which the coordinating feature is in the left branch could be more persuasive than that in (80). In other words, dvandva words have a single head instead of two heads, and the head is the first member attached to a coordinating feature **[+and]**. This supposition also clarifies

why dvandva non-simplex words show left dominance as left-headed non-simplex words.[26]

Additionally, dvandva non-simplex words never undergo rendaku, such as left-headed words (Otsu 1980, Kageyama 1982).

(81) Dvandva and left-headed words do not undergo rendaku

a. Dvandva non-simplex words

[ku'ro]	+	[shi'ro]	→	[ku'roshiro]	*[kuro'jiro]
黒 'black'		白 'white'		黒白 'black and white'	
[suki']	+	[kirai-]	→	[suki'kirai]	*[suki'girai]
好き 'like'		嫌い 'dislike'		好き嫌い 'like and dislike'	

b. Assumed left-headed non-simplex words

[hito']	+	[ka'ta]	→	[hito'kata]	*[hito'gata]
一 'one'		肩 'shoulder'		一肩 'assist'	
[ka'ku]	+	[kaisha-]	→	[ka'ku kaisha-]	*[ka'ku gaisha-]
各 'every'		会社 'company'		各会社 'every company'	

[26] Naya (2015) proposes a similar analysis in which the left member in coordinate compounds serves as a silent head. One example used in his paper is Austria-Hungary in English and Austria is the silent head that have 'phonologically null heads.' However, the definition of a phonologically null head is unclear.

The rendaku-blocking can be triggered by the coordinating feature. Rendaku is believed to originate from an ancient genitive particle (Vance 2005). By contrast, the coordinating feature indicates semantic content exclusive to rendaku's genitive feature. Thus, rendaku is blocked in dvandva structure. A minimal pair of a rendaku form and a word with dvandva structure supports this analysis:

(82) Minimal pairs that differ by rendaku and a coordinating feature

a. [yama'] + [kawa'] → [yama'kawa]

山 川 山川

'mountain' 'river' 'mountain and river'

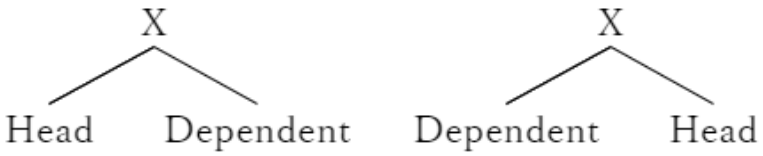
b. [yama'] + [kawa'] → [yamagawa-]

山 川 山川

'mountain' 'river' 'river in the mountain'

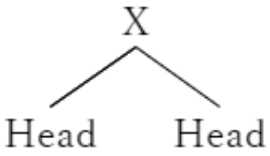
The most critical reason for rendaku-blocking is related to morphological head-dependent structure. The rendaku process only voices the first element of the head component in a noun compound (Sugioka and Ito 2002). This explanation is why only a right-headed structure undergoes rendaku, whereas a left-headed structure does not.

(83) Left-headedness and right-headedness



Evidence of rendaku also supports my hypothesis, which views dvandva compounds as left-headed structure. Suppose rendaku is a process that used to be phonological and productive, and now has become lexical and only applies to the head component. I would predict rendaku to occur in the dvandva structure if dvandva non-simplex words are double-headed, because double headedness subsumes the condition where the right component is the head, such as other right-headed non-simplex words in (84).

(84) The right component of a double-headed structure is a head that is supposed to be in the scope of rendaku application



To summarize this subsection, it has been demonstrated that head information in morphological inner structure is saliently reflected in prosody.

4.1.5 Frequency effect

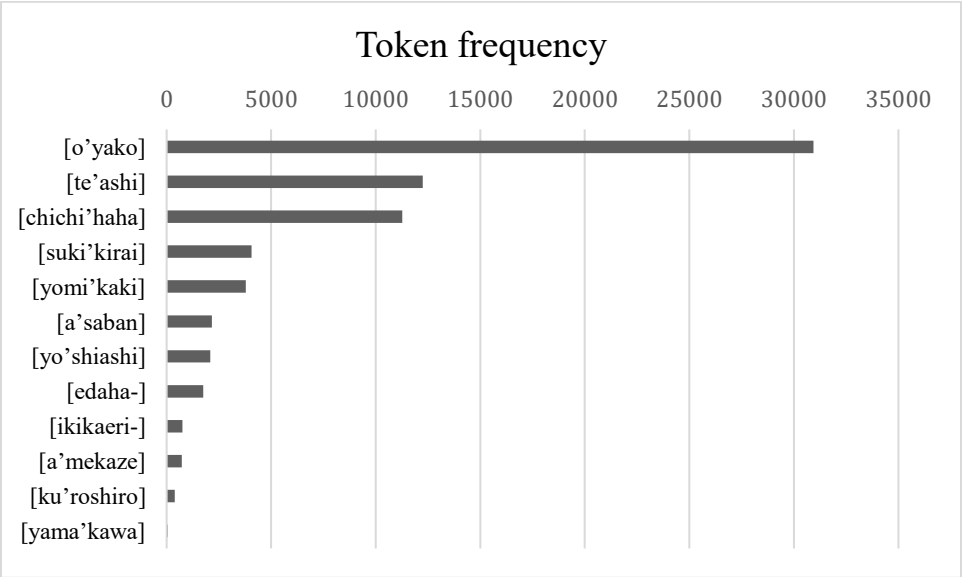
Thus far, the accentual type of the first member in dvandva words seems to determine the accent except for [o'yako], which requires a theoretical explanation. I now review the three proposals of 'compound accent rules' in (77). In the default accent rule, a given word is accented, and its accent is located at the syllable that contains antepenultimate mora, juncture accent, and left dominancy. Left dominancy fails to predict [o'yako]; likewise, juncture accent is also unable to explain this. The most possible account is that [o'yako] is assigned a default accent in Japanese. Despite the very few examples, which makes generalization more difficult, I can surmise that words like [o'yako] might be due to the frequency effect based on the hypothesis that frequent words are more likely to undergo the lexical process in which morphological complexity is omitted. In other words, words such as [o'yako] might be lexicalized and stored as one unit in mental lexicon because of their high frequency, and this is supported by the table in (85) where the frequency of each word is listed:

(85) Token frequency of native dvandva words (NINJAL-LWP for TWC, accessed on 11/15/2019)

Target word	*Token frequency*	*Target word*	*Token frequency*
[o'yako]	30943	[yo'shiashi]	2088
[yama'kawa]	44	[ikikaeri-]	749
[ku'roshiro]	380	[a'saban]	2167
[a'mekaze]	725	[yomi'kaki]	3787
[edaha-]	1749	[chichi'haha]	11272
[suki'kirai]	4058	[te'ashi]	12256

A quantitative survey of the correlation between frequency and accentual type of dvandva words is limited to the small number of existing native words that have a dvandva structure. Despite the insufficient sample size, the following chart shows that the frequency of [o'yako] is highest among all the items, which makes [o'yako] an outlier of the data.

(86) Token frequency chart of native dvandva words



Japanese also has Sino-Japanese dvandva words such as *kyoodai* (兄弟, 'siblings'), *shimai* (姉妹, 'older and younger sisters'), and *tenchi* (天地, 'sky and land'). The following examples show that Sino-Japanese dvandva words have much in common with native dvandva words: The accentual type of the first member in dvandva words is preserved, and rendaku is never applied to the second member.

(87) Sino-Japanese dvandva words and their accent

a.	[kyo'o]	+	[da'i]	→	[kyo'o#dai]
	兄		弟		兄弟
	'older brother'		'younger brother'		'brothers; siblings'
b.	[shi']	+	[ma'i]	→	[shi'#mai]
	姉		妹		姉妹
	'older sister'		'younger sisiter'		'sisters'
c.	[u']	+	[mu']	→	[u'#mu]
	有		無		有無
	'presence'		'absence'		'presence or absence'
d.	[te'n]	+	[chi']	→	[te'n#chi]
	天		地		天地
	'sky'		'land'		'sky and land; top and bottom'
e.	[chu'u]	+	[ya']	→	[chu'u#ya]
	昼		夜		昼夜
	'day'		'night'		'day and night'

f.	[jo'o]	+	[ge']	→	[jo'o-#e]
	上		下		上下
	'up'		'down'		'up and down'
g.	[na'i]	+	[ga'i]	→	[na'i#gai]
	内		外		内外
	'inside'		'outside'		'inside and outside'
h.	[sa']	+	[yu'u]	→	[sa'#yuu]
	左		右		左右
	'left'		'right'		'left and right'

However, Sino-Japanese dvandva words show a significant effect of syllabic structure (Ogawa 2006). The effect is especially observed when a word ends with a heavy syllable, or when the total prosodic length of a word is four morae (Ogawa 2004, Kubozono 2006, Ito and Mester 2015). A small number of Sino-Japanese dvandva words that are unaccented are also observed:

(88) Unaccented Sino-Japanese dvandva words

a.	[shi'n]	+	[hai-]	→	[shin#pai-]
	心		肺		心肺
	'heart'		'lung'		'heart and lungs'
b.	[shutu']	+	[ke'tsu]	→	[shuk#ketsu-]
	出		欠		出欠
	'attendance'		'absence'		'presence or absence'
c.	[u']	+	[mu']	→	[u'#mu]
	有		無		有無
	'presence'		'absence'		'presence'

Another issue is that the accentual type of some bound morphemes like *kyoo* are difficult to define because *kyoo* is not a free morpheme.[27] Bound morphemes like *kyoo* or *shi* in *shimai* tend to be pronounced with initial accent. Furthermore, Sino-Japanese words rarely undergo rendaku except for words containing morphemes like *kaisha* (会社, 'company') or *shoochuu* (焼酎, 'shochu'), e.g. *booeki-gaisha* (貿易会社, 'trading company'), *imo-joochuu* (芋焼酎, 'sweet potato shochu'). Thus, rendaku might be prohibited by lexical stratum and dvandva structure simultaneously.

[27] Most Japanese native speakers can still read these bound morphemes by character reading. Sino-Japanese morphemes are written by an independent writing system.

4.2 Opaque cases in Kubozono (1998)

In this subsection, examples in Kubozono (1998) that cannot be explained by the traditional account of CAR are discussed. Kubozono (1998) listed words that form a minimal pair —one is a prosodic word, and the other is a phonological phrase—by accent, with each other. Despite these few 'exceptions,' it is critical to verify whether the explanatory power of head dominancy enlarges and results in fewer exceptions than the traditional account. I will demonstrate that morphological head structure and prosodic dominancy hold for many exceptional cases.

4.2.1 Difference of second component

(89) [shinshintoo-] vs. [shinshi'ntoo]

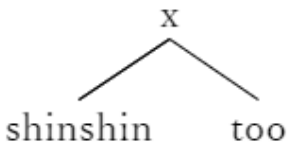
a. 新進党　[shinshintoo-]

b. 新新党　[shinshi'ntoo]

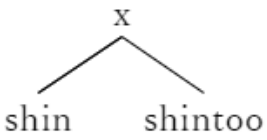
The first example of an exception is [shinshintoo-] (新進党) versus [shinshi'ntoo] (新新党). This question remains: Why do the two words have a different accent pattern despite ending with a deaccenting morpheme [to'o] (党, 'political party')? Notably, these two words differ in their morphological structure, respectively, in (90).

(90) Morphological structure of examples in (89)

a. 新進党　[shinshintoo-]



b. 新新党　[shinshi'ntoo]



In [shinshintoo-] (新進党) versus [shinshi'ntoo] (新新党), both are right-headed but have different second components: one has a deaccenting morpheme [to'o], and the other has a party name as its second member, named [shi'ntoo]. The first one is a covert dominant example, whereas the second one is an overt dominant case, where the accentual pattern of the head part is unchanged. Notably, many 'exceptional' cases in Kubozono (1998) are because of the different lexical assignments of second members. For instance, the examples in (91) are all various second members, which results in different accentual representation. The second member in (91a) is a pre-accenting morpheme meaning prefecture while it is a deaccenting morpheme in (91b).

(91) Other non-simplex words

a. 秋田県	[akita'ken]
b. 秋田犬	[akitaken-]
c. 満腹時	[manpuku'ji]
d. 万福寺	[ma'npukuji]
e. 自治会長	[jichika'ichoo]
f. 自治会会長	[jichi'kai kaichoo-]
g. 名古屋グランパス	[nagoya gura'npasu]
h. 名古屋グランパスエイト	[na'goya guranpasue'ito]

Likewise, the second morpheme of (91c, e) is a pre-accenting morpheme [ji] that serves as the second morpheme, and (91d) is an initially-accented morpheme that assigns the accent in the initial syllable of the 'word,' which functions in a larger domain than other initially-accented morphemes.

(92) Non-simplex words with [ji]

a. [manpuku'ji] 満腹時

b. [ma'npukuji] 万福寺

The examples in (92) have different second morphemes with the same segmental sequence [ji] one means ‘time’ and the other means ‘temple.’ Interestingly, non-simplex words ending with [ji] (‘temple’) are word-initially accented in most cases.

(93) Non-simplex words with [ji] (‘temple’)

a. [ko’oenji] 高円寺 ‘Koen Temple’

b. [ma’npukuji] 万福寺 ‘Manpuku Temple’

c. [to’odaiji] 東大寺 ‘Todai Temple’

d. [se’nsooji] 浅草寺 ‘Senso Temple’

[ji] (‘temple’) as the second morpheme triggers an initial accent in non-simplex words, and in present-day Japanese this morpheme is still productive. Since [ji] is the trigger of initial accentedness, words with [ji] are right-dominant. The question remains in which sub-category these words should be categorized. This morpheme does not seem to refer the accentual type of the first member.

(94) Words with [ji] (‘temple’) and its first member

a. [manpuku-] + [ji] → [ma’npukuji] 万福寺

b. [ankoku-] + [ji] → [a’nkokuji] 安国寺

c. [ko’ozan] + [ji] → [ko’ozanji] 高山寺

d. [ko’oki] + [ji] → [ko’okiji] 高貴寺

[ji] (‘temple’) triggers an accentual fall on the initial syllable of the word. Likewise, Kawahara and Wolf (2010) observed that [zu] triggers an initial accent in the root of the foreign lexical stratum in specific phonological environments.[28]

(95) Accent pattern of /zu/ (Kawahara 2015b: 472)

a. [raion-] + [zu] → [ra’ionzu] ライオンズ

b. [tonneru-] + [zu] → [to’nneruzu] トンネルズ

c. [okamoto-]+ [zu] → [o’kamotozu] オカモトズ

d. [heppoko-]+ [zu] → [he’ppokoozu] ヘッポコーズ

[zu], a suffix which is borrowed from the English plural suffix ‘s,’ has become productive in Japanese loanwords. Initial accentuation is triggered when this suffix is added

[28] As for the following discussion about this generalization, please also refer to Kawahara and Gao (2012) and Giriko et al. (2011).

to a foreign root. The examples of [zu] are right-dominant because [zu] predominates the accentual type in these non-simplex words.

Examples of [ji] and [zu] can by no means be explained by junctural accent, nor by preservation of accent of any member. An appropriate view would be that this pattern is a morphologically-assigned pattern by its lexical information, because both [ji] and [zu] do not seem to correlate with other phonological features such as the accentual type of adjacent members and syllabic structure.

Contrary to [ji] (‘temple’), [ji] (‘time’) is a typical preaccenting morpheme which triggers ultimate accent of the first member regardless of the accentual type of the first member, as seen in the following examples:

(96) Non-simplex words with [ji] (‘time’)

a. [manpuku’ji] 満腹時 ‘when being stuffed’

b. [enso’oji] 演奏時 ‘while playing’

c. [shinsa’ji] 審査時 ‘during examination’

d. [anna’iji] 案内時 ‘while guiding’

[manpuku-] and [ensoo-] are unaccented roots while [shi’nsa] and [anna’i] are accented roots. Despite the difference, all non-simplex words in (96) have an accent on the syllable before the second member.

Returning to the difference between [ji] for ‘temple’ and [ji] for ‘time’, their accentual assignment cannot be properly predicted unless lexical information is considered. Theoretically, viewing one as an exception while viewing the other as following the general compound accent rule is possible. By doing so, lexical information is hypothesized to be accessed in either of the two [ji].

4.2.2 Difference of head-dependent structure

(97) Right dominancy vs. zero dominancy[29]

a.	浦島ホテル	[urashima ho’teru]	
		LHHH HLL	Right-dominant
b.	ホテル浦島	[ho’teru urashima-]	
		HLL LHHH	Zero-dominant
c.	エリザベス・テーラー	[erizabesu te’eraa]	
		LHHHH HLLL	Right-dominant
d.	山口百恵	[yama’guchi momoe-]	
		LHLL LHH	Zero-dominant

[29] L=low tone, and H=high tone in this example.

e. 南部九州 [nanbu kyu'ushuu]

LHH HLLL Right-dominant

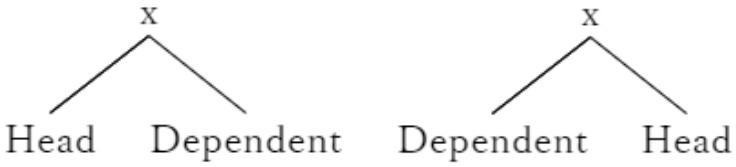
f. 九州南部 [kyu'ushuu na'nbu]

HLLL HLL Zero-dominant

In the examples in (97) are three pairs of right dominancy and zero dominancy. (97a, c, e) are right-dominant, and (97b, d, f) are zero-dominant. The head position also coincides with the dominancy. (97a, c, e) are right-headed, whereas the others are left-headed, resulting in zero dominancy. In other words, the accentual difference between (97a, c, e) and (97b, d, f) is because of the dominancy difference, which originates from its head structure in (98).

(98) Left-headedness vs. right-headedness

(97b, d, f) = the left and (97a, c, e) = the right



The accent of many cases in Kubozono (1998) can be accounted for by dominancy and head correlation. Notably, a few cases cannot be explained by the same framework

because these words do not have an apparently different head structure, and the difference in accent might originate from factors other than head dominancy, a topic that requires further research.

(99) Exceptional cases

	Right-dominant (X Y)	Zero-dominant (X) (Y)
a.	[sansha ka'idan]	[sa'nsha bontai-]
	三者会談	三者凡退
b.	[sedai ko'otai]	[shi'nkyuu kootai-]
	世代交代	新旧交代
c.	[kiokuso'o shitsu]	[jisin- sooshitu-]
	記憶喪失	自信喪失
d.	[chuusha i'han]	[sho'ohoo ihan-]
	駐車違反	商法違反
e.	[yukue fu'mei]	[shoosoku- fumei-]
	行方不明	消息不明
f.	[takeshi ji'isan]	[ta'keshi roojin-]
	たけし爺さん	たけし老人

4.3 Effect of prosodic length in the head-dominancy relation

Another intriguing problem is the asymmetric distribution of different dominancy types (mentioned in Subsection 4.1). Through the generalization made in the previous section, I found that the dominancy type changes along with the prosodic length, as in (100). Notably, dvandva non-simplex words are assumed to be left-headed because of the reasoning in Subsection 4.1.

(100) Prosodic length and dominancy

Shorter left-headed non-simplex words

a.	[yama’]	+	[kawa’]	→	[yama’kawa]
	山		川		山川
	‘mountain’		‘river’		‘mountain and river’
b.	[ka’ku]	+	[ji’n]	→	[ka’kujin]
	各		人		各人
	‘every’		‘person’		‘everyone’

Longer left-headed non-simplex words

c. [che'ko] + [suroba'kia] → [che'ko suroba'kia]

チェコ　　スロバキア　　チェコ・スロバキア

'Czech'　　'Slovak'　　'Czech and Slovak'

d. [ka'ku] + [kenkyu'usha] → [ka'ku kenkyu'usha]

各　　研究者　　各研究者

'every'　　'researcher'　　'every researcher'

Shorter right-headed non-simplex words

e. [kyo'oto] + [ga'su] → [kyooto ga'su]

京都　　ガス　　京都ガス

'Kyoto'　　'gas'　　'Kyoto gas'

Longer right-headed non-simplex words

f. [kyo'oto] + [bunkaka'ikan]→ [kyo'oto bunkaka'ikan]

京都　　文化会館　　京都文化会館

'Kyoto'　　'cultural hall'　　'Kyoto Cultural Hall'

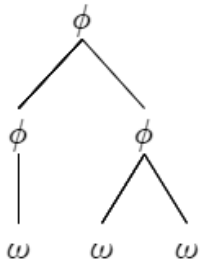
In (100), left-headed non-simplex words show left dominance, whereas right-headed words show right dominance. Interestingly, both left-headed and right-headed

words become zero-dominant, in which both accentual patterns of the components are preserved, when the dependent exceeds some length. However, this question remains: Why and in which condition is this dominancy change is triggered?

The critical length that triggers zero dominance, namely, bi-phrasal accentuation, has not received as much attention as other issues in compound accentuation. Kubozono et al. (1997) proposed that the critical length to trigger bi-phrasal accentuation is four morae or two feet, and Ito and Mester (2007) agreed with that. In (101), I review the bi-phrasal structure assumed in Ito and Mester (2007):

(101) Bi-phrasal structure assumed by Ito and Mester

e.g., [ze'nkoku kaisha a'nnai] (全国会社案内 'nationwide company information')



The mechanism of bi-phrasal realization results from the overlong second morpheme that exceeds the critical number of feet. Kubozono et al. (1997) claimed that when the second morpheme is two to three feet, its accentual pattern starts to variate.

(102) Bi-phrasal accentuation caused by exceeding the critical length

(Examples cited from Kubozono et al. 1997: 161)

a. [chiho'o] + [dantai-] → [chihooda'ntai]

地方 'local' 団体 'organization' 地方団体 'local organization'

b. [chiho'o] + [kookyooda'ntai] → [chiho'o kookyooda'ntai]

地方 'local' 公共団体 'authorities' 地方公共団体 'local authorities'

Once the second morpheme exceeds the critical length of three feet, it is much more likely to be bi-phrasal. In the example [ze'nkoku kaisha a'nnai], because the second morpheme contains four feet. Here, every Sino-Japanese character is viewed as a foot (Kurisu 2001, Ito and Mester 1996, 2015). A phrasal boundary between the second moprheme and the left morpheme comes along, which isolates the first member and results in bi-phrasal accentuation.

Notably, left-headed non-simplex words are absent in the discussion of the aforementioned studies. Left-headed words seem to have a stricter criterion for what is called critical length. For example, in the examples with [ho'n] as first morpheme, the critical length of triggering zero dominancy seems to be two feet.

(103) Zero dominancy in left-headed non-simplex words

a.	[ho'n]	+	[ka']	→	[ho'nka]
	本		科		本科
	'this'		'department'		'this department'
b.	[ho'n]	+	[ge'tsu]	→	[ho'ngetsu]
	'this'		'month'		'this month'
	本		月		本月
c.	[ho'n]	+	[ka'igi]	→	[ho'n ka'igi]
	本		会議		本会議
	'this'		'meeting'		'this meeting'
d.	[ho'n]	+	[happyo'osha]	→	[ho'n happyo'osha]
	本		発表者		本発表者
	'this'		'presenter'		'this presenter'

In (103), the examples show the asymmetric condition between left-headedness and right-headedness. Unlike right-headed structure, left-headed structure seems to be more sensitive to the number of feet: The critical length of being realized as zero-dominant for the former is three feet, whereas it is two feet in left-headed words.

The difference of critical length can be tackled with constraint-based account. First, I suppose that the optimal representation of a left-headed structure is left dominancy that

must preserve the accentual pattern of the head on left-hand side, and the optimal representation of a right-headed one is right dominancy, which in contrast, must preserve the accentual pattern of the right head. Now, there is head with N syllables and an accent in its initial syllable, and it is attached to a dependent with the number P of syllables. The following table virtualizes it with left-headed and right-headed structure, in which ○ denotes accent-unspecified mora, ● denotes accented mora, and | denotes the morphological boundary. D is the dependent of its inner structure. All morae in this case are assumed to have only a CV structure (i.e., without special mora).

(104) Virtualization of left and right-headedness with different values of N

	Left-headedness	*Right-headedness*
If N=1	a. ● | D	b. D | ●
If N=2	c. ●○| D	d. D | ●○
If N=3	e. ●○○ | D	f. D | ●○○
If N=4	g. ●○○○ | D	h. D | ●○○○
If N=5	i. ●○○○○ | D	j. D | ●○○○○
If N=6	k. ●○○○○○ | D	l. D | ●○○○○○

The distance of the accent to the word ends in left-headedness is the prosodic length of D. However, D does not affect the distance between the accent and the word-end in

right-headedness. By contrast, the distance between the accent and the word-end enlarges in left-headedness when D is longer. In other words, D is the common tolerance in this arithmetic progression when N is assumed to be fixed. The distance in the following chart indicates the number of syllables between the word-end boundary and accented syllable.

(105) Arithmetic progression (when N=2)

N=2	*Left-headedness*	*Distance*	*Right-headedness*	*Distance*
If D=1	●○|○	2	○| ●○	1
If D=2	●○|○○	3	○○| ●○	1
If D=3	●○|○○○	4	○○○| ●○	1
If D=4	●○|○○○○	5	○○○○| ●○	1
If D=5	●○|○○○○○	6	○○○○○| ●○	1

Additionally, Tokyo Japanese has an accentual constraint that leads to the following: Most words do not appear in a position where the distance to the word-end exceeds three morae. It is, all accents are maximumly except for some loanwords such as [a'kusento]. This accentuation has been viewed as an interaction of a number of OT constraints such as NonFinality and Rightmost (Kubozono 1995, 1997, Tanaka 2001, Mutsukawa 2005). Next, I present the above constraints as a single group of constraints. The left part of the table in (105) shows the morphological structure of examples in (103). If the second morpheme exceeds two morae, the accentual position violates the

aforementioned constraint, which results in zero dominancy. By contrast, the prosodic length of the dependent in right-headed cases does not affect the prosodic distance. Instead, the head part, namely, the N value in (105), determines the distance between the accent and word-final boundary. This difference might be the grounding of the difference between left-headed structure and right-headed structure. Despite the different surfaces in terms of the prosodic length, zero dominancy in both cases can be accounted for by the same constraint that prohibits the distance of the accent to be farther than three morae to the word-end.

4.4 Theoretical analysis

In this section, I will demonstrate an example of a theoretical analysis of the head-dominancy relation using Optimality Theory. OT is a theoretical framework developed after Generative Grammar, in which universal principles of language are assumed as *constraints*, and surface forms of a language are evaluated by these *constraints*. OT does not rely on structural rules. Instead, all outputs are evaluated by a hierarchy of constraints, and the surface form is the optimal candidate among all possible outputs. In the basic assumptions of OT, constraints are universal and violable in evaluation. Constraints in OT can be divided into *markedness constraints* and *faithfulness constraints* (Prince and Smolensky (1993/2004). One constraint might conflict with another constraint; however, a candidate does not become ungrammatical just by violating a constraint. A candidate could outrank other candidates as long as it does not violate a highly ranked constraint,

even if the candidate violates a number of other lower-ranked constraints. In other words, the optimal candidate is the candidate that results in 'the least serious violations of a set of constraints' (Kager 1999:13).

The reason why OT is demonstrated in this section is because OT is able to account for parallel phenomena with an identical group of universal constraints by reranking the head-dominancy relation is one of these accountable phenomena, which might be representable through the following rules: Rules to realize a word with right-headed structure as right-dominant or zero-dominant depending on its prosodic length, and rules for left-headed structure. I will show that the various accentual patterns of right-headed and left-headed words and the effect of prosodic length can be explained by a number of constraints, without abandoning the traditional theoretical account of right-dominant compound accentuation proposed by Kubozono (1995), Tanaka (2004), etc.

The framework of OT used in this subsection is based on the version developed in Prince and Smolensky (1993/2004) and Kager (1999).

4.4.1 Constraints on Japanese syllabic structure

In this subsection, I review the vital constraints on Japanese phonology that are proposed in previous studies. Before discussing accent, the foot structure of Japanese should be considered. A foot is a metrical unit which is assumed to contain prominence (Liberman and Prince 1977). Poser (1990a) claims that a foot is bimoraic in Japanese, using evidence such as hypocoristic formation in which light syllables are lengthened to satisfy

the bimoraic condition. Bimoraic foot can be accounted for by the constraint **FT-BIN(μ)**. This constraint is violated when there is a foot that does not contain two morae.

The second constraint is **ALIGN-L**, which ensures that the left edge of the foot agrees with the left edge of the root. Morphemes are defined as roots instead of stems since roots are the minimum unit and cannot be further analyzed (Bauer 1983: 20-21) Third, **PARSE σ** is a constraint which is violated when there is an unparsed syllable. This constraint ensures that all syllables are exhaustively parsed into feet and is assumed in the compound analysis of Tokyo Japanese (Kubozono 1995, Tanaka 2001, among others)

(106) **FT-BIN (μ)**: Feet are bimoraic (Poser 1990a, Prince and Smolensky 1993/2004). [30]

	μμ	**FT-BIN (μ)**
a.	☞ (μμ)	
b.	(μ)μ	*!
c.	μ(μ)	*!

[30] The domain of a foot is indicated by ( ). μ stands for mora. σ stands for syllable.

(107) **ALIGN-L (Ft, Root):** Align the left edge of foot to the left edge of the root.

		[μμ]Root[μ]Root	**ALIGN-L (Ft, Root)**
a.	☞	(μμ)(μ)	
b.		(μμ)μ	*!
c.		(μ)(μμ)	*!

(108) **PARSE σ**: Syllables are parsed into feet (Prince and Smolensky 1993/2004).

		σσσ	**PARSE σ**
a.	☞	(σσ)(σ)	
b.		(σσ)σ	*!
c.		σσσ	*!**

The ranking of the three constraints is hypothesized as follows: [31]

(109) **ALIGN-L (Ft, Root)** » **FT-BIN (μ)** » **PARSE σ**

		μμ#μμ	**ALIGN-L**	**FT-BIN(μ)**	**PARSE σ**
A	☞	(μμ)#(μμ)			
B		μ(μ#μ)μ	*!		**
C		(μμ)# μμ			*!*

This hypothesized ranking determines the optimal foot structure of a word.

[31] # stands for the root boundary.

4.4.2 Constraints on compound accent

Next, constraints on compound accentuation are introduced. The OT analysis of compound accent in Kubozono (1995) contains the following constraints:

(110) Constraints in Kubozono (1995)

a. **NonFinality(Foot)**: Accent[32] cannot occur in the final foot of the prosodic word.

b. **NonFinality(σ)**: Accent cannot occur on the final syllable of the prosodic word.

c. **Rightmostness**: Put accent at the right edge of the prosodic word. This constraint is violated per syllable in Kubozono (1995).

d. **Parse (N2)**: Parse the accent of the second member.

e. **Align-CA**: Align the accent with the boundary between the first member and the second member. This constraint is violated when unaccented.

Kubozono (1995) also proposes a default ranking of compound accent as follows:

(111) **NonFinality(σ)** » **Parse (N2)** » **NonFinality (Foot)**, **Align-CA** » **Rightmost**

The analysis of Kubozono is based on the generalization in which compound accent only refers to the accentual type of the second member, but this analysis fails to account

[32] = accent nucleus

for ultimately accented non-simplex words like [besuto te'n] (ベストテン, 'Best 10') or [shooge'n] (証言, 'testimony'), and non-right-dominant words.

As for the problem of ultimately accented non-simplex words, Tanaka (2001) refines some constraints (e.g. using Max N2's accent instead of Parse N2, etc.) and proposes another model in which minimal reranking occurs per lexical stratum. This idea accounts for the internal difference of accentual patterns in Japanese. Foreign words, native words, and Sino-Japanese words are assumed to have a different ranking. Lexical stratification is proposed based on the core-periphery model to solve the internal difference within a language and is proved by some phonological processes such as rendaku or phonotactic constraints (Ito and Mester 1995a, 1995b; Fukuzawa 1997; Fukuzawa et al. 1998). The general ranking system of Tanaka (2001) is shown below. New constraints are added as follows.

(112) The constraint-ranking system for compound accent in Tanaka (2001:165)

a. General cases: **Non-Finality (μ' σ' F')** » **Max (accent)** = **Align-L (σ', root)** » **ALIGN-R (PrWd, σ')**

b. Foreign heads (or some archaic native and Sino-Japanese heads): **Max (accent)** » **Non-Finality (μ' σ', F')** » **Align-L (σ', root)** » **Align-R (PrWd, σ')**

Max (accent) is a constraint that requires every accent in the input to be realized in the output. This constraint is violated when an accent in the input does not appear in the output. Both Kubozono (1995) and Tanaka (2001) focus on right-dominant non-simplex words. The phonological ground of the constraints used in their research, which requires the accentual nucleus of the surface form to be preserved, is based on the hypothesis that all non-simplex words are right headed (See Tanaka 2001: 188).[33] As might be expected, left-dominant words like [ka'ku jin] (各人, 'every person') can by no means be predicted by the proposed models above because the faithfulness constraints only refer to the accentual type of the second member. [34]

(113) Tableau of [ka'fe] + [ba'a] using Tanaka (2001)'s constraints

		ka'fe+ba'a	**Max (accent)**	**Non-Finality (μ', σ', F')**	**Align-R (PrWd, σ')**
A	☞	kafe ba'a		**	
B		kafe' baa	*!		*

[33] Tanaka (2001: 188) mentioned right-headedness in a footnote: 'The reason that the accent of N2 is preserved rather than that of N1 may be attributed to the fact that N2 is the morphological head of a compound.'

[34] A similar analysis using the notion 'head' appears in Alderete (2015), where a constraint 'PrWdHeadAccent' is used. This constraint is defined as '[the] head PrWd of a prosodic word compound must have a peak prominence.' The difference between Alderete (2015) and the analysis here is that accent is always required to be put in the second morpheme in his analysis, which is independent from the head position.

(114) Tableau of [ka'ku] + [ji'n] using the same constraint ranking that assumes the right-headed structure [35]

		ka'ku+ji'n	**Max (accent)**	**Non-Finality (μ', σ', F')**	**Align-R (PrWd, σ')**
A	💣	kaku ji'n		**	
B		ka'ku jin	*!		**
C	☹	kaku' jin	*!		*

This problem can be easily solved by defining words such as [ka'ku jin] as left-headed words by morphology. Tanaka (2001) defines MAX(ACCENT) as 'the accent of a head root has a correspondent in a compound.' In other words, Max (accent) would not be violated if [ka'kujin] is left headed.

(115) Tableau of [ka'ku] + [ji'n] (refined)

		ka'ku+ji'n	**Max (accent)**	**Non-Finality (μ', σ', F')**	**Align-R (PrWd, σ')**
A		kaku ji'n	*!	**	
B	☞	ka'ku jin			**
C		kaku' jin	*!		*

The problem of the tableau above, however, becomes obvious in zero-dominant cases. In these cases, the accents of both elements in non-simplex words are preserved. The

[35] The sad face symbol appears before the actual surface form when it is not optimal, while the bomb symbol indicates the form that is selected by the constraint ranking, which is different to the surface form.

constraint ranking cannot predict zero-dominant cases because Max (accent) is only violated when the accent of a head root is not preserved. Whether the accent of a modifier is preserved or not is not counted.

(116) Tableau of [ka'ku] + [ka'igi]

		ka'ku+ ka'igi	**Max (accent)**	**Non-Finality (μ', σ', F')**	**Align-R (PrWd, σ')**
A		kaku ka'igi	*!	*	*
B	💣	ka'ku kaigi			***
C	☹	ka'ku ka'igi		*!	*

This wrong selection does not appear in shorter non-simplex words like [ka'ku jin], because the zero-dominant candidate [ka'ku ji'n] violates two levels of Non-Finality.

(117) Tableau of [ka'ku] + [ji'n] with zero-dominant candidate

		ka'ku+ji'n	**Max (accent)**	**Non-Finality (μ', σ', F')**	**Align-R (PrWd, σ')**
A	☞	ka'ku jin			**
B		ka'ku ji'n		*!*	

One solution to the [ka'ku ka'igi] issue is the reranking of Non-Finality and Aling-R. If Non-Finality constraints are ranked below Align-R, the wrong output [ka'ku ka'igi] would be the optimal candidate.

(118) Tableau of [ka'ku] + [ka'igi] (reranking)

	ka'ku+ ka'igi	**Max (accent)**	**Align-R (PrWd, σ')**	**Non-Finality (μ', σ', F')**
A	kaku ka'igi	*!	*	*
B	ka'ku kaigi		**!*	
C	☞ ka'ku ka'igi		*	*

However, the tableau in (117) results in another wrong prediction in the [ka'ku jin] case. Unlike [ka'ku eki] which has a variation of [ka'ku e'ki], [ka'ku ji'n] sounds unnatural to Tokyo Japanese speakers (p.c. Sakuya Kuwabara):

(119) Non-simplex words with [ka'ku]

a. [ka'ku] + [ji'n] → [ka'ku jin]
   * [ka'ku ji'n]
   各 'every' 人 'person' 各人 'every person'

b. [ka'ku] + [e'ki] → [ka'ku e'ki]
   ~ [ka'ku eki]
   各 'every' 駅 'station' 各駅 'every station'

c. [ka'ku] + [ba'su] → [ka'ku ba'su]
   ~ [ka'ku basu]
   各 'every' バス 'basu' 各バス 'every bus'

One of the differences between [ka'ku eki] ~ [ka'ku e'ki] and [ka'ku jin] is the syllabic structure of the final syllable. The lack of zero-dominant variation for [ka'ku jin] implies that the constraint Non-Finality (σ') plays a role. [ka'ku ji'n] violates Non-Finality (σ') while [ka'ku e'ki] and [ka'ku ba'su] do not. Thus, I propose a new constraint ranking where Non-Finality (σ') and Non-Finality (μ') outrank Align-R (PrWd, σ'). Furthermore, since I assume that all non-simplex words are phonological phrases instead of prosodic

words, I replace Align-R(PrWd, σ') with Align-R(PhPr, σ'), corresponding to its morphological complexity, in the following tableaux. [36]

(120) Tableau of [ka'ku] + [e'ki] (with Non-Finality constraints reranking)

		ka'ku+ e'ki	**Max (accent)**	**Non-Finality (μ', σ')**	**Align-R (PhPr, σ')**	**Non-Finality (F')**
A	☞	ka'ku e'ki			*	*
B	☞	ka'ku eki			***	

(121) Tableau of [ka'ku] + [ji'n] (with Non-Finality constraints reranking)

		ka'ku+ ji'n	**Max (accent)**	**Non-Finality (μ', σ')**	**Align-R (PhPr, σ')**	**Non-Finality (F')**
A		ka'ku ji'n		*!	*	*
B	☞	ka'ku jin			**	

[36] An alternative analysis of the difference between *kakujin* and *kakueki* is to take morphological classes such as bound morphemes and free morphemes into account. One can assume bound morphemes cannot stand alone without any context (e.g. literal reading) and therefore an accentual difference appears. However, this analysis is also problematic because words like *kaku* is a bound morpheme. Some morphemes mentioned in this or the previous chapters such as *sei* are basically bound morphemes, but they also have a free morpheme variant with the same representation and a similar meaning. This dissertation assumes all words are discomposed into morphemes when being processed or produced. Therefore, I use the reranking of constraints to account for the difference between *kakujin* and *kakueki*.

The refined ranking does not hinder the optimal candidate in zero-dominant words like [ka'ku ka'igi].

(122) Tableau of [ka'ku] + [ka'igi] (with Non-Finality constraints reranking)

		ka'ku+ ka'igi	**Max (accent)**	**Non-Finality (μ', σ')**	**Align-R (PhPr, σ')**	**Non-Finality (F')**
A		kaku ka'igi	*!		*	*
B		ka'ku kaigi			**!*	
C	☞	ka'ku ka'igi			*	*

This constraint ranking does not affect the optimal candidate in right-dominant cases like [kafe ba'a] in the following tableau. The constraint ranking thus far is as follows: Max (accent) > Non-Finality (μ', σ') > Align-R (PhPr, σ') = Non-Finality (F').

(123) Tableau of [ka'ku] + [ka'igi] (with Non-Finality constraints reranking)

		ka'fe+ ba'a	**Max (accent)**	**Non-Finality (μ', σ')**	**Align-R (PhPr, σ')**	**Non-Finality (F')**
A	☞	kafe ba'a		*		*
B		kafe' baa	*!		*	
C		ka'fe baa	*!		**	*

A problem of this ranking is that this constraint ranking does not block zero-dominant candidates like [ka'fe ba'a] from being selected. In Tokyo Japanese non-simplex words, modifiers lose their accent, e.g. [gi'taa] (ギター, 'guitar') + [ke'esu] (ケース, 'case') → [gitaa ke'esu] (ギターケース, 'guitar case'), except for left-headed words that have a second morpheme longer than two morae.

There is another issue in this analysis regarding the unaccented non-simplex words. Since unaccented words do not have an accented nucleus, bi-phrasal candidates with an unaccented second member like [ka'ku happyoo-] (with the accentual pattern: HL LHHH) would show no difference with the competing candidate with an HL LLLLL pattern.

A solution to this is to assume that a head element forms a morphological boundary at its right edge. This is observed in left-headed words. A large number of left-headed words are zero-dominant, preserving the accentual patterns of both elements. I assume that the reason is that the head element forms a boundary at its right edge, triggering an accentual reset after the head element.

(124) The definition of **Head }**

Head } : Every head element is followed by a morphological boundary. This constraint is violated when a morphological boundary is absent after the head element.

(125) A head element forms a boundary at its right edge (} shows the boundary)

a. ka'ku } happyoo- left-headed, zero-dominant

b. happyoo ji'kan } right-headed, right-dominant

It is notable that it is not necessary for the constraint in (124) to be evaluated in the same paradigm as it was in the previous tableaux in terms of the relationship among input, output, and the final product with accent. The constraint in (124) represents an input-to-output correspondence.[37] The morphological boundary is formed when the target elements are retrieved from the lexicon. On the other hand, the accent evaluation is a process where lexical items already have their accentual representation, so this process is an output-to-output correspondence (Benua 1995, Hale et al. 1998).

The morphological boundary inserted after the head element also corresponds to the prosodic boundary, since I assume a strict hierarchy based on SPMH as follows.

[37] In Benua's early model of output-to-output correspondence, two types of mapping are assumed: Reduplication and truncation. In reduplication, input-to-output-faithfulness, base-to-reduplicant faithfulness, and input-to-reduplicant faithfulness are all at work, while in truncation, input and the truncated form do not have a correspondence. Here I hypothesize that accentual determination of compounding involves three types of correspondence.

(126) Proposed mapping model in Chapter 4

MORPHOLOGY		**PHONOLOGY**
PHRASE	—	PHONOLOGICAL PHRASE
NON-SIMPLEX WORDS	—	PHONOLOGICAL PHRASE
SIMPLEX WORDS	—	PROSODIC WORD

Non-simplex words are realized as phrases composed by multiple prosodic words. Mismatch does not occur in the suggested model, and morphological complexity plays an important role in structure.

4.5 Summary

In Tokyo Japanese, the accentual type of a compound or a complex word in Japanese can be predicted by the accentual type of its components, and the right component usually determines the accentual type of a compound, called right-dominant. With the basic idea proposed by Huang (2017, 2018), which reported left-dominant data in which the left component instead of the right component determines the accentual type, the claim is that the head position in a compound determines its accentual type because the left component in these compounds can be viewed as the head. In that sense, both right-dominant and left-dominant compounds can be predicted by using the same principle that requires the head component to be referred in accentual determination.

In Section 1, head-dominancy correlation of dvandva (or coordinate) compounds was addressed. By contrast, the aforementioned analysis can account for compounds with a relatively clear head; thus, the question becomes how to predict words that do not have a clear head in dvandva compounds. Based on the data that shows that dvandva non-simplex words behave similarly to left-headed non-simplex words, an assumption is that dvandva structure has a left-headed structure. In addition, the linguistic grounding of left-headedness in dvandva words might result from the coordinating feature that is assumed to form a node with the left-headed part, which reflects the morphological structure and dominates the accentual pattern of dvandva words.

In Section 2 of this chapter, words that have been viewed as exceptional cases were discussed. The findings demonstrate that more than half of these cases are related to head-dominancy issues and can be predicted by head position. Although some minimal pairs still remain a puzzle, most minimal pairs provided in the data still imply that head dominancy holds and helps to account for compound accentuation in non-simplex words.

In Section 3, the effect of prosodic length in the head-dominancy relation was discussed. Some issues remained unclear regarding the difference between left-headedness and right-headedness, namely, why the prosodic length that triggers zero dominancy is different. With a basic mathematic virtualization of possible prosodic structure, I found that both left-headed cases and right-headed cases are common in the determination of the accentual position. If accent is put in a position that violates the prosodic constraint in

regard to prosodic distance, zero dominancy occurs to avoid the violation. In other words, zero dominancy might be a means to evade this violation of this prosodic constraint.

Section 4 shows an example of a theoretical analysis of the head dominancy relation by proposing a constraint ranking based on the framework of OT. It also shows that accentuation on both right-dominant words and left-dominant words can be explained by the same account. However, there is more than one theoretical possibility. OT is not the only theory that can account for accentuation of non-simplex words; however, the idea is that leading in morphological analysis would be an efficient way to explain cases that could not be predicted by previous models of compound accentuation.

Chapter 5: Conclusions

5.1 Summary of the findings

This dissertation suggests that head and dominancy are two critical factors that account for compound accentuation in Tokyo Japanese. By carefully defining and examining terminology, the morphophonological phenomena regarding compound accentuation have been described and analyzed. This dissertation also contributes to the clarification of unclear notions in morphology and phonology. The first basic but epochal assumption of this dissertation is based on the identical classification of complex words and compound words in a morphological sense and the discussion based on phonology and morphology. In addition, the following vital notions and findings concern the prediction of compound accentuation observed in non-simplex words:

5.1.1 Morphological head

Head, perchance as the most notorious notion with various definitions, is the second notion that holds a key position. In Chapter 2, head is defined as a mixture of categorical and semantic information, in which categorical information is primary. Thereby, head here is rather morphological if it must be classified into any linguistic field. The most important observation and claim in this dissertation is that morphological head and dominancy deeply interact. Notably, not all cases of dominancy can be used to infer backward to decide head.

5.1.2 Dominancy

The first important notion proposed in this dissertation is dominancy. For all non-simplex words, the accentual pattern is determined by either one or both components. There are three types of dominancy, depending on which component dominates the accentual pattern: left dominancy, right dominancy, and zero dominancy. The directionality in these terms is defined by the position where the dominating morpheme is located in universally assumed binary structure, either left, right, or both. Cases where the accentual pattern of both components is preserved are called zero dominancy because that case has no clear dominance relationship. Moreover, dominancy can be divided into the categories of overt type and covert type. Overt dominancy consistently preserves the accent presence and accent position of the dominating morpheme: otherwise, it would be defined as covert dominancy.

5.1.3 Accentual transfer

Accentual transfer has been defined as conditions where the dominating component refers to the accentual type of the other component. Accentual transfer helps to clarify the grounding of the mismatch that occurs in some target cases. This mismatch causes some ambiguous cases that occur into each type of dominancy. Accentual transfer can be schematized as shown in (127). Assume X and Y are two components of a non-simplex word ZP. If X or Y is the morphological head and an accentual transferring morpheme, the

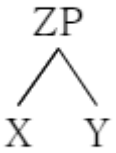
accentual type of ZP refers to the accentual type of X. In other words, the accentual information of X is projected on the root node ZP.

(127) Schematization of accentual transfer [38]

X, Y are the only components of ZP)

(Y⊕X=head) ∧(Head ⊆ accentual transferring morpheme)

⇒ The accentual type of ZP = The accentual information of ¬Head



5.1.4 Morphology-prosody mapping

One question that remains unclear in the literature may be how morphological information is mapped onto prosody by accentual cues in Tokyo Japanese, particularly for non-simplex words. Following Selkirk (1982, 2006, 2009, 2011), the inference is based on the hypothesis called SPMH. The epoch-making point of the discussion of morphology-prosody mapping contains two aspects: First, an entirely one-to-one mapping correspondence is assumed, and second, morphological complexity is considered in the

[38] It is notable that the possibility of X to be the head is not excluded in this schematization by posing (Y⊕ X=head), since there is no sufficient evidence showing that accentual transfer in Japanese only occurs in right-headed structure.

mapping system. Thus, I reconsidered the term 'syntax-phonology interface' and afterward refined the term to 'morphology-prosody interface.' To briefly summarize, a model in which only morphological simplex words are realized as prosodic words is suggested. Words other than simplex words are assumed to be mapped as phonological phrases, elaborated with the assumption of classification in Kubozono et al. (1997) and Ito and Mester (2013), who have divided phonological phrases into three major subgroups: word compound, mono-phrasal compound, and bi-phrasal compound, based on accentual formation. This analysis also profoundly accounts for overtly dominant non-simplex words.

(128) Proposed mapping model

MORPHOLOGY		**PHONOLOGY**
PHRASE	—	PHONOLOGICAL PHRASE
NON-SIMPLEX WORDS	—	PHONOLOGICAL PHRASE
SIMPLEX WORDS	—	PROSODIC WORD

5.1.5 Head dominancy in dvandva structure

Dvandva structure has been analyzed as double-headed in the literature. By contrast, this dissertation proposes that dvandva structure is left-headed because of the observation of directional dominancy. Based on head-dominancy correspondence, the presumption of a double-headed structure for dvandva non-simplex words would cause a dilemma in terms of the absence of difference compared with left-dominant non-simplex words.

An addition to the aforementioned notions reviewed, this dissertation also discussed empirical data that had been regarded as exceptional cases by the same grounding. In the last chapter, dvandva structure and exceptional cases from studies and the prosodic effect in terms of length of head dominancy were discussed. The findings demonstrate that the difference between left-headed words and right-headed words can be predicted by using one unified principle of accentual position.

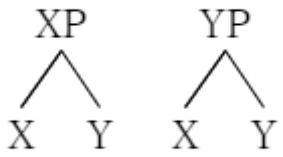
5.2 Remaining issues and further research

The view adopted in this dissertation considers morphosyntactic information and prosodic dominancy. Despite providing examples that support our hypotheses or disclaim any assumption, quantitative data are also necessary to provide an empirical view and a different view from this qualitative inference. Research based on corpus might also be able to provide further evidence. One problem this study encountered is that the present corpora of Japanese provide an insufficient amount of information to conduct a quantitative study. Another quantitative method to test our observation would be experimental studies where conditions and items along with other variables are controlled.

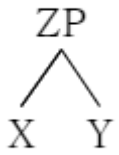
The head in this dissertation is defined as a notion which is based on categorical and semantic information. An important assumption is that a morphological head always corresponds to the dominant element in dominancy. This assumption also indicates that some cases might be ambiguous when the categorical and semantic criteria cannot properly function, e.g. some exocentric non-simplex words. Different from endocentric non-simplex

words, exocentric non-simplex words do not have a clear head. Scalise et al. (2009) and Scalise and Bisetto (2009) propose a definition where the morphological features of the morphologically exocentric words are different from the morphological features of any of its internal constituents. If I assume that a non-simplex word contains the two elements X and Y, then either X or Y projects its category, semantic information, or morphological features on the root node. On the other hand, neither X nor Y projects its information on ZP in the exocentric structure, as shown in (128) and (129).

(129) Inner structure of endocentric non-simplex words



(130) Inner structure of exocentric non-simplex words



Exocentric non-simplex words in Japanese are words that are not semantically transparent, or idiomatic non-simplex words. These non-simplex words do not seem to have a clear tendency in terms of dominancy, including the exceptional cases in Chapter 4

which are mostly idiomatic non-simplex words. Some idiomatic words like [ichi'go ichi'e] are zero-dominant while other words like [isse ichi'dai] are right-dominant as shown below. The accentual difference also awaits future research.

(131) Idiomatic expressions in Japanese

a. [ichi'go] + [ichi'e] → [ichi'go ichi'e]

→ ~ [ichigo ichi'e] (LHH LHL[39])

一期 一会 一期一会

'one life' 'encounter once' 'once-in-a-lifetime'

b. [i'sse] + [ichi'dai] → [isse ichi'dai]

一世 一代 一世一代

'one life' 'one generation' 'once-in-a-lifetime'

Regarding the main topic of this study, mental lexicon might be another topic for further research. Especially in Chapter 4, I mentioned that some frequently used dvandva words that do not follow left dominancy can be predicted with the default accent rule. Notably, although for this dissertation I paid little attention to this peripheral issue, a worthwhile investigation would be of why a part of words like [o'yako] undergoes this type of accentual change. This topic might be also related to *specialist accentuation*, in

[39] L=low tone; H=high tone.

which some jargon or exceedingly frequent words are pronounced without accentuation. In terms of the relation between type frequency and accentuation, Huang (2017c) conducted an experiment in which participants were asked to rate the acceptability of new compounds with a specialist accent. In this experiment, an acceptability rating with six levels was used to test how native Tokyo Japanese speakers evaluate unaccented simplex words and compound words. The results showed that besides the morphological complexity factor, the effect of presenting order was also significant, which implies that type frequency correlates to the acceptability of unaccentedness, even in compound words.

(132) Four conditions in Huang (2017c)'s experiment

	Simplex	*Non-Simplex*
Accented	A: [paina'ppuru]	C: [toire # ta'nku]
Unaccented	B: [painappuru-]	D: [toire # tanku-]

The experimental design could also be used to test the token frequency effect. Words with a higher token frequency that do not have an antepenultimate accent might have a higher acceptability rate when presented with an antepenultimate accentual pattern than the group with a lower token frequency.

The accentual change also means that language users seem to 'conceal' or 'ignore' the accentual pattern of well-known words. By contrast, Tokyo Japanese users are also known to apply default accent rules to unknown items such as foreign words to which they

have never been exposed. Beyond the framework of head dominancy, a question remains: Why does a language adopt the identical method for two types of words with extremely different positions?

The last topic for further research might be the diachronically changed dominancy. Some works such as Matsumori (2016) have claimed that left dominancy was once the dominant dominancy in the history of Tokyo Japanese. This hypothesis is from observations of other Japanese dialects. Nonetheless, if this hypothesis is true, further research might investigate how morphological information such as head also changes with time such as an articulatory feature or constraint ranking.

5.3 Conclusions

Head-dominancy correlation abounds in various portraits in Tokyo Japanese. Because an absolute relation between head and dominancy is assumed, dominancy is also a valid means to test headedness. As for the mapping issue, a constraint has been posed in the literature that a lexical word in morphology would be realized as a minimal prosodic word (Booij 2007: 158). However, compounding in Tokyo Japanese implies that morphological complexity should occupy a vital position in prosodic computation, because no persuading evidence suggests that complex words and compounds are realized differently. By considering a model that includes morphological complexity, syntactic phrases with the status of a prosodic word and morphological words realized as phonological phrases could be explained.

This dissertation provides insights into two major adjacent subfields in linguistics: phonology and morphology. Phonologists manage external sounds and internal phonemes that cannot be set apart out of the semantic scope of language, and morphology discusses the grammar in a word. The main contributions of this dissertation are twofold: First, I have been shown through empirical cases that prosodic information refers to the morphological head defined in a categorical and semantic base. Second, morphology intervenes between syntax and phonology and is phonologically realized by dominancy in the target language. The head-dominancy relation also implies that morphological structure has access to prosody and vice versa.

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