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**A Stratal OT Analysis of the Intonation of
Japanese Dialects with Multiple Intonational
Classes**

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Dedicated to my grandparents: Herman & Jo and Piet & Klaar.

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Chapter 1

Introduction

This thesis will present data and analyses on the intonation of nouns in seven Japanese dialects, namely Kagoshima, Hondo, Isaneku, Wan, Koshikijima, Old (1930s) Koshikijima, and Kokonogi dialect. All seven dialects belong to a class of languages traditionally referred to as *N-pattern accent* languages. The main characteristic of such languages is that regardless of word length, there is a maximum of N intonational oppositions between words. Put differently, every word in a prototypical N-pattern language is a member of one of N classes, or *accent types* where each type has a distinct intonational pattern. For Japanese dialects, N usually equals two, but there are also known cases of N=1 and N=3.

In addition to the different tonal melodies, the accent types within a single language can display other differences. For example, one accent type may be sensitive to prosodic or morphological structure, while the other is not. Within a single accent type, the treatment of identical tones can also differ. For example, an accent type may prefer to spread or delete one of its H tones over the other. Furthermore, intonational domains can grow quite large, so that a variety of tone spreading behaviors become observable.

Because of the phenomena mentioned above, the Japanese data require an account that is decidedly different from that of previous OT literature on tonality. In the following, it will be argued that a Stratal OT approach and a set of constraints governing intonation can lead to a satisfactory account for all of the presented dialects.

Chapter 2 goes into more depth on N-pattern accent languages, and surveys previous literature on tonal phenomena in OT. Chapter 3 then presents the theoretical framework that will be used for the analyses. Chapter 4 discusses the interpretation of the data, and then presents the data and analysis for each of the seven dialects. Chapter 5 adds further comments and criticisms on the approach taken.

Chapter 6 summarizes the results of the investigation and considers avenues for further research.

Chapter 2

Previous Literature

2.1 N-Pattern Accent Languages

2.1.1 Uwano (1984, 2012b)

The concept of N-pattern languages was first proposed in Uwano (1984), creating a divide between N-pattern accent dialects as found mainly in the southwest of the Japanese main islands, and more prototypical accent marking dialects such as Tokyo Japanese, called “multi-accent dialects” (see also Uwano, 2012c). The main characteristic of such dialects is that regardless of word length, there is a maximum of N tonal oppositions between words. Uwano (2012b) bases the classification on four aspects: *bunsetsu* domain, serialization, compound accent properties, and accent properties of conjugated verbs.

The *bunsetsu* is a traditional term for an intonational domain encompassing a noun as well as a number of word-level suffixes, traditionally referred to as particles. Particles are covered in more depth in section 4.1.3.2. Unlike multi-accent dialects, many if not all N-pattern dialects apply an intonational pattern to the entire *bunsetsu*. That is, any present suffixes will receive intonation based on the intonational pattern that the noun class is associated with.

Serialization refers to the fact that N-pattern accent intonation is typically concerned only with the length of the domain. In particular, serialization holds if there is no impact of the boundary between noun and particles. That is, given the same intonational class, a four-mora noun and a two-mora noun suffixed with a two-mora particle should show the same intonation under serialization. An example of this is considered in the discussion of Kagoshima dialect, section 4.2.2.

In general, serialization holds for N-pattern accent languages, but Uwano notes one exception: the case of an accent kernel, i.e. the lexical specification of a fall or rise in the word, that is specified from the edge of the noun. Since the position of the noun edge in the *bunsetsu* domain is determined in part by the tone-bearing units (TBUs) added on by particles, it follows that serialization cannot hold in such cases. Examples of this are encountered in the Isaneku and Wan dialects (section 4.4 and 4.5).

N-pattern accent dialects also typically show a specific pattern in the derivation of compound noun intonation. In prototypical cases, the accent type of the left member of the compound is adopted for the entire compound domain. Sections 4.1.3.1 and 5.1.1 go into more detail on compound nouns.

Finally, N-pattern accent dialects typically show an identical or highly similar intonational contour for different verb conjugations. This point will not be explored in depth in the present investigation, since

the focus is on the intonation of nouns.

2.2 Tonality in Optimality Theory

2.2.1 Myers (1997)

Myers (1997) focuses his investigation on three Bantu languages, Shona, Rimi, and Kishambaa, with the goal of exposing the interaction of OCP effects with faithfulness constraints. One contribution of this work is the exposition of cases of tonal fusion, a typologically rare phenomenon that also happens to be attested in Koshikijima dialect (section 4.6).

Myers interprets the investigated languages as having privative H: each TBU is specified for the presence or absence of an H tone. Although TBUs without an H tone surface as low, the L tone is not considered as a full-fledged tonal element. In this respect, the languages investigated by Myers deviate from the present Japanese dialects, where both H and L tones can be active, even in the same dialect.

In addition to a difference in tonal elements, the lexical storage of tonal information for the languages investigated by Myers is strikingly different from that of the present Japanese dialects. In Myers' Bantu languages, any number of individual tones is preassociated to a TBU of the stem, i.e. the association is stored in the lexicon. In contrast, the present Japanese dialects are specified for intonational melodies, consisting of a string of tonal elements, and without any lexical association links.

The TBU in Shona, Rimi, and Kishambaa is the syllable, and Myers does not report any sensitivity to heavy syllables. In contrast, the present Japanese dialects mainly take the mora as TBU, and some dialects show strikingly different patterns in forms with heavy syllables.

Interestingly, Myers reports a sensitivity to three layers of morphological domain in the investigated languages. This is reminiscent of Stratal OT, the morphophonological framework employed in the present investigation (see section 3.1.1). However, he takes no position on how the interactions between the different morphological layers can be conceptualized in a grammatical system, and does not posit a derivational chain going through each of the three morphological levels.

Lastly, tone spreading is highly restricted in Myers' Bantu languages, whereas in the present Japanese dialects, it is ubiquitous. Consequently, although the present account will adopt a set of faithfulness and OCP constraints highly similar to those used in Myers' work, a number of innovations will be essential

to account for the differences in behavior between the two sets of languages.

2.2.2 Cassimjee and Kisseberth (1998)

Cassimjee and Kisseberth (1998) (hereafter C&K) propose a framework called Optimal Domains Theory (ODT). At the core of the framework lies the concept of a feature domain, described as follows:

“In ODT, segments may or may not be specified with a particular feature F in underlying structure. We call the segment that is specified with F the sponsor of F. If we examine output structures, it is clear that features often have a ”sphere of influence” (what we shall refer to as the feature’s domain) that potentially extends beyond the sponsoring element itself. ODT takes a feature’s sphere of influence, i.e. its domain, to be an aspect of the structure of output candidates” (p7)

This concept follows from the nature of Bantu dialects, which are the object of C&K’s study. That is, TBUs in most Bantu dialects are underlyingly specified for the presence or absence of an H tone. From this fact, feature domains can straightforwardly be constructed. However, this core assumption of the ODT framework does not extend to the present Japanese dialects, since they show no sign of lexical associations between TBUs and tones.

As was the case with Myers (1997), the focus on Bantu dialects found in C&K’s work differs from the Japanese dialects with regards to the privativity of H tones, the absence of (activity of) L tones, limitations on or absence of tonal spreading, and the non-melodic, simple nature of tonal specifications. Furthermore, C&K operate in a purely nonderivational framework. However, they do suggest that this may not be the whole picture, stating that some of their earlier work included a “limited degree of serialism” (p5).

Since the present Japanese dialects are not in line with one of the core assumptions of the ODT framework, it is unsuitable for application. Adapting the ODT framework to allow for floating tonal specification may provide interesting results, but this is beyond the scope of the present investigation.

2.2.3 Yip (2002)

Yip (2002) considers a vast number of tonal patterns stemming from American, African (Bantu) and Asian and Pacific language families. For the Asian and Pacific languages, Yip looks at several Chinese

dialects, as well as languages from the Tibeto-Burman, Austro-Tai, and Mon-Khmer language groups. Most of these languages feature rich tonal inventories, with tonal elements consisting of short chains of tones or as elements that “behave as unitary contours”. Additionally, while some languages take the entire phrase as domain, most languages have short, even monosyllabic, word-level tonal domains.

Despite the large number of language groups in Yip’s investigation, it seems that no language group features the combination of long, word-level intonational domains and complex tonal melodies displayed by the present Japanese dialects. Although Yip states that “Japanese has many dialects”, the only dialect that is discussed is standard Tokyo dialect, which is decidedly different from the N-pattern accent dialects.

Yip also reports on interactions between tone on the one hand, and morphology and syntax on the other, clearly acknowledging the necessity of a framework modeling such interaction. Yip does not consider Stratal OT, instead showing an account using Output-Output constraints (Kager, 1999).

2.2.4 Zoll (2003)

Zoll (2003) proposes an OT framework for tonal spreading dubbed Optimal Tone Mapping (OTM). Zoll states that “the claim of the strongest version of OTM [is] that nonmorphological spreading patterns are determined by tone quality”. At the core of the OTM constraint set are the constraints CLASH and LAPSE, which rule out sequences of H and L tones, respectively.

Zoll applies the OTM framework to a number of Bantu languages that feature slightly longer domains and slightly more complex melodies than the Bantu languages taken up for consideration in previous studies. However, Zoll does not investigate forms of more than three TBUs (in comparison, the present Japanese dialects can feature up to five to eight TBUs), with one exception. In response to several tonal configurations of four-TBU forms of the Bambara language, Zoll states the following:

“The claim of strong OTM is that the resolution of [tonal associaton] paradoxes lies in abandoning phonological directionality as a force in tone mapping. On the other hand, Bambara, in all its complexity, clearly requires some factor that goes beyond the constraints introduced here. Determining these other factors is an important area for further research.” (p264)

2.2.5 Morén and Zsiga (2006)

Morén and Zsiga (2006) (hereafter M&Z) report on an in-depth study of the phonetics and phonology

of tone in Bangkok dialect Thai. Unlike the Japanese dialects, Thai words are monosyllabic, and tonal specifications for each word do not exceed two tones. Furthermore, M&Z use the absence of tonal specification to denote a phonetic interpretation surfacing as a Mid tone, differing from the full tonal specifications of (the present interpretation of) Japanese dialects.

M&Z consider both the lexical and postlexical tonology of Thai, and implement the derivation of both levels through Stratal OT. Unlike the Japanese dialects, however, there is no word-level opacity in Thai as reported by M&Z. Consequently, the analysis of M&Z does not need to make use of the full range of morphological levels provided by Stratal OT.

2.2.6 McCarthy et al. (2012)

McCarthy et al. (2012) show an implementation of Kikuyu tonality in Harmonic Serialism, a derivational OT framework with a derivational chain of variable length based on small, local operations. In Kikuyu, tones are lexically associated with monosyllabic and bisyllabic morphemes. This means that there is little room for spreading phenomena, despite the possibility of longer domains and longer tonal chains. The one case of spreading occurs word-initially, where a ‘plateau’ of two TBUs is reserved for the first tone. McCarthy et al. account for this with a constraint they describe as “ad hoc”.

A fortuitously chosen set of constraints allows McCarthy et al. to account for the Kikuyu data, and they report that typological predictions are “consistent with expectations”. Crucially, the constraint set does not contain any constraints that block or otherwise regulate spreading. Adding such constraints to the set is expected to prove fatal for the typological predictions; because of the local nature of Harmonic Serialism, languages which have such constraints high-ranked may terminate at any point during the derivation where the spreading constraints can no longer be satisfied, leading to forms that have one part of the word intonated, and another part toneless.

McCarthy et al. do not consider the role of morphology in tonal phenomena. To the author’s knowledge, there is no implementation of Harmonic Serialism aimed at accounting for such processes. Consequently, Harmonic Serialism seems to be in need of further research before it can be considered a viable option for accounting for morphophonological tonal phenomena.

2.2.7 Summary

Although the surveyed authors have considered a wide variety of tonal languages using a number of frameworks, some aspects found in the present Japanese dialects seem to be underrepresented in the literature so far.

More specifically, in comparison to many other tonal languages, the present Japanese dialects feature large intonational domains, and complex melodies that are not preassociated to TBUs. This means that there are relatively many different ways that the intonation patterns can end up, since there is much room to spread for a variety of tones.

The Japanese dialects also offer a chance to investigate interactions between several morphological layers in Stratal OT, a framework dedicated to this task. Furthermore, the moraic TBU of the dialects opens the door to interactions with prosodic structure, i.e. heavy syllables, in contrast to the syllabic TBU nature of most of the dialects in previous literature.

The above factors suggest the potential of a wide variety of intonational patterns. In OT terms, this means that a large number of candidates may be optimal or near-optimal. Consequently, the present Japanese dialects pose a worthy challenge for the Optimality Theory framework.

Chapter 3

Theoretical Framework

3.1 Phonology-Morphology Interface

3.1.1 Stratal OT

The present analysis employs Stratal OT, an Optimality Theory (=OT) framework that implements insights from the Lexical Phonology program (Booij, 1997; Bermúdez-Otero, 1999; Kiparsky, 2000). The original OT framework, due to Prince and Smolensky (1993), is nonderivational in nature. In contrast, Stratal OT models morphophonological processes with a derivational chain consisting of stem, word, and phrase level. Each of these levels has its own *constraint stratum*, i.e. a ranked set of constraints. No relation holds between the constraint strata of different levels. That is, in theory, the constraint stratum for the word level can have a completely different ranking of constraints than the stem level.

Derivations proceed by sequentially applying the three levels to the underlying form. In other words, the underlying form is the input to the first level, which is the stem level. Inside the stem level, the derivation follows the standard OT conventions; all possible candidates are generated, and the candidate that is optimal for the stem-level constraint ranking is selected as the winner. This winning candidate is the output for the stem level. Crucially, this output becomes the input for the word level. Again, a word-level OT process is applied, with the optimal form becoming the output of the word level, and then the input for the phrase level. The output of the phrase level is the form that surfaces as the output of the phonological component.

Importantly, the output of a given level is provided to the input of the next level *as is*. This includes all floating features that a form may have. For example, in the context of the present investigation, any floating tones, i.e. tones that are not associated to any TBU (=tone-bearing unit), related to the form of a winning candidate will still be considered part of the output form. Subsequent levels do not have access to anything except the output of the preceding level. For example, the word and phrasal level do not have access to properties of the underlying form of a given derivation, unless such properties have been passed on through the stem level.

Faithfulness constraints, which in standard OT operate between the underlying form and the output form, operate for the input and output of each level in Stratal OT: UF ↔ Stem ↔ Word ↔ Phrase. The faithfulness constraints employed in the present investigation are described in detail in section 3.2.1.

The three different levels indicate three different morphological domains. That is, the phrase level is

the locus where phrasal composition occurs, and phrasal information is taken into account. For example, in some Japanese dialects, words are sensitive to their position in the phrase, behaving differently phrase-medially than they do phrase-finally. This type of process is modeled in Stratal OT through interactions at the phrasal level.

Morphological processes and insertions can be defined at each of the three levels, as long as the domain allows this. For example, the insertion of suffixes to words could occur at both the stem and word level, while the insertion of suffixes to phrases must occur at the phrase level.

3.1.2 Stratal Specification of Accent Types

One addition to the standard Stratal OT framework is proposed. This is the possibility to specify the stratal insertion point for nouns of different accent types. That is, while by default all nouns will start their derivation at the stem level and go through stem, word, and phrase-level strata, it should also be possible to define the nouns of an accent type as starting their derivation at the word level. This added flexibility is necessary to account for discrepancies in some dialects, where one accent type appears to be sensitive to stem-level interactions, while another does not.

This flexibility only provides the option for accent types to skip the stem level. All nouns should at least go through the word and phrase-level strata. Furthermore, note that it is not possible to define a different order or timing for the application of phonological *processes*. Although some forms may skip stem-level interactions, word-level and phrase-level processes will apply to the forms of all accent types of a language in the same order.

The addition to the framework finds an analogy in the Lexical Morphology treatment of affixes: some affixes are taken to be inserted at stem level, while others are inserted at later levels. Consequently, it is believed that the extension of this type of behavior to nouns is not an unreasonable addition, especially in the face of data that necessitates it.

3.1.3 Morphological Conventions

In some cases, less than three levels are required to account for all of the attested processes in a language. Consequently, one or more levels may be considered inactive, absent, vacuous (not containing any constraints) or inert (i.e. with all faithfulness constraints outranking all markedness constraint). No position

is taken on which of these interpretations is most favorable, since there seems to be no available way to test such considerations. If the stem level is stated to be inactive, this means that forms from the lexicon will move on in their entirety to the word level.

Similarly, noun-level suffixes in Japanese do not seem to require both levels (i.e. stem and word) either. In such cases, there is some freedom of analysis, since suffixes could plausibly have been inserted either at stem-level or word-level. The default assumption will be to have suffixation occur at the word level, but if the pattern can only be accounted for with stem-level suffixes, this will be considered a valid option for analysis. In such cases, some attention will be paid to showing that this is necessary.

In addition to the insertion of additional segmental material, some analyses will also make use of *tonal* affixes. The presented dialects do not feature tonal affixes that carry meaning, but there do appear to be tones that are obligatorily prefixed to all forms, i.e. *boundary tones*. In cases of tonal prefixation, this tone is simply added as the leftmost part of an existing tonal melody.

3.2 Phonological Constraints

The present section will detail the major OT constraint types used in the rest of the thesis. Phonological representations are conceptualized according to autosegmental theory, with tonal elements and segmental elements on separate tiers, and autosegmental links associating the two (Leben, 1973; Goldsmith, 1976).

3.2.1 Tonal Faithfulness

In Correspondence Theory, faithfulness constraints place requirements on the relation between the input form of an OT derivation and the output form of a candidate (McCarthy and Prince, 1995). The main assumption is that elements of the input structure have a *correspondent* in the output. For the present purposes, the focus is on the correspondence between pairs of tones. For more in-depth treatments of correspondence in general, see e.g. McCarthy and Prince (1999); McCarthy and Wolf (2007).

Note that in the context of Stratal OT, the terms ‘input’ and ‘output’ refer to the input and output of each stratum. Since there are three constraint strata and a level for underlying forms, there are three places in the derivation where faithfulness interactions apply.

The following subsections will consider faithfulness constraints militating against tonal change, deletion, insertion, and fusion. These four processes are attested in the presented Japanese dialects. Faithfulness constraints blocking other processes, most notably tonal metathesis, are not relevant to the present discussion, and not considered here.

3.2.1.1 Identity

The first type of faithfulness constraint prevents candidates from changing the *identity* or nature of an element between its input and output version. Specifically, it bars the change of an L tone into an H tone, and vice versa. Formulated neutrally for a tone T, the constraint is referred to as IDENT-TONE:

IDENT-TONE	Every output correspondent to a tone T in the input should be identical to T.
------------	---

By formulating the constraint in this way, IDENT-TONE does not place requirements on whether an output correspondent is present for each input element. This is a job that is left to the faithfulness constraint regulating deletion.

3.2.1.2 Deletion and Insertion

In some cases, an element may be present in the input, but not in the output, i.e. the element is deleted. Conversely, the element may be inserted, i.e. present in the output, but not in the input. Two types of faithfulness constraints regulate these two processes: MAXIMALITY (MAX) constraints maximize the presence of input elements in the output, and DEPENDENCY (DEP) constraints require a dependency of output elements on the input. The constraints are again formulated neutrally for a tone T, which can be either H or L.

MAX-TONE	For every tone T in the input, there should be a corresponding tone in the output.
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DEP-TONE	For every tone T in the output, there should be a corresponding tone in the input.
----------	--

Note that these constraints are only concerned with the *presence* of corresponding elements, not with their identity. Hence, changing a tone from H to L will not violate MAX-TONE, since it only checks to see that some correspondent, in this case the L tone, is present for the H tone in the input.

3.2.1.3 Uniformity

Correspondence theory allows for an element in the input to have multiple output correspondents, or conversely, for multiple input correspondents to merge into a single output correspondent. The former case describes a process of tonal fission; the splitting of one tone in the input into multiple tones in the output. Such a process is not attested in the presented Japanese dialects, and its reality as a phonological process is questionable in general. On the other hand, tonal fusion, the merging of tones from the input into a single output tone, is attested under the present interpretation of Koshikijima dialect (section 4.6). The faithfulness constraint UNIFORMITY(T) militates against tonal fusion.

UNIFORMITY(T)	For every output tone T, assign one violation mark for each correspondent of T in the input beyond the first.
---------------	---

3.2.2 Alignment

Alignment constraints also have a place in the derivation of tonal phenomena. Such constraints can require the presence or absence of a tonal phenomenon at the edges of prosodic categories. Specifically, the present investigation uses an alignment constraint type that refers to edges of the prosodic word, and the presence of H or L tones:

ALIGN-	Assign one violation mark for each prosodic word where the left-
L/R(PRWD,	most/rightmost TBU is not associated to a H/L tone.
H/L)	

Two choices have been made in the formulation of the constraint. Firstly, the constraint makes reference to prosodic structure, specifically the prosodic word, rather than to morphological structure. This means that the constraint can force changes in the prosodic word even in wider morphological domains, i.e. at the phrase level.

Secondly, the constraint places a requirement on the intonation of the edgemoat TBU, but makes no requirement on the status of the tonal element. Consequently, the tone that associates to the edgemoat TBU doesn't have to be the leftmost or rightmost tone in the melody. In an extreme example, a constraint ALIGN-L(PRWD, H) could be satisfied by having the rightmost H tone of a melody associated to the leftmost TBU of the word.

As can be gleaned from its formulation, the constraint's violations are categorical, not gradient; the distance from the edge to an intonated TBU is not important to the constraint's evaluation. This differs from some versions of alignment constraints in earlier work, but follows the computational and typological arguments favoring categorical constraint evaluation (Eisner, 1997; McCarthy, 2003).

3.2.3 Association

Previous literature has provided several variations on a set of constraints to govern basic tonal association patterns. Specifically, some constraints are presented that drive the association process, relate tonal association to moras and syllables, and achieve the directionality that is often observed in association patterns.

Much of the previous literature focused on accounting for African tonal languages. These languages

often use the syllable as the TBU, and often have tonal associations specified in the lexicon. In contrast, the presented Japanese dialects use the mora as TBU and do not carry associations in the underlying form. Because of these two factors, some changes and additions were made to constraint sets from previous literature.

3.2.3.1 Tones and TBUs

A tone is taken to surface in an auditory form if it is associated to at least one TBU in the output structure. Tones that are not associated to any TBU are said to be *floating*. Crosslinguistically, there is a tendency to avoid floating tones if possible. Although many tonal languages do not have underlying tone specifications for some or all of their TBUs, many (if not all) of those languages have a full tonal specification in surface forms. Consequently, it can at least be said that there is also a strong crosslinguistic tendency to map tones to all TBUs. These two tendencies are represented straightforwardly by two constraints.

The first of these constraints is HAVE(TONE):

HAVE(TONE)	Assign one violation mark for every mora that is not associated with a tone.
------------	--

The formulation of this constraint is lifted from McCarthy et al. (2012), except that ‘mora’ was written here instead of ‘syllable’. Highly similar constraints can also be found in earlier accounts, namely SPECIFY(T) in Myers (1997), SPECIFY T in Yip (2002), and SPEC(TONE) in Zoll (2003).

Secondly, NO-FLOAT militates against floating tones:

NO-FLOAT	Assign one violation mark for every tone that is not associated with a mora.
----------	--

This constraint is again taken from McCarthy et al. (2012) with the replacement of ‘syllable’ by ‘mora’. In both Meyers’ and Yip’s framework, the constraint is called *FLOAT. Zoll names the constraint PARSE(TONE).

3.2.3.2 Tones and Prosodic Structure

The autosegmental framework in principle does not object to multiple association on a single TBU. In an extreme example, an entire HLHL melody could be mapped to a single mora. In the presented dialects,

only double association to moras occurs, and even this is rare. However, it does demonstrate that multiple association is an option in language, and that there should be violable constraints blocking it.

There are also languages that disprefer the association of multiple tones to a single syllable, even if that syllable is heavy. Taken to its extreme, such a preference results in a language with syllables as the TBU. A mora-based and syllable-based constraint against multiple association are proposed:

SYL-TO-TONE	For any syllable σ , assign one violation mark for every tone associated to (any mora contained in) σ after the first one.
-------------	--

μ -TO-TONE	For any mora μ , assign one violation mark for every tone associated to μ after the first one.
----------------	--

Yip (2002) defines a highly similar constraint, “NOCONTOUR: A TBU may be associated with at most one tone”. The main difference is that NOCONTOUR is ambiguous for the value of the TBU. Morén and Zsiga (2006) propose $*[TT]_{\mu}$ and $*[TT]_{\sigma}$ constraints, ruling out multiple tone association to moras and syllables, respectively.

3.2.3.3 Directionality and Contiguity

Many tonal languages can be thought of as spreading their tones by starting from an edgemost tone in the melody and continuing by mapping each adjacent tone until the last tone or TBU has been reached. This type of mapping is called left-to-right for association patterns starting from the leftmost tone, and right-to-left for the inverse case. For example, in a right-to-left mapping dialect with an HLHL melody, four-mora forms might show the entire HLHL contour, while shorter forms would show a rightmost substring of these tones: LHL, HL, and L, for three, two, and one-mora words, respectively. Furthermore, languages rarely if ever skip a tone in this association process. In summary, constraints are needed that can derive this *directionality* and *contiguity*.

The present framework will employ two types of constraints inspired by McCarthy et al. (2012) to achieve these two properties:

LINK-INITIAL,	Assign a violation mark if the initial/final tone is not linked to the
LINK-FINAL	initial/final mora.

NOSKIP	“Assign one violation mark for every unlinked tone that is preceded and followed (at any distance) by linked tones.” (McCarthy et al., 2012)
--------	--

The constraints LINK-INITIAL and LINK-FINAL are the two mirror instances of a constraint that requires an edgemost tone to associate to its edge. McCarthy only defined the LINK-INITIAL constraint, and used the syllable instead of the mora in his definition, but otherwise the definition is identical. The contiguity effect is achieved by NOSKIP, which was called NO-SKIP(tone) in McCarthy et al. (2012).

Right-to-left association is now achieved by a high-ranked pair of LINK-FINAL and NOSKIP. LINK-FINAL will ensure that the final tone is mapped. Once this is established, the optimal candidate will map tones in a non-skipping fashion because of NOSKIP, meaning that only a contiguous set of tones adjacent to the rightmost tone can be mapped. Left-to-right association is achieved in an analogous way, using LINK-INITIAL and NOSKIP.

One undesirable effect of these constraints is that there is room for a pattern that places high priority on linking both the initial and final tone. This occurs when LINK-INITIAL and LINK-FINAL are both high-ranked. To the knowledge of the author, such patterns are not attested. Since McCarthy used only the LINK-INITIAL constraint, this problem did not surface in his investigation, but it is clear that the LINK-FINAL constraint should also be included; it is needed to account for right-to-left directionality, which is widely attested in Japanese dialects. Unfortunately, developing a more satisfactory alternative is beyond the scope of the present investigation.

One alternative is present in the literature: Yip (2002) uses gradient alignment constraints to derive directionality effects. Specifically, she defines the following constraint type: “ALIGN-TONE: Align the specified edge (L/R) of a tone span with the head or edge (L/R) of a prosodic or morphological unit” (Yip, 2002). This definition goes against the reigning conception that alignment constraints should be evaluated categorically, as mentioned in section 3.2.2 on alignment.

Once again, some other literature on OT analyses of tonal phenomena is not mentioned here because directionality plays no significant role in the languages investigated in that literature. For example, the languages discussed in Myers (1997) feature individual, underlyingly associated H tones, instead of a tonal melody that must be mapped directionally by the grammar.

3.2.3.4 Faithfulness to Association Links

The associations between TBUs and tonal elements can themselves be the target of faithfulness constraints as well. This is achieved through the constraint FAITH-LINK:

FAITH-LINK	Assign one violation mark for each pair of TBU and tone that was associated in the input, but is not associated in the output.
------------	--

A previous version of this constraint is found in Myers (1997), called MAX-IO(A), and defined as “A tone association in the input must have a correspondent in the output”. The present investigation further agrees with Myers that tone deletion should not trigger a FAITH-LINK violation. This point is considered in more detail in section 5.1.4.

Although Myers’ definition of the constraint is identical to the present one, the context in which it applies is different. As mentioned before, in Stratal OT there are three loci where faithfulness constraints apply. Although none of the investigated dialects appear to have lexically specified tonal associations, FAITH-LINK is still active on two levels: it preserves stem-level associations on the word level, and word-level associations on the phrase level. In contrast, Myers’ MAX-IO(A) was defined in the context of parallel OT, to preserve lexically specified associations in the output.

3.2.4 Obligatoriness and Culminativity

Hyman (2009) notes that some languages require the presence of at least one H or L tone in every form. In other words, such a tone is *obligatory*. Although Hyman does not explore the OT implementation in depth, he proposes OBLIG constraints which can refer to either H or L tones. Similarly, the present analyses will use OBLIGATORINESS(H/L) constraints:

OBLIGATORI- NESS(H/L)	Assign one violation mark for every prosodic word that has no H/L tone associated to it.
--------------------------	--

Note again that the constraint definition refers to tones that are *associated* to the word. This means that floating tones cannot violate OBLIGATORINESS(H/L). Since the lexical tonal melodies of the presented Japanese dialects often contain at least one instance of every tone, obligatoriness constraints are rarely violated. However, the constraint can become active in monomoraic forms, where there is often room for only one tone, meaning that either H tone or L tone obligatoriness cannot be satisfied.

Analogously to the obligatoriness phenomenon, Hyman notes a tendency in some languages to have only a single H or L tone in a word. This property, *culminativity*, is represented by Hyman with a CULM constraint, and in the present analysis as CULMINATIVITY(H/L).

CULMINATI- VITY(H/L)	Assign one violation mark for every prosodic word that has more than one H/L tone associated to it.
-------------------------	---

One important choice made in the formulation of both these constraint types is to define the prosodic word as the domain for constraint evaluation, instead of simply taking the entire input as a single domain. This way, the constraint can be active on a word domain even at the phrasal level of a Stratal OT derivation, which will prove to be necessary in some cases. There is no evidence to suggest that similar constraints with the phrase as prosodic domain are needed.

3.2.5 Spreading

Finally, some constraints are required to regulate the spreading or non-spreading of tones, and the preservation of tonal association. Since all forms in the presented dialects are fully intonated, forms with more than TBUs than tonal elements have to spread obligatorily. The main role of spreading-related constraints, then, is to govern which tone is the optimal tone to spread.

3.2.5.1 Quality-Based Anti-Spreading Constraints

Some languages always select one type of tone, i.e. always H or always L, to be the spreading tone. In negative terms then, these languages block the spreading of some tones based on their quality (H/L). This is encoded in the following constraint type:

*SPREAD(H/L)	Assign one violation for each association of an H/L tone beyond the first.
--------------	--

One precedent to this type of constraint is NOLONGTONE, found in Yip (2002). This constraint is defined as “A tone may be associated with at most one TBU”. This constraint is not specified for H/L, so it blocks all spreading. Zoll (2003) uses a somewhat different approach, using CLASH and LAPSE constraints. These constraints block identical tone specifications on adjacent TBUs, for H and L tones respectively. This type of constraint excludes both tonal spreading and situations where different tones

of the same quality are associated to adjacent TBUs.

3.2.5.2 Spreading Constraints Based on the Edges of the Tonal Melody

In addition to the quality-based anti-spreading constraints, a type of constraint is proposed that regulates spreading in relation to edges of the tonal melody. This reflects the tendency in languages to spread either the leftmost or rightmost tone of the tonal melody.

SPREAD-	Assign one violation mark for each association beyond the first by a
LEFT/RIGHT	tone other than the leftmost/rightmost one.

A negative version of this constraint is also defined, notated with an asterisk in front of the constraint name.

*SPREAD-	Assign one violation mark for each association beyond the first by the
LEFT/RIGHT	leftmost/rightmost tone.

In combination, the constraints governing spreading can select each tone as the optimal tone for spreading, even in melodies consisting of four or five tones. An example is shown in tableau 3.1. The input is a fivemoraic nonce form, *tatatata*, which carries a four-tone, HLHL tonal melody. Assuming that the output form must be fully intonated and that each tone must be exclusively associated to at least one TBU, the four candidates represent the four different spreading options for the melody.

Tableau 3.1: Violations of spreading constraints incurred by spreading different tones. Input tonal melody: HLHL.

<i>tatatata</i>	*SPR(H)	*SPR(L)	SPRD-L	SPRD-R	*SPRD-L	*SPRD-R
a. $\begin{array}{ccccc} \sigma & \sigma & \sigma & \sigma & \sigma \\ & & & & \\ \text{TA} & \text{TA} & \text{ta} & \text{TA} & \text{ta} \\ \text{---} & & & & \\ & \text{H} & \text{L} & \text{H} & \text{L} \end{array}$	*			*	*	
b. $\begin{array}{ccccc} \sigma & \sigma & \sigma & \sigma & \sigma \\ & & & & \\ \text{TA} & \text{ta} & \text{ta} & \text{TA} & \text{ta} \\ \text{---} & & & & \\ & \text{H} & \text{L} & \text{H} & \text{L} \end{array}$		*	*	*		
c. $\begin{array}{ccccc} \sigma & \sigma & \sigma & \sigma & \sigma \\ & & & & \\ \text{TA} & \text{ta} & \text{TA} & \text{TA} & \text{ta} \\ \text{---} & & & & \\ & \text{H} & \text{L} & \text{H} & \text{L} \end{array}$	*		*	*		
d. $\begin{array}{ccccc} \sigma & \sigma & \sigma & \sigma & \sigma \\ & & & & \\ \text{TA} & \text{ta} & \text{TA} & \text{ta} & \text{ta} \\ \text{---} & & & & \\ & \text{H} & \text{L} & \text{H} & \text{L} \end{array}$		*	*			*

Candidate 3.1a shows a form that has spread the leftmost, H tone. This goes against *SPREAD(H) because the spread tone is H. Furthermore, although it satisfies SPREAD-LEFT, since the spread tone is leftmost, it incurs a violation of SPREAD-RIGHT, since the spread tone is not rightmost. Conversely, it satisfies *SPREAD-RIGHT, while violating *SPREAD-LEFT.

Candidate 3.1b shows a form that has spread one of the tones that is not edgemost. In this case, it is a low tone, violating *SPREAD(L). Furthermore, the form violates both SPREAD-LEFT and SPREAD-RIGHT, since it has spread a tone that is neither leftmost nor rightmost. At the same time, this means it has satisfied *SPREAD-LEFT and *SPREAD-RIGHT.

The evaluation of candidates 3.1c and 3.1d follow by analogy. The main takeaway from the tableau is that none of the candidates, and hence none of the spreading options, is harmonically bounded. Furthermore, there are also no ties. All constraints are necessary to create this effect; taking away the *SPREAD(H/L) constraints creates a tie between candidates 3.1b and 3.1c. Taking away the SPREAD-LEFT/RIGHT constraints will cause candidates 3.1a and 3.1d to be harmonically bounded by candidates 3.1b and 3.1c, respectively. Taking away the *SPREAD-LEFT/RIGHT constraints will have the inverse effect.

Lastly, it should be noted that the spreading constraints simply count the number of associations of a tone, and is blind to prosodic structure. For example, the association of a non-edgemost tone to both moras of a heavy syllable is not exempt from the usual pressures, and will cause a violation of SPREAD-LEFT/RIGHT.

3.2.6 Default Constraint Rankings

For space reasons, in most of the presented analyses a number of assumptions about the constraint rankings are not explicitly stated. Firstly, not all possible repair strategy types (deletion, insertion, fusion, tonal change, tone delinking) are explicitly considered for each analysis. If not discussed, faithfulness constraints blocking these processes may be assumed to outrank all the presented constraints. Conversely, typical markedness constraints that are left out of the discussion may be assumed to be ranked below all the presented constraints, this way not impacting the derivation of the output forms.

Secondly, the set of constraints governing the basic association pattern are invariably high or top-ranked in all of the investigated dialects. These are the constraints that together achieve the pattern of

right-to-left, one-to-one association. Unless otherwise indicated, the reader can assume that HAVETONE, LINK-FINAL, NOSKIP, and NO-FLOAT outrank all of the constraints presented for a stratum. This further implies that by default, all forms must have a tone associated to each TBU.

Chapter 4

Data and Analyses

4.1 Introduction

Before considering the actual data and analyses of the dialects, the present section will go over some notation, nomenclature, and conventions, and will describe the interpretative steps taken in the process of presenting the data.

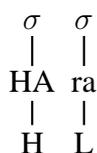
4.1.1 Notation

Since the majority of moras in the presented data will be either flat high or flat low-toned, the notation is tailored to represent this fact. Capitals denote high-toned moras, while lowercase letters denote low-toned moras, e.g. /HA/ and /ha/, respectively. In the case of mora-internal rises or falls, which happens exclusively in monomoraic forms, this will be indicated by a mix of lowercase letters and capitals, and the tonal contour following the word, e.g. /hA (LH)/ or /Ha (HL)/. Segmental material that is not associated to a tone is denoted by lowercase italics. This happens mostly in underlying forms. For example, when the input of a tableau is the combination of an already intonated, low-toned word and a newly appended suffix, this may be represented as: *ha + ga*.

Mora boundaries are denoted by commas, unless they are syllable boundaries, in which case they are denoted by full stops, unless they are noun boundaries in which case they are denoted by dashes. For example, a HLHL tonal pattern on a heavy monosyllabic noun with a bisyllabic suffix is denoted as /HA,a-KA.ra/. Dashes only separate the noun from suffixes; in the case of boundaries between multiple suffixes, full stops are used.

This style of notation is used both to describe surface forms and as a shorthand for phonological representations. It should be noted that the notation always has a corresponding autosegmental representation. That is, a form /HA.ra/ contains the same information as the autosegmental representation shown in figure 4.1. Cases deviating from this convention will always be shown with full autosegmental representation.

Figure 4.1: The autosegmental representation corresponding with /HA.ra/



The notation is ambiguous in the case of stretches of the same pitch, since for example the phono-

logical representation /HA.RA/ could be either a sequence of two H tones or a spread, single H tone. The convention used in such cases is to assume maximal spreading, unless explicitly stated otherwise. Consequently, a form /HA.RA/ without additional description should always be interpreted as a single, spread H tone.

A numbering convention is used to allow for references to individual tones. Numbering occurs from left to right, and is separate for high and low tones. For example, the tones in an LLLH melody are L1, H1, L2, L3, H2, from left to right, respectively. Note that this numbering is based on output tonal contours; if a surface LHL melody is derived from an inserted L and an HL melody, the tones are still numbered L1, H2, L2.

In tableaux, morphological composition is indicated by a plus sign. For example, if the form /HA.ra/ was the output of the stem level, and is suffixed at the word level by the suffix *ga*, the input for the tableau will read 'HA.ra + *ga*'. In case the newly added material consists only of tonal elements, a plus sign is used, and the tone is written in normal font. For example, in the case of L-tone prefixation (seen in Kokonogi dialect, section 4.8), the input might read 'L + HA.ra'. Prefixed tones are added to the left of the tonal melody.

Forms that are non-phrase-final are denoted by ending with a double full stop. For example, for a phrase-final form /HA.ra/, the phrase-medial form is notated as /HA.ra./'. In tableaux, the addition of phrasal information as a form enters the phrasal stratum is indicated by a plus sign followed by the double full stop, similar to the way morphological insertion is denoted. It is not suggested here that such information is in fact embodied by morphological material; this is simply a convenient notation. Thus, if a form /HA.ra/ enters the phrasal stratum, and is not phrase-final, the input for the tableau will read 'HA.ra + ..'.

All tableaux also mention the tonal melody associated with an input form in the description of the tableau. This is intended to clarify the presence of floating tones. For example, if an input form is /HA.ra/, but the tableau description mentions a HLHL melody, it can be deduced that the H1 and L1 tones are floating (assuming default right-to-left association).

A notion that is used throughout the analyses is that of the *accommodating tone*. In the majority of cases, at a given stratum, there is one tone that performs all of the spreading, since it is deemed the optimal spreading tone by spreading constraints. The term is derived from the fact that this tone will accommodate all TBUs in a word in excess of the number of tones.

4.1.2 Data and Interpretation

Although all data is represented here in an autosegmental context, much of it was reinterpreted from a similar framework employed in Japanese linguistic literature. Originally, the data was marked for rises and falls, and whether such rises or falls occurred mora-internally or in the transitions between moras. The translation from this system to that of autosegmental theory went as follows: mora-internal rises or falls were understood to be contour tones, and interpreted as a mora-internal LH or HL contour. Rises or falls between moras were interpreted as the change from L to H, and vice versa. There seems to be some inconsistency between authors as to whether to indicate a word-final fall if the word had risen previously, as an indication that following words do not (necessarily) continue at this same pitch height. Such word-final notations were ignored if present, since they are considered only a notational convention to place the word in the proper phrasal context. Apart from this phenomenon, the translation does not destroy any information. However, there may be a difference in conception between the two systems in regards to the psychological reality of rises and falls vs. the association of tonal material. For a discussion of this, as well as an English-language application of the Japanese notation, see Uwano (2012c, p1425).

Segmental information in Japanese literature is often denoted in *katakana*, a simple Japanese script that does not allow for the kinds of nuance expressible through IPA. Data reported by Uwano (2012a) was originally presented in Roman script, and displayed a wider range of contrasts, mainly in the difference between word-initial vs. other contexts, which surfaces among others in aspiration contrasts and alternations between stops and fricatives. Data from the survey by Kibe et al. (2011) does offer forms in IPA, although cases of variation are not specified for individual dialects. The data is reported here mainly in a romanized form of the Japanese script, although deviating from this in some cases to better correspond to some of Uwano's romanization style. However, not all of the contrasts reported by Uwano have been preserved. None of the dialects are reported to have any interaction between prosody and segmental information, and this relation is not under investigation here.

Another influence from the Japanese literature is the nomenclature of the different accent types. Since related dialects may largely share the division of lexical items over the different classes, it is a convention to denote similar lexicon splits between languages by giving the accent types in these languages the same name. For example, the set of words referred to as 'type A' in Kagoshima will largely overlap with the set of words referred to as 'type A' in Koshikijima dialect. In contrast, there may be less overlap between

these groups of lexical items and that of words in 'type alpha' Kikaijima dialects. Although these facts are by no means absolutes, and an analysis of the lexical inventories of accent types across dialects is not part of the present investigation, the nomenclature has been preserved in the presentation of the data.

4.1.3 Basic Japanese Morphology

4.1.3.1 Noun Compounds

The rules governing compound accent of Japanese dialects have warranted extensive research. Different dialects display a variety of behavior, which may or may not involve sensitivity to word length and headedness (i.e. the accent or intonational melody of either the left or right noun in the compound).

Precisely because compound accent has so many idiosyncracies, it falls outside the scope of the present investigation. However, the extension of the framework to include compound accent is considered in the discussion chapter, in section 5.1.1.

One essential aspect of compound accent in the presented dialects is that it always selects the intonation of one of the accent types. In this sense, compound nouns are no different from morphologically simple nouns. Consequently, compound forms can serve the same purpose as simple nouns for the present investigation. Particularly for higher word lengths, some of the reported forms may therefore be compound nouns. Since there is no sensitivity to the boundary between the two nouns of a compound for the intonational pattern in any of the presented dialects, this boundary will not be indicated.

4.1.3.2 Affixes

The Japanese language features a number of suffixes, traditionally referred to as *particles*. These particles often show interaction with the intonation of nouns. They vary from one to four moras in length, and sometimes feature heavy syllables. The particles can also be strung together to some extent, although it is rare to see chains of more than two particles. A list of the particles that appear in the present data is shown in table 4.1. The first column lists the romanized transcription of the particle in standard Japanese. Dialectal variations in pronunciation or notation are also listed in the final column of the table. In the glosses, N represents the noun that the particle is suffixed to.

In the presently investigated data, no prefixes were reported to interact with intonation. To the extent that the Japanese language has prefixes, it may be the case that prefixed nouns have been lexicalized, or

Table 4.1: Common Japanese particles. N represents the noun that the particle is suffixed to.

<i>Particle</i>	<i>Gloss</i>	<i>Dialectal variations</i>
<i>ga</i>	(nominative case)	<i>nga</i> (Wan, Isaneku)
<i>mo</i>	'N, too'	
<i>made + mo</i>	'as far as N, too'	<i>madimu</i> (Isaneku)
<i>ni</i>	'to(ward) N'	
<i>kara</i>	'from N'	
<i>kara + mo</i>	'from N, too'	<i>karamu</i> (Wan)
<i>nara</i>	'if N'	
<i>ni + nara</i>	'if to(ward) N'	<i>nnara</i> (Kokonogi)
<i>bakkari</i>	'nothing but N'	<i>bakkai</i> (Kagoshima)

derived through noun compounding, instead of interacting with the intonation in the way that the listed particles do.

4.2 Kagoshima

Kagoshima city is located near the south tip of Kyushu, the southernmost of Japan’s main islands. The dialect features two accent types, traditionally referred to as type A and B. Example forms are shown in table 4.2. The data reported here is reinterpreted from Kibe (2012), but more discussion on the dialect can be found in Kubozono (2007, 2012b), among others.

Table 4.2: Kagoshima forms.

Type	Noun	<i>N + ga</i>	<i>N + kara</i>	<i>N + bakkai</i>
A	Ha (HL)			
	HA.na	ha.NA-ga	ha.na-KA.ra	ha.na-BA,K.ka,i
	sa.KU.ra			
	ka.ma.BO.ko			
	a.ba.ra.BO.ne			
B	HA			
	ha.NA	ha.na-GA	ha.na-ka.RA	ha.na-ba,k.KA,I
	ko.ko.RO			
	a.sa.ga.O			
	ha.ru.ya.su.MI			

Glosses: *ha* (Type A) = ‘tooth’, *hana* (Type A) = ‘nose’, *sakura* = ‘cherry blossom’, *kamaboko* = ‘fish paste’, *abarabone* = ‘rib’, *ha* (Type B) = ‘leaf’, *hana* (Type B) = ‘flower’, *kokoro* = ‘heart’, *asagao* = ‘morning glory’, *haruyasumi* = ‘spring holiday’.

4.2.1 Descriptive Generalization

4.2.1.1 Tonal Contours

In type A, the most complex tonal contour that is observed is LHL. This is displayed in forms with three or more syllables, such as /sa.KU.ra/, /ka.ma.BO.ko/, and /a.ba.re.BO.ne/. In words with two syllables, only the two tones HL are observed, which may be thought of as a rightmost substring of the LHL melody. Similarly for type B, longer words show an LH contour, e.g. in /ko.ko.RO/ and /ha.ru.ya.su.MI/, while a monosyllabic word displays only a rightmost substring of this melody, the H tone, in /HA/. Consequently, the two accent types can be thought of as mapping LHL and LH tonal melodies, respectively, from right to left. In cases where there are more TBUs than tones, the leftmost tone, an L tone in both accent types, will associate to the excess TBUs.

One peculiarity of Kagoshima dialect is that it uses the syllable as a tone-bearing unit. Although this

is not noticeable from most of the example forms, it can be observed in cases using the suffix *bakkai*. In type A, this is intonated as /BA,K.ka,i/ while a moraic assignment of the LHL melody would yield */ba,k.KA,i/. Similarly, in type B it is intonated as /ba,k.KA,I/, instead of */ba,k.ka,I/. Kagoshima dialect is the only dialect discussed here which prefers the syllable as TBU.

There is one exception to the above generalizations: the case of monosyllabic type A words. These words display an HL melody, e.g. in /Ha (HL)/, instead of a simple L melody, which would be expected if the language mapped a number of tones proportionate to the number of syllables.

4.2.1.2 Morphology

Kagoshima dialect shows no effect of morphological processes. There is no difference between a string consisting of a noun and suffix, and an isolated noun of equal length. The phrasal position of a noun is also not reported to have any effect.

4.2.2 Previous Analyses

Kibe (2012), framing her analysis in the context of the framework of Uwano (2012b), discussed in section 2.1.1, notes that most particles and auxiliary verbs do not act as an independently intonated element, but adjoin to the intonational domain of the noun instead. Exceptions to this generalization are cases of affixes which attach to the phrase as a whole, i.e. they are not actually part of the nominal paradigm. Hence, Kibe interprets Kagoshima dialect as having the bunsetsu as an intonational domain.

Kibe also states that Kagoshima dialect carries the property of serialization. This follows from the fact that there is no effect of word-level morphology; the system treats strings of identical length the same, regardless of the division between noun and particle TBUs. For example, the intonation of type A /ha.NA-ga/ equals that of type A /sa.KU.ra/, and the same goes for /ha.na-KA.ra/ and /ka.ma.BO.ko/.

4.2.3 Analysis

Since the language shows neither postlexical activity nor interactions between stem and word level, the analysis only needs to define stem-level constraints to derive the correct forms.

4.2.3.1 Basic Pattern

Assuming LHL/HL melodies, the basic tonal contour spreads the leftmost tone in all cases, which can be modeled straightforwardly with SPREAD-LEFT. This leaves the issues of syllabic TBUs. As discussed in section 3.2.3.2, the constraint SYL-TO-TONE can straightforwardly restrict the number of tones to one per syllable. There is some interaction between the constraints; SPREAD-LEFT allows only the leftmost tone to spread, but SYL-TO-TONE may expect any tone associating to a heavy syllable to spread, filling the entire syllable. Consequently, SYL-TO-TONE should outrank SPREAD-LEFT to ensure that TBUs are syllabic throughout the word, and not only in leftmost tonal position.

Tableau 4.3 shows the word-level derivation of a four-syllabic type A string, /ha.na-KA.ra/. Since the stem level was specified to be inactive, the input for the word-level can be taken to be identical to the underlying form. Candidate 4.3a shows the winning, attested form, spreading the leftmost tone. 4.3b and 4.3c show candidates attempting to spread one of the other two tones, resulting in unnecessary violations of SPREAD-LEFT.

Tableau 4.3: Kagoshima word-level derivation for type A. Input tonal melody: LHL.

<i>hana + kara</i>	SYL-TO-TONE	SPREAD-LEFT
a. ☞ ha.na-KA.ra		
b. ha.NA-ka.ra		*!
c. ha.NA-KA.ra		*!

Tableau 4.4 shows the word-level derivation of a four-syllable type B string, /ha.na.ba,k.KA,I/. In addition to showing the derivation of the basic pattern, this will also demonstrate the role of SYL-TO-TONE. Candidate 4.4a shows the winning, attested form, which violates SPREAD-LEFT once to be able to satisfy higher-ranking SYL-TO-TONE. Candidate 4.4b shows the result of prioritizing SPREAD-LEFT; the L tone associates to all excess moras, but this causes a syllable-internal rising contour, violating SYL-TO-TONE. Candidate 4.4c shows that spreading the H tone runs counter to the SPREAD-LEFT constraint at no apparent gain. Similarly, candidate 4.4d also unnecessarily spreads a tone that is not leftmost. One particularly catastrophic case is shown in 4.4e, which spreads the H tone to the middle of a heavy syllable, violating both constraints.

Tableau 4.4: Kagoshima word-level derivation for type B. Input tonal melody: LH.

<i>hana + bakkai</i>	SYL-TO-TONE	SPREAD-LEFT
a. ☞ ha.na.ba,k.KA,I		*
b. ha.na.ba,k.ka,I	*!	
c. ha.NA.BA,K.KA,I		**!***
d. ha.na.BA,K.KA,I		**!*
e. ha.na.ba,K.KA,I	*!	**

4.2.3.2 Type A Monosyllabic Forms

Recall that monosyllabic type A words deviated from the basic pattern, surfacing with a syllable-internal fall instead of the expected L tone. The constraint ranking presented so far is insufficient to account for this, as shown in tableau 4.5. Candidate 4.5a shows the attested form, which fatally violates SYL-TO-TONE, and loses out to 4.5b, which simply associates the L2 tone. Consequently, additional constraints are required to account for the type A monosyllabic cases.

Tableau 4.5: Failed derivation of a Kagoshima monosyllable form for word-level type A. Input tonal melody: LHL.

<i>ha</i>	SYL-TO-TONE	SPREAD-LEFT
a. ☹ Ha (HL)	*!	
b. ☞ ha		

A likely motivation for the type A monosyllabic case is that the language requires H tones in all words, i.e. the presence of an OBLIGATORINESS(H) constraint, introduced in section 3.2.4. While other dialects may completely leave out other tones in monomoraic cases to satisfy OBLIGATORINESS(H), Kagoshima dialect respects the L2 tone, and elects the hybrid solution of the syllable-internal fall. There are several other imaginable repairs to satisfy OBLIGATORINESS(H): the L2 tone could be deleted, violating MAX-TONE, it could be changed to an H tone, violating IDENT-TONE, or an H2 tone could be inserted to the right of L2, violating DEP-TONE. These alternatives are not pursued here, but their analyses are highly similar to the situation shown in Tableau 4.6, which shows the interaction of OBLIGATORINESS(H) with LINK-FINAL, the constraint that requires the rightmost tone of the melody to be associated to the word. In this specific case, LINK-FINAL prevents candidates from not associating the L2 tone.

Candidate 4.6a shows the winning, attested form. Candidate 4.6b shows a candidate that tries to follow the basic intonational pattern by assigning the L2 tone. This violates OBLIGATORINESS(H). Candidate 4.6c displays a candidate that has skipped over the melody-initial L at the cost of violating

Tableau 4.6: Kagoshima monosyllable form for word-level type A. Input tonal melody: LHL.

<i>ha</i>	LINK-FINAL	OBLIGATORINESS(H)	SYL-TO-TONE	SPREAD-LEFT
a. \rightarrow Ha (HL)			*	
b. ha		*!		
c. $\begin{array}{c} \sigma \\ \\ HA \\ \\ L \ H \ L \end{array}$	*!			

LINK-FINAL.

4.2.4 Summary

The present analysis starts from an underlying LHL melody for type A, and an LH melody for type B. The only relevant interactions take place at the word level. Under these circumstances, the constraint strata as shown in table 4.7 lead to the output of the attested forms.

Table 4.7: Kagoshima constraint strata.

Stem	(no stem-level interactions)
Word	LINK-FINAL > OBLIGATORINESS(H) > SYL-TO-TONE > SPREAD-LEFT
Phrase	(no postlexical interactions)

4.3 Hondo

Hondo dialect is spoken in the city of Amakusa, Kumamoto prefecture, Kyushu island. The dialect has two accent types, referred to as A and B. Table 4.8 shows example forms reinterpreted from Kibe (2012).

Table 4.8: Hondo forms.

Type	Noun	<i>N + ga</i>	<i>N + kara</i>	<i>N + kara + mo</i>
A	HA			
	HA.na	ha.NA-ga	ha.NA-ka.ra	ha.NA-ka.ra.mo
	o.NA.go			
	ni.GI.ri.me.shi			
B	HA			
	HA.NA	HA.NA-GA	HA.NA-KA.RA	HA.NA-KA.RA.MO
	O.TO.KO			
	I.NA.BI.KA.RI			

Glosses: *ha* (Type A) = ‘leaf’, *hana* (Type A) = ‘nose’, *onago* = ‘woman’, *nigirimeshi* = ‘rice ball’, *ha* (Type B) = ‘tooth’, *hana* (Type B) = ‘flower’, *otoko* = ‘man’, *inabikari* = ‘(flash of) lightning’.

4.3.1 Descriptive Generalization

4.3.1.1 Tonal Contours

The maximal tonal contour of type A words is observed in forms carrying three or more moras. It is an LHL tonal melody, exemplified by forms such as /o.NA.go/. In forms with more than three moras, the L2 tone will spread to accommodate excess TBUs, e.g. in /ni.GI.ri.me.shi/. In bimoraic words, only a rightmost substring of the melody is mapped, an HL contour, for example /HA.na/.

Monomoraic type A words deviate from the generalization: instead of mapping only the rightmost L tone, monomoraic forms are H-toned, e.g. /HA/.

Type B forms are all exclusively H-toned.

4.3.1.2 Morphology

Neither accent type shows an interaction between stem and word level. For example, in type A, the isolated noun form /ni.GI.ri.me.shi/ is intonationally identical to a string of similar length with particles, e.g. /ha.NA-ka.ra.mo/. In type B, all forms have only a single tone, and are consequently intonationally identical regardless of morpheme boundaries.

No effect is observed in either accent type for the position of a form in the phrase.

4.3.2 Previous Analyses

As was the case for Kagoshima dialect, Kibe once again offers an interpretation of the Hondo dialect facts according to the classification framework of Uwano (2012b). The results are highly similar.

Kibe notes that in Hondo dialect, too, particles and auxiliary verbs tend to adjoin to the intonational domain of the noun. Exceptions to this generalization are cases of affixes which attach to the phrase as a whole, i.e. they are not actually part of the nominal paradigm. Hence, Kibe interprets Hondo dialect as having the bunsetsu as an intonational domain.

Kibe further states that Hondo dialect carries the property of serialization. As was stated in the discussion of Kagoshima dialect, this follows from the fact that there is no effect of word-level morphology; the system treats strings of identical length the same, irrespective of the noun-particle boundary.

4.3.3 Analysis

Since the language shows neither postlexical activity or interactions between stem and word level, the analysis only needs to define stem-level constraints to derive the correct forms.

4.3.3.1 Basic Contours

In type A, all spreading is performed by the rightmost tone of the melody. From this, it follows that a SPREAD-RIGHT constraint should suffice to derive the type A forms, since it enforces exactly this behavior. Tableau 4.9 shows the derivation for a sample word. Since the stem level does not play an active role in this language, the underlying form can be considered to be the input to the tableau.

Tableau 4.9: Word-level derivation of a Hondo dialect type A form. Input tonal melody: LHL.

<i>hana + kara</i>	SPREAD-RIGHT
a. ha.na-KA.ra	*!
b. ha.NA-KA.ra	*!
c.  ha.NA-ka.ra	

The input is a four-mora form, so one of the three tones will have to spread. Candidates 4.9a and 4.9b show attempts at spreading tones which are not rightmost, but both candidates violate SPREAD-RIGHT in doing so. Candidate 4.9c is the attested forms, which has no violations of this constraint.

As for type B, since it has only one tone, there is only one viable candidate for every form, which is to spread the tone to all TBUs. Since this tone is the only tone, it is also rightmost, and hence will not violate SPREAD-RIGHT. Given the triviality of the type B derivation, no tableau will be considered.

4.3.3.2 Type A Monomoraic Forms

The monomoraic form in type A is H although it would be L if the language simply mapped the first tone of the LHL melody. As was the case in the analysis of Kagoshima dialect, specifically section 4.2.3.2, this behavior may be due to the activity of an OBLIGATORINESS(H) constraint. However, in the case of Hondo dialect, the L2 tone is not associated to the word. Assuming that the surfacing H tone is the H1 tone of the type A tonal melody, this suggests that OBLIGATORINESS(H) should outrank LINK-FINAL here. In Kagoshima dialect, the constraint blocking the association of multiple tones to a TBU was SYL-TO-TONE, and it was ranked relatively low, causing a syllable-internal contour. In contrast, the moraic version of this constraint, μ -TO-TONE, is high-ranked in Hondo dialect, so the language has to choose between associating the L2 tone or the H1 one.

As was discussed in the analysis of Kagoshima monosyllabic type A cases, alternative interpretations of the monomoraic form are also imaginable which will not be pursued in detail here. These interpretations function highly similarly to the LINK-FINAL-based analysis, in the sense that there is a constraint blocking the H-toned form, but this blocker constraint is outranked by OBLIGATORINESS(H).

Tableau 4.10 shows the derivation of a monomoraic type A form at the word level. Recall that the stem level is inactive, so the input to the tableau is the same as the underlying form.

Tableau 4.10: Word-level derivation of a Hondo dialect monomoraic type A form. Input tonal melody: LHL.

<i>ha</i>	μ -TO-TONE	SPREAD-RIGHT	OBLIGATORINESS(H)	LINK-FINAL
a. ha			*!	
b.  $\begin{array}{c} \sigma \\ \\ \text{HA} \\ \\ \text{L H L} \end{array}$				*
c. Ha (HL)	*!			

Candidate 4.10a shows the default behavior, linking the L2 tone to the single TBU. Since the form now surfaces without an H tone, this violates OBLIGATORINESS(H). Candidate 4.10b skips the association of the L2 tone, which is optimal given the lower rank of LINK-FINAL. Candidate 4.10c shows

the Kagoshima option, associating both the H1 and L2 tone to the single mora, but in Hondo dialect, μ -TO-TONE is in its default, high-ranked position, and prevents such a structure.

Note that the final tableau introduces some constraints which were left out in the analysis of more regular patterns. However, none of the newly introduced constraints has an impact on earlier tableaux. All winning candidates in other tableaux contain an H tone, satisfying OBLIGATORINESS(H). Furthermore, no winning candidate assigned two tones to the same mora, so all winning candidates satisfy μ -TO-TONE.

4.3.4 Summary

There is no stratal interaction, so all that is needed is to define the forces active during the suffixation process. Under the assumption of LHL/H tonal melodies for the two accent types, the constraint stratum as shown in 4.11 should suffice to derive the required forms.

Table 4.11: Hondo constraint strata.

Stem	<i>(no stem-level interactions)</i>
Word	μ -TO-TONE > SPREAD-RIGHT, OBLIGATORINESS(H) > LINK-FINAL
Phrase	<i>(no postlexical interactions)</i>

4.4 Isaneku

Isaneku is a dialect spoken on Kikaijima island, which is located to the south of Kyushu. The data here is reinterpreted from Uwano (2012a). The dialect features two accent types, alpha and beta. Data are shown in Table 4.12. Apart from the forms shown, Uwano mentions a phenomenon of further pitch-dropping on suffixes in phrase-final form, but interprets this as a phonetic process. Uwano does not report on monomoraic forms.

Table 4.12: Isaneku forms.

Type	Noun	<i>N + ga</i>	<i>N + kara</i>	<i>N + made + mo</i>
α	ja.MA	JA.ma-NGA	JA.ma-ka.RA	JA.ma-ma.di.MU
	MI.na.TU	MI.na.tu-NGA	MI.na.tu-ka.RA	MI.na.tu-ma.di.MU
	TI,n.to,O	TI,n.to,o-NGA	TI,n.to,o-ka.RA	TI,n.to,o-ma.di.MU
	TA.ka.ra.mu,N			
β	U.mi	U.mi-nga	U.mi-ka.ra	U.mi-ma.di.mu
	fa.TE,e	fa.TE,e-nga	fa.TE,e-ka.ra	fa.TE,e-ma.di.mu
	TI,n.ZJO,o	TI,n.ZJO,o-nga	TI,n.ZJO,o-ka.ra	TI,n.ZJO,o-ma.di.mu
	HU.mi.ba.KU,u			

Glosses: *jama* = ‘mountain’, *minatu* = ‘harbor’, *tintoo* = ‘sky’, *takaramun* = ‘treasure’, *umi* = ‘sea’, *fatee* = ‘cultivated land’, *tinjoo* = ‘ceiling’, *humibakuu* = ‘rice box’.

4.4.1 Descriptive Generalization

4.4.1.1 Tonal Contours

The maximal tonal contour for type alpha surfaces in strings with a length of three or more moras. It is an HLH sequence, as exemplified in the form /MI.na.TU/. In longer forms, the L1 tone accommodates excess TBUs, for example in /TA.ka.ra.mu,N/. In shorter forms, a rightmost substring of the tonal contour is spread, as exemplified in /ja.MA/.

The maximal contour for type beta is an HLHL sequence, surfacing in forms with a length of four or more moras, for example /TI,n.ZJO,o/. In longer nouns, it is again the L1 tone that accommodates excess TBUs, e.g. /HU.mi.ba.KU,u/. Again, shorter forms display a rightmost substring of this tonal contour.

4.4.1.2 Morphology

The intonational domain for type alpha is the bunsetsu. That is, there is no sensitivity to the morpheme boundary between nouns and particles. For example, the pair /TA.ka.ra.mu,N/ and /MI.natu-ka.RA/, with both forms having five moras, are identical in intonation.

Unlike type alpha, there is a sensitivity to the morphological domain for type beta forms. In combinations of a noun and particles, the number of tones that can surface is equal to the moraic count of the noun; suffixes do not trigger additional associations of the tonal melody. For example, the bimoraic word /U.mi/ displays the same HL contour both in isolated, unaffixed form, as well as in longer forms such as /U.mi-ma.di.mu/.

The morphological sensitivity extends to the matter of the accommodating tone. Even in suffixed forms where all tones are available, such as /TI,n.ZJO,o-ka.ra/, it is the L2 tone that accommodates the TBUs introduced by the suffix. Consequently, type beta can be thought of as having two accommodating tones; L1 will spread to excess TBUs within the noun, while L2 will accommodate excess TBUs introduced by suffixes.

Neither intonational class shows a phonological sensitivity to the position of a word in the phrase.

4.4.2 Previous Analyses

Uwano (2012a) interprets Isaneku dialect as having two peaks, which can never be adjacent. Type alpha is then typified as taking the bunsetsu as its intonational domain, and placing a rising intonation on the last two moras, and if any additional material is available, only placing a peak on the first mora.

Type beta is interpreted as having the noun as its intonational domain, and being specified for a falling kernel on the prefinal mora. Uwano notes that, like type alpha, the intonation of the rest of the word follows by stating that only the first mora will carry a second peak, TBUs allowing. Although Uwano does not explicitly discuss the L2 spreading onto the suffix, this is presumably viewed as a natural consequence of the falling kernel ending in a low pitch, with no subsequent peaks raising the pitch.

4.4.3 Analysis

To account for the difference in morphological sensitivity between the two intonational types, the analysis will proceed from the assumption that type beta starts out at stem level, while type alpha starts out at word

level, which is also where suffixation occurs. This modelling technique was described in more detail in section 3.1.2. As mentioned in the descriptive generalization, there is no sensitivity to phrasal position in Isaneku dialect, so the phrase level strata will be considered inactive. In conclusion, the analysis will show a stem-level derivation for type beta, and a word-level derivation for both types, the latter leading to the attested forms.

4.4.3.1 Stem Level Type Beta

At the stem level, the aim is to correctly predict the noun-only forms of type beta accent. Since L1, the accomodating tone in this context, is not at an edge, it can't be targeted directly by either a SPREAD-LEFT or SPREAD-RIGHT constraint. Instead, the selection of L1 as optimal spreading tone can be achieved by combining two constraints. Firstly, a high-ranked *SPREAD(H) can rule out the spreading of the H1 and H2 tones. This leaves L1 and L2 as potential spreading tones. Since L2 is the rightmost tone, spreading out would violate *SPREAD-RIGHT. Consequently, invoking this constraint rules out L2 as a potential spreading tone, leaving L1 as the optimal choice for spreading. Since neither constraint favors a losing candidate over the winner, any ranking of the two constraints will come to the correct predictions. The derivation is demonstrated in tableau 4.13.

Tableau 4.13: Isaneku stem-level interactions for type beta. Input tonal melody: HLHL.

<i>humibakuu</i>	*SPREAD(H)	*SPREAD-RIGHT
a. HU.MI.ba.KU,u	*!	
b.  HU.mi.ba.KU,u		
c. HU.mi.BA.KU,u	*!	
d. HU.mi.BA.ku,u		*!

Since this derivation takes place at the stem level, the underlying form serves as the input, with the tonal melody still unassociated. The input is a pentamoraic form, while the tonal melody consists of the four tones HLHL, meaning that one of the tones must be spread. Candidate 4.13b shows the winning, attested form, which does not violate either of the constraints. Candidates 4.13a and 4.13c spread the H1 and H2 tones, respectively, leading to a violation of *SPREAD(H). Finally, candidate 4.13d avoids spreading a H tone by spreading L2 tone instead. However, this is the rightmost tone, so a violation of *SPREAD-RIGHT is incurred.

With these constraints in place, type beta forms will associate all four tones to a mora if possible, and elect L1 as the optimal spreading tone in case additional TBUs are available.

4.4.3.2 Word Level Type Alpha

At the word level, the intonation of type alpha occurs, and type beta forms have to associate tones to suffixal moras.

The type alpha intonation is a simpler version of the type beta intonation. Since there is only one low tone, the only constraint necessary to derive the pattern is *SPREAD(H). Tableau 4.14 shows the derivation for word level type alpha forms.

Tableau 4.14: Isaneku word-level interactions for type alpha. Input tonal melody: HLH.

<i>minatu + nga</i>	*SPREAD(H)
a. MI.NA.tu-NGA	*!
b.  MI.na.tu-NGA	
c. MI.na.TU-NGA	*!

Since type alpha was stipulated to start its derivation at the word level, the underlying form serves as the input. Furthermore, suffixation occurs at the word level, so the input takes into account the suffix TBUs as well. The input form has four moras, while type alpha has three tones, HLH, so one of the tones must spread. Candidates 4.14a and 4.14c show the result of spreading H1 and H2, respectively: both attempts run into a violation of *SPREAD(H). Consequently, the winner is the attested form in 4.14b, which spreads the L1 tone.

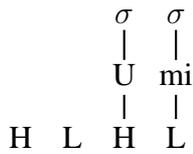
4.4.3.3 Word Level Type Beta

Type beta nouns were already associated at the stem level. The new objective at the word level is to correctly produce forms that spread the L2 tone onto suffixes. Crucially, such forms must be optimal over forms that try to use the TBUs of freshly appended suffixes to associate additional parts of the HLHL tonal melody. For example, /U.mi/ should lead to /U.mi-ka.ra/, and not */U.mi-KA.ra/.

The type beta sensitivity to the nominal domain can be interpreted as a tendency for tones associated to the noun to want to stay in place. That is, instead of unassociated parts of the melody being deleted or in any way inaccessible at the word level, they are simply blocked from associating to any TBU because the earlier associated tones will not move. For example, figure 4.2 shows the status of the unassociated H1 and L1 tones in /U.mi-ka.ra/ in an autosegmental representation:

Under such an interpretation, FAITH-LINK is an ideal constraint to account for the phenomenon, since it militates against changes to associations that were in the input. At the word level, the input is the

Figure 4.2: H1 and L1 tones blocked from association at word-level type beta.



output of the stem level, which is where type beta nouns were intonated. The definition of FAITH-LINK is repeated below:

FAITH-LINK	Assign one violation mark for each pair of TBU and tone that was associated in the input, but is not associated in the output.
------------	--

The effect of an active FAITH-LINK constraint for beta forms is shown in 4.15. Note that *SPREAD(H) is included in the tableau since it should also be active at the word level, to account for the type alpha forms. However, it has no effect on the present type beta candidates.

Tableau 4.15: Isaneku word-level interactions for type beta. Input tonal melody: HLHL.

	FAITH-LINK	*SPREAD(H)
a. TI,n.ZJO,o + nga	*!***	*
b. TI,n.zjo,O-nga	*!*	
c. TI,n.ZJO,O-nga	*!	*
d. ☞ TI,n.ZJO,o-nga		

The input is taken from the stem level, which simply mapped the four-tone HLHL melody to the four-moraic /TI,n.ZJO,o/. At the current level, suffixation of /nga/ occurs, and the grammar has to decide how to intonate the resulting structure. As subsequent candidates select a spreading tone closer to the right edge, the violations of FAITH-LINK abate, culminating in the optimality of candidate 4.15d, which also does not spread a high tone.

Tableau 4.16 shows the case of /U.mi-ka.ra/. This demonstrates that FAITH-LINK can achieve the intended blocking effect. This goes at the cost of associating floating tones, thereby violating NO-FLOAT.

Tableau 4.16: Isaneku word-level interactions for a short type beta form. Input tonal melody: HLHL.

	FAITH-LINK	*SPREAD(H)	NO-FLOAT
a. ☞ U.mi-ka.ra			**
b. U.mi-KA.ra	*!*		
c. u.MI-ka.ra	*!*		*

The input is /U.mi/, derived from the stem level, with a word-level suffix. Candidate 4.16a shows the winning, attested form, keeping the associations to the two morae in place at the cost of violating

NO-FLOAT. Candidate 4.16c shows that NO-FLOAT can be satisfied, but at the cost of violating FAITH-LINK, since the H2 tone is no longer associated to /U/, and the L2 tone no longer to /mi/. Interestingly, candidate 4.16c shows that linking just the L1 tone will already result in the two FAITH-LINK violations, as both the H2 and L2 tones must move to make room for L1. Consequently, the association of H1 at this point is free, making 4.16b a better candidate than 4.16c.

The type beta intonation demonstrates a property of FAITH-LINK: it is optimal to spread the tone that is closest to the edge where new material is being added. Spreading any tones that are farther from this edge means that the surrounding tones will be pushed away, resulting in the breaking of association links. In the case of Isaneku type beta, spreading the L2 tone to suffixes ensures that all of the association links created in the previous stratum can be retained.

The analysis of type alpha forms did not include the FAITH-LINK constraint. However, introducing the constraint does not cast doubt on the type alpha derivations. Since alpha words do not go through the stem level, there are no prior association links, and consequently FAITH-LINK will not mark violations for any candidate.

The type beta derivation also introduced NO-FLOAT. This also has no impact on the type alpha word-level derivation, since *SPREAD(H) will never motivate the non-association of tones, only their non-spreading. Consequently, no floating tone candidates will become optimal to the attested forms despite the low rank of NO-FLOAT.

4.4.4 Summary

The present analysis starts from an underlying HLH melody for type alpha, and an HLHL melody for type beta. In addition, type beta is taken to start its derivation at the stem level, while type alpha words skip the stem level and start derivations from the word level. Under these assumptions, the constraint strata as shown in table 4.17 lead to the output of the attested forms.

Table 4.17: Isaneku constraint strata.

Stem	*SPREAD(H), *SPREAD-RIGHT
Word	FAITH-LINK, *SPREAD(H) > NO-FLOAT
Phrase	(no postlexical interactions)

4.5 Wan

Wan dialect is spoken in the village of Wan on Kikaijima island. Table 4.18 shows example forms of the dialect reinterpreted from Uwano (2012a), who also reports on the other dialects. Kubozono (2011) also reports on Wan dialect, and finds the same pattern as Uwano. The dialect features two accent classes, traditionally referred to as alpha and beta. Type beta is reported to have no monomoraic forms. Note that a double full stop following a form indicates that the form is in phrase-medial position. If such forms are not presented, as in Wan dialect type alpha, this implies that the phrase-medial form is identical to the presented isolated form.

Table 4.18: Wan forms.

Type	Noun	<i>N + ga</i>	<i>N + kara</i>	<i>N + kara + mo</i>
α	KA	ka-NGA	KA-ka.RA	KA-KA.ra.MU
	mi.DU	MI.du-NGA	MI.DU-ka.RA	MI.DU-KA.ra.MU
	TA.ta.MI	TA.TA.mi-NGA	TA.TA.MI-ka.RA	TA.TA.MI-KA.ra.MU
	MI.DU.ku.MI	MI.DU.KU.mi-NGA	MI.DU.KU.MI-ka.RA	MI.DU.KU.MI-KA.ra.MU
β	NA.bi	NA.BI-nga	NA.BI-KA.ra	NA.BI-KA.RA.mu
	NA.BI..	NA.BI-NGA..	NA.BI-KA.RA..	NA.BI-KA.RA.MU..
	ha.TA.na	ha.TA.NA-nga	ha.TA.NA-KA.ra	ha.TA.NA-KA.RA.mu
	ha.TA.NA..	ha.TA.NA-NGA..	ha.TA.NA-KA.RA..	ha.TA.NA-KA.RA.MU..
	MU.cji.GU.mi	MU.cji.GU.MI-nga	MU.cji.GU.MI-KA.ra	MU.cji.GU.MI-KA.RA.mu
	MU.cji.GU.MI..	MU.cji.GU.MI-NGA..	MU.cji.GU.MI-KA.RA..	MU.cji.GU.MI-KA.RA.MU..
	HA,N.SU,U.ba.TE,e			

Glosses: *ka* = ‘child’, *midu* = ‘water’, *tatami* = ‘tatami mat’, *midukumi* = ‘drawing water’, *nabi* = ‘saucepan’, *hatana* = ‘knife’, *mucjigumi* = ‘glutinous rice’, *hansuubatee* = ‘sweet potato field’.

Wan dialect can perhaps be regarded as the main dialect of the island, with closely similar variations spoken in a number of other villages. In the village of Kamikatetsu, the general pattern of intonation is identical to that of Wan dialect, but some particles, notably *kara* and *made*, have their own intonational contour. Furthermore, the dialect spoken in Nakato village is highly similar to Wan dialect as well. However, in non-phrase-final contexts it features a mora-internal fall and rise instead of the HLH tonal contour found in longer Wan forms. The Kamikatetsu and Nakato dialects are not part of the present investigation.

4.5.1 Descriptive Generalization

4.5.1.1 Basic Contours

The maximal tonal contour in type alpha is displayed in forms of three or more moras. It is an HLH tonal melody, as exemplified by /TA.ta.MI/. In longer forms, the H1 tone accommodates excess moras, for example /TA.TA.MI-ka.RA/. In bimoraic and monomoraic forms, the accent class maps a rightmost substring of the commensurate length, resulting in an LH and H tonal contour, respectively, i.e. /mi.DU/ and /KA/.

Type beta noun intonation is highly similar to that of type alpha, but there is a difference in tonal melody. The maximal tonal contour is found in nouns of length four or higher, and is an HLHL melody. As the longer noun form /HA,N.SU,U.ba.TE,e/ demonstrates, it is still the H1 tone that spreads to excess TBUs. As in type alpha, shorter words will map a rightmost substring of the HLHL melody, e.g. in /ha.TA.na/ and /NA.bi/.

4.5.1.2 Morphology

Type beta shows an interaction between stem and word level similar to the one in Isaneku dialect; the number of tones mapped is equal to the mora count of the noun, irregardless of the mora count of suffixed material. For example, the bimoraic noun /NA.bi/ retains its HL contour in suffixed forms, such as /NA.BI-KA.ra/. As the suffixed example shows, the accommodating tone is different from that in Isaneku dialect. Wan dialect spreads the H2 tone to accommodate suffixes, while Isaneku dialect spreads its rightmost L2 tone. For example, under Isaneku intonation, the previous example would come out as */NA.bi-ka.ra/.

Type beta additionally displays a postlexical effect; while isolated forms show the HLHL tonal contour, there is no L2 tone in forms that are not phrase-final. In this case, the mora normally associated to L2 is also covered by H2. The form is otherwise identical to the isolated form. For example, the phrase-medial form of /NA.BI-nga/ is /NA.BI-NGA../, and that of /MU.cji.GU.mi/ is /MU.cji.GU.MI../.

4.5.1.3 Heavy Syllables and the Nasal Coda

Uwano further reports data showing the sensitivity of type beta forms to heavy syllable constructions involving geminates, long vowels and the nasal coda consonant, /N/. Relevant forms for both accent

types are shown in table 4.19.

Table 4.19: Wan heavy syllable forms.

<i>Type</i>	<i>Noun</i>	<i>N + ga</i>
α	HA.tu,U	HA.TU,u-NGA
	HA.ra,s.SA	HA.RA,S.sa-NGA
	TA.KA.RA.mu,N	TA.KA.RA.MU,n-NGA
β	KO,on	KO,ON-nga
	PO,T.to	
	KU,N.zja	
	ho,O.zji	
	ko.RO,K.ke	
	KA,a.NGI,i	
	TO.RO,n.BO,on	TO.RO,n.BO,ON-nga

Glosses: *hatuu* = ‘pigeon’, *harassa* = ‘barefoot’, *takaramun* = ‘treasure’, *koon* = ‘corn’, *potto* = ‘pot’, *kunzja* = ‘whale’, *hoozji* = ‘mold’, *korokke* = ‘croquette’, *kaangii* = ‘mulberry tree’, *toronboon* = ‘trombone’.

There are some differences in the treatment of the different types of heavy syllables. Firstly, long vowels are treated no differently than other bimoraic sequences; type alpha shows the standard HLH association pattern in /HA.tu,U/, and type beta shows HLHL in the four-mora form /KA,a.NGI,i/. Secondly, syllables with geminated consonants never show a contour. For example, the type alpha form /HA.ra,s.SA/ shows that the L tone spreads across the entire syllable /ra,s/, even though the /s/ is geminated. An example type beta case is /PO,T.to/.

The most striking cases of heavy syllable sensitivity occur in heavy syllables with nasal coda consonants. In these cases, the two accent types differ in their behavior. Type alpha forms do not show exceptional behavior, treating such syllables as ordinary bimoraic sequences. This is seen for example in the pair /TA.KA.RA.mu,N/ and /TA.KA.RA.MU,n-NGA/, which do not surface with only a single tone on the syllable, which would lead to */TA.KA.ra.MU,N/ or */TA.KA.RA.mu,n-NGA/. However, in type beta, high tones mapping onto a nasal coda consonant will spread to occupy the entire syllable. For example, the form /KU,N.zja/ is attested, which is apparently preferred over the expected moraic mapping, */ku,N.zja/. This phenomenon extends even to syllables featuring a long vowel and the /N/ coda. An example of this is /KO,ON-nga/, instead of expected */ko,ON-nga/. In contrast, it is acceptable for a low tone to occupy only a mora linked to a nasal coda consonant, as exemplified in /TO.RO,n.BO,on/, which does not surface as e.g. */to.RO,N.bo,on/.

Accounting for the heavy syllable facts is beyond the scope of the present analysis. However, the data is considered in section 5.1.2 of the discussion, in light of an analysis of similar facts in Koshikijima dialect (section 4.6).

4.5.2 Previous Analyses

4.5.2.1 Kubozono (2011)

Kubozono (2011) gives both a descriptive and autosegmental account of the Wan pattern. Descriptively, he states that type alpha intonation can be described by stating that the prefinal mora is low, while all others are high, and that the intonational domain is the bunsetsu. Furthermore, he follows earlier work by Uwano in stating that the rise between the antepenultimate and penultimate mora is the distinctive feature of type beta accent, and that its intonational domain is the noun. Kubozono takes the L2 tone in type beta to be a boundary tone.

In autosegmental terms, Kubozono considers type alpha to carry an HLH underlying melody, assigned from right to left, with the H1 tone spreading to excess moras on the left. The same HLH melody is proposed for type beta. The fact that the position of these tones is shifted one to the left, relative to type alpha, is accounted for by Kubozono by stating that the final mora of the noun domain is ‘invisible’ to the prosodic structure, i.e. extrametrical.

4.5.2.2 Uwano (2012a)

Uwano (2012a) agrees with Kubozono in describing the alpha intonation as an all-high pattern except for the prefinal mora. For type beta, he states that the rise between the antepenultimate and penultimate mora is the result of a rising accent kernel in that location (see also Uwano, 2012c). He notes that the final tone in type beta forms is high for phrase-medial forms, and low in phrase-final contexts. Consequently, he states that this is not a word-level feature, and does not need to be represented by a second accent kernel between the prefinal and final mora. He takes type alpha to be kernelless. As for the intonational domains, type alpha is stated to take the bunsetsu as its domain, while type beta is assigned to the noun. Serialization only applies in type alpha, but not in type beta.

Uwano takes up a point also stressed in Kubozono (2011): the fact that longer type beta forms invariably have an initial high-toned stretch. This is not covered by the stipulation of the raising kernel, which

only accounts for the part of the melody that in autosegmental terms is produced by the L1 and H2 tones. Consequently, Uwano states that a word-tone property must apply to type beta. This is the same type of feature that bestows a tonal melody on type alpha. However, the two accent classes do not have an identical word-tonal feature; in type alpha, the entire melody is derived from the word-tone, while in type beta, only the initial stretch is derived from this, with the accent kernel and phrasal intonation picking up the rest of the work.

Consequently, in Uwano's analysis the LH part of the HLH/HLHL melodies are derived through different means. Uwano finds further support for this position by considering the forms that are sensitive to syllable structure, i.e. words with /N/. Indeed, type alpha does not give special treatment to these forms, but type beta does. Uwano accounts for the type beta behavior with an analysis based on licensing, stating that the /N/ mora in "does not have the capability of carrying the accent kernel" and that the accent kernel shifts to the left as a result of this.

4.5.3 Analysis

Similarly to Isaneku dialect, type beta forms are taken to start at stem level, prior to suffixation, while alpha forms originate at word level, together with suffixes. This means that at stem level, the only concern is to derive the correct beta forms. At the word level, derivations for both forms are presented. The sensitivity of type beta forms to their position in the phrase is an interaction that will be modeled at the phrase level, as this is conceived to be the locus where the information of phrasal position becomes available to the derivation. Consequently, phrase-level derivations for both types will be presented, to show how the type beta behavior can be accounted for, and to show that this account does not interfere with the type alpha forms.

The analysis proceeds from underlying HLH and HLHL melodies for type alpha and beta, respectively. The main advantage of this assumption becomes apparent in the derivation of the phrasal level, and will be discussed further in section 4.5.4.1.

4.5.3.1 Stem Level Type Beta

In forms of length up to four moras, type beta shows the default right-to-left association behavior, as discussed in section 3.2.6 on default constraint rankings. This means that at the stem level, most of

the noun forms already come out as they were presented in noun-only, phrase-final contexts in table 4.18. Specifically, *nabi*, *hatana*, and *mucjigumi* will leave the stem level as /NA.bi/, /ha.TA.na/, and /MU.cji.GU.mi/, respectively.

Longer forms still follow the default behavior to the extent possible, but in addition, the leftmost tone spreads to accomodate excess moras. This behavior can be modeled straightforwardly through SPREAD-LEFT. This is shown for the longer noun *hansuubatee* in tableau 4.20.

Tableau 4.20: Wan stem-level derivation for a long type beta form. Input tonal melody: HLHL.

<i>hansuubatee</i>	SPREAD-LEFT
a. ☞ HA,N.SU,U.ba.TE,e	
b. HA,n.su,u.ba.TE,e	*!***
c. HA,n.SU,U.BA.TE,e	*!***
d. HA,n.SU,u.ba.te,e	*!***

The winning, attested form is candidate 4.20a, which spreads the leftmost tone, H1. Candidates 4.20b through 4.20d show attempts at spreading any of the other three tones, but all these candidates incur violations of SPREAD-LEFT.

4.5.3.2 Word Level Type Alpha

At the word level, type alpha forms display highly similar behavior to that of the stem-level type beta forms. Once again, the language follows default right-to-left association behavior for the tonal melody, which in the case of type alpha is assumed to be HLH, and once again the leftmost tone spreads to accomodate excess TBUs. The difference with type beta is that the intonational domain for type alpha includes word-level nominal suffixes. However, this difference in morphological sensitivity has been accounted for through the stipulation that type alpha words start their derivation at the word level. That is, type alpha nouns enter the derivation simultaneously with the particles, and can therefore be treated as one prosodic unit. Consequently, the only grammatical force that is required now is the same one used for type beta stem forms: SPREAD-LEFT.

Tableau 4.21 shows a trimoraic type alpha form, *tatami*, composed with a monomoraic suffix, *nga*. Since type alpha nouns skip the stem-level, the input can be considered to be identical to the underlying form.

Candidate 4.21a shows the winning, attested form, which spreads the leftmost tone, H1. The other two candidates demonstrate failed attempts at spreading either of the other tones. Note that the suffix,

Tableau 4.21: Wan word-level derivation for a long type alpha form with a suffix. Input tonal melody: HLH.

<i>tatami</i> + <i>nga</i>	SPREAD-LEFT
a. ☞ TA.TA.mi-NGA	
b. TA.ta.mi-NGA	*!
c. TA.ta.MI-NGA	*!

nga, is readily included in the intonational domain, since there is no force blocking the association of specific tones to this TBU.

4.5.3.3 Word Level Type Beta

An account for type beta forms cannot suffice with the single SPREAD-LEFT constraint used in type alpha derivations. This is because doing so would lead to the use of the whole bunsetsu as the intonational domain for type beta as well. This problem was covered in the analysis of word-level type beta forms in Isaneku dialect as well, in section 4.4.3.3. The solution there was to introduce a higher-ranking FAITH-LINK constraint. However, by itself, FAITH-LINK will select the tone closest to the extending edge, i.e. L2 for suffixes, to spread to the new TBUs, because this leaves the maximum number of tonal associations in place. This is not in agreement with the Wan dialect data, which shows H2 as the accommodating mora for spreading triggered by suffixation. The problem is demonstrated in tableau 4.22. The input to the tableau is the stem-level output of the underlying form *mucjigumi*, which is /MU.cji.GU.mi/. At the current level, a suffix *nga* is appended to this form.

Tableau 4.22: Wan dialect failed word-level derivation for a suffixed type beta form. Input tonal melody: HLHL.

MU.cji.GU.mi + <i>nga</i>	FAITH-LINK	SPREAD-LEFT
a. MU.CJI.gu.MI-nga	*!***	
b. MU.cji.gu.MI-nga	*!*	*
c. ☹ MU.cji.GU.MI-nga	*!	*
d. ☞ MU.cji.GU.mi-nga		*

The attested form is candidate 4.22c. However, this is not the optimal constraint under the presented constraint ranking, since candidate 4.22d preserves more of the tonal associations that were present in the input. Incidentally, candidate 4.22a represents the type alpha behavior, since it is optimal in terms of SPREAD-LEFT.

Recall that in the analysis of Isaneku dialect, a pair of markedness constraints was employed to rule

out all but one tone as optimal for spreading purposes. Similarly, in the analysis of Wan dialect, the appropriate accomodating tone for suffixes, H2, can be selected by ruling out other viable candidates. Since FAITH-LINK by itself orders the four type beta tones in optimality as L2, H2, L1, and H1, from most to least optimal, all that is required is a markedness constraint that militates against the spreading of L2, while allowing the spreading of H2. There are two constraints that could fulfill such a role. Firstly, *SPREAD-RIGHT fulfills this purpose since it bars spreading of the rightmost tone, which is L2, but does not inhibit the spreading of other tones, notably H2. Secondly, *SPREAD(L) can do the job, since it bars spreading of L tones, i.e. L1 and L2, but dose not inhibit the spreading of H tones, i.e. H1 and H2. The present analysis will use *SPREAD(L) to model the Wan data.

Tableau 4.23 shows the same derivation and considers the same candidates as tableau 4.22, but now includes a high-ranked *SPREAD(L).

Tableau 4.23: Wan word-level interactions for type beta. Input tonal melody: HLHL.

MU.cji.GU.mi + <i>nga</i>	*SPREAD(L)	FAITH-LINK	SPREAD-LEFT
a. MU.CJI.gu.MI-nga		**!*	
b. MU.cji.gu.MI-nga	*!	**	*
c.  MU.cji.GU.MI-nga		*	*
d. MU.cji.GU.mi-nga	*!		*

Under the influence of newly introduced *SPREAD(L), candidates 4.23b and 4.23d are ruled out right away because they spread an L tone, respectively L1 and L2. The competition then continues between the two candidates spreading the high tones. As demonstrated by candidate 4.23c, spreading H2 is preferable, since it does not push away the H1 and L1 tones, and consequently runs into a minimal number of violations of FAITH-LINK.

The two constraints employed to account for word-level type beta derivations have not been taken into consideration for type alpha derivations on this level. However, neither constraint has an influence on the type alpha result. Firstly, FAITH-LINK has no effect on any type alpha candidate, since there are no association links in the input. Secondly, adding the *SPREAD(L) constraint may punish some losing candidates in type alpha derivations, but will not detract from the optimality of winning forms, which were shown to exclusively spread the leftmost high tone.

4.5.3.4 Phrase Level Type Beta

Type beta forms display a sensitivity to the position of the form in the phrase. Specifically, phrase-final forms retain their L2 tone, but in all other forms, the final TBU is high-toned. Because the stem and word level have been modeled with the L2 as part of the intonational melody, the phrase-level phenomenon can now be straightforwardly interpreted as a case of positional faithfulness. That is, phrase-final forms are protected by a faithfulness constraint that is sensitive to phrasal position, while non-phrase-final forms lose their L2 tone under the pressure of a generally applying markedness constraint.

The markedness constraint in question is $\text{ALIGN-R}(\text{PRWD}, \text{H})$, an alignment constraint that expects a H tone associated to the rightmost TBU of the word. This will cause a violation of all type beta forms, which map an L tone to the rightmost mora, and is fixed by the behavior shown in non-phrase-final forms, which lose the L2 tone and spread H2 to the right edge of the word.

For the present analysis, the repair strategy executed by non-phrase-final forms will be taken to be deletion. The corresponding violated faithfulness constraint for deletion is MAX-TONE . The positionally sensitive version of the constraint is here called $\text{MAX-TONE}(\text{PHRASEFINAL})$. As was discussed in relation to monomoraic forms in Kagoshima and Hondo dialect, there are several alternative interpretations of the phenomenon, with highly similar analyses, so the interpretation adopted here is to some extent arbitrary. Notably, delinking of the L2 tone, at the cost of violating FAITH-LINK , also appears to lead to a satisfactory analysis.

MAX-TONE	For every tone T in the input <i>of a word in phrase-final position</i> , there
(PHRASEFINAL)	should be a corresponding tone in the output.

For the positional faithfulness effect to occur, the constraints must be ranked $\text{MAX-TONE}(\text{PHRASEFINAL}) > \text{ALIGN-R}(\text{PRWD}, \text{H}) > \text{MAX-TONE}$.

Finally, a constraint is needed to account for the repaired form in non-phrase-final contexts. With the L2 tone deleted, the repair strategy of spreading H2 to the right can be interpreted as a case of the rightmost tone spreading towards unintonated material on the right side of the domain. As such, this is another instance of the behavior promoted by FAITH-LINK .

One remaining question is whether deletion of associated tones triggers FAITH-LINK violations. This issue will be taken up in the discussion, in section 5.1.4. For the present account, deletion of associated tones will not be counted as a violation of FAITH-LINK .

Tableau 4.24 shows the phrase-level interaction for a non-phrase-final type beta form. The input is /MU.cji.GU.MI-nga/, which is the output of the word level for the underlying form *mucjigumi*, composed with the suffix *nga*. The word-level derivation of this form was presented in tableau 4.23. Note that the phrase-medial nature of the form is indicated by the double full stop. The constraint MAX-TONE is abbreviated as MAX-T.

Tableau 4.24: Wan phrase-level derivation for a long type beta form, non-phrase-final context. Input tonal melody: HLHL.

MU.cji.GU.MI-nga + ..	MAX-T(PHRFIN)	ALIGN-R(PRWD, H)	MAX-T	FAITH-LINK
a. MU.cji.GU.MI-nga..		*!		
b. ☞ MU.cji.GU.MI-NGA..			*	
c. MU.cji.gu.MI-NGA..			*	*!
d. MU.CJI.gu.MI-NGA..			*	*!*

Candidate 4.24a shows the faithful form, identical to the word-level output. This form is suboptimal because it does not align a H tone to the right of the prosodic word, going against the requirements of ALIGN-R(PRWD, H). The other three candidates delete the L2 tone, at the cost of a violation of MAX-TONE. Note that MAX-TONE(PHRASEFINAL) does not play a role in this case, since the derivation does not take place in a phrase-final context. Candidates 4.24b through 4.24d spread H2, L1, and H1, respectively. By the nature of FAITH-LINK, spreading H2 is preferred, so candidate 4.24b becomes the winning form.

Tableau 4.25 shows the derivation of the same form in a phrase-final context.

Tableau 4.25: Wan phrase-level derivation for a long type beta form, phrase-final context. Input tonal melody: HLHL.

MU.cji.GU.MI-nga	MAX-T(PHRFIN)	ALIGN-R(PRWD, H)	MAX-T	FAITH-LINK
a. ☞ MU.cji.GU.MI-nga		*!		
b. MU.cji.GU.MI-NGA	*!		*	
c. MU.cji.gu.MI-NGA	*!		*	*
d. MU.CJI.gu.MI-NGA	*!		*	**

In phrase-final contexts, MAX-TONE(PHRASEFINAL) becomes active, and overrules the requirement of the language to align a H tone to the right edge of the form. Consequently, candidates 4.25b through 4.25d are all ruled out, since they all delete the L2 tone. Instead, as demonstrated by candidate 4.25a, the optimal strategy is to remain faithful to the word-level form, and retain the L2.

4.5.3.5 Phrase Level Type Alpha

Type alpha forms do not show sensitivity to their position in the phrase. Since their output forms were already achieved at the word level, the only objective is to derive the faithful candidate at the phrase level. This is straightforwardly achieved under the present account. There is only one markedness constraint at the phrase level, which is *ALIGN-R*(PRWD, H). Type alpha forms never violate this constraint, since the last tone of the type alpha melody is H2, and this tone is mapped in words of all lengths. Consequently, word-level outputs for type alpha forms never violate a markedness constraint at the phrase level, so there is no incentive to change the form. Moreover, the other three constraints, most notably *FAITH-LINK*, are faithfulness constraints, which will only deter the language from making changes to type alpha forms.

4.5.4 Discussion

4.5.4.1 Comparison to Previous Analyses

Kubozono (2011) interpreted the L2 tone in type beta as a boundary tone, inserted at the phrase level. Under this analysis, one major issue is to explain why such a boundary tone is only inserted after type beta words, but never after type alpha words. In the present analysis, type alpha and beta show different behavior because their melodies end in different tones, making type beta, but not type alpha, sensitive to an alignment constraint.

The boundary tone account further needs to explain why the H2 tone in type beta words will take up the two final moras of a word; if the language mapped an HLH tonal contour onto a noun, forms like /MU.cji.GU.MI.../ would be expected to come out as */MU.CJI.gu.MI.../. Kubozono explains this by stating that the final mora of the word is extrametrical. In the present analysis, this is a natural result of the H2 tone's original (prefinal) position in the intonational melody. In summary, by interpreting the L2 tone as part of the intonational melody, both the extrametricality stipulation and the discrepant treatment of alpha and beta forms at phrase-level are avoided.

Uwano, too, interprets the type beta L2 tone as being related to phrase-level interactions, and separate from the word-level specifications. This agrees with the present analysis to some extent, as both accounts determine whether the L2 tone surfaces based on phrase-level interactions. Uwano solves the location of the H2 tone by positing an accent kernel here. The presence of this kernel in type beta, and the absence of a kernel in type alpha, are then also leveraged to explain the difference in word-level behavior

between the two types. The present analysis is simpler than Uwano’s account in the sense that it does not need to specify any type of accent, but only the intonational melodies. However, this is traded off for increased complexity in the stipulation of different entry levels for the two accent classes in the Stratal OT derivation.

4.5.4.2 Summary

The present analysis starts from an underlying HLH melody for type alpha, and an HLHL melody for type beta. In addition, type beta is taken to start its derivation at the stem level, while type alpha words skip the stem level and start derivations from the word level. Under these assumptions, the constraint strata as shown in table 4.5.4.2 lead to the output of the attested forms.

Table 4.26: Wan constraint strata.

Stem	SPREAD-LEFT
Word	*SPREAD(L) > FAITH-LINK > SPREAD-LEFT
Phrase	MAX-T(PHRFIN) > ALIGN-R(PRWD, H) > MAX-TONE > FAITH-LINK

4.6 Koshikijima

The Koshikijima islands are located to the southwest of Kyushu, and to the northwest of Kikaijima. Table 4.27 shows example forms of the basic intonational patterns of a dialect spoken in the Teuchi village, but representative of most of the villages on the island (Kubozono, 2012a,b, p.c.).

Table 4.27: Koshikijima basic forms.

<i>Type</i>	<i>Noun</i>	<i>N + ga</i>
A	HI	HI-ga
	A.me	a.ME-ga
	ba.RE,e	ba.RE,e-ga
	ba.RE,e..	ba.RE,e-ga..
	KE.da.MO,n	KE.da.MO,n-ga
	TO,N.NE.ru	TO,N.ne.RU-ga
	NA.TSU.ya.SU.mi	NA.TSU.YA.su.MI-ga
	NA.TSU.ya.su.mi..	NA.TSU.YA.su.mi-ga..
	KA.za,i.MO.no	KA.ZA,I.mo.NO-ga
	SA,I.BO,o.gu	SA,I.bo,o.GU-ga
SA,I.BO,o.gu..	SA,I.bo,o.gu-ga..	
B	HI	hi-GA
	a.ME	A.me-GA
	a.ME..	A.me-ga..
	TO.ta,N	TO.ta,n-GA
	ri,n.GO	RI,N.go-GA
	HA.RU.fu.KU	HA.RU.FU.ku-GA
	HA.RU.YA.su.MI	HA.RU.YA.SU.mi-GA
HA.RU.YA.su.mi..	HA.RU.YA.SU.mi-ga..	

Glosses: *hi* (Type A) = ‘sunlight’, *ame* (Type A) = ‘candy’, *baree* = ‘volleyball’, *kedamon* = ‘wild animal (colloquial)’, *tonneru* = ‘tunnel’, *natsuyasumi* = ‘summer holiday’, *kazaimono* = ‘ornament’, *saiboogu* = ‘cyborg’, *hi* (Type B) = ‘fire’, *ame* (Type B) = ‘rain’, *totan* = ‘zinc’, *ringo* = ‘apple’, *harufuku* = ‘spring clothes’, *haruyasumi* = ‘spring holiday’.

4.6.1 Descriptive Generalization

4.6.1.1 Basic Contours

The maximal tonal contour for type A can be observed in forms of four or moras. As seen for example in /KE.da.MO,n/, type A features an HLHL melody. Shorter forms show a rightmost substring of this melody, e.g. /ba.RE,e/ and /A.me/. In longer forms, the leftmost tone, H1, accomodates excess moras, as

seen in /NA.TSU.ya.SU.mi/.

The basic contour of type B follows a pattern analogous to that of type A, but with an HLH melody. Thus, forms of three or more moras show the maximal contour, e.g. /TO.ta,N/. Shorter forms show a rightmost substring, e.g. /a.ME/, /HI/. In longer forms, the H1 tone spreads: /HA.RU.YA.su.MI/.

4.6.1.2 Heavy Syllables and Monomoraic Forms

The language shows sensitivity to branching syllables in two ways. Firstly, there is a phenomenon termed ‘high tone shift’ (Kubozono, 2012b). In type A words, the H2 tone will shift to the left in case the basic pattern would associate it to a weak mora. This results in a spread L2 tone, for example in the case of /ba.RE,e-ga/, which is preferred over */BA.re,E-ga/, and similarly for the case of /KE.da.MO,n-ga/ instead of */KE.DA.mo,N-ga/. Secondly, L1 tones prefer to associate to an entire heavy syllable if given the chance. For example, the attested form is /KA.za,i.MO.no/ instead of */KA.ZA,i.MO.no/. Type B forms show no such effect, and simply map the H2 tone to a weak mora, as in /TO.ta,N/.

A third exceptional phenomenon involves the apparent fusion of the two peaks in type A words. This happens in cases where the initial syllable is heavy, and would have to house both the H1 and L1 tone under the basic pattern. Examples are /TO,N.NE.ru/ instead of */TO,n.NE.ru/, and /SA,I.BO,o.gu/ instead of */SA,i.BO,o.gu/, with the latter example also displaying high tone shift. Type B does not fuse the peaks in such contexts, but simply spreads the L tone instead, leaving H1 unassociated, e.g. in /ri,n.GO/ as opposed to */RI,n.GO/ or fused */RI,N.GO/.

Both accent types have level high monomoraic forms, although type A would be expected to have an L-toned form under the basic association pattern. For example, type A shows /HI/ instead of */hi/.

4.6.1.3 Morphology

Type A alternations such as /HI/, /HI-ga/ and /KE.da.MO,n/, /KE.da.MO,n-ga/ may suggest that type A forms are sensitive to the noun-particle boundary. However, these are exceptions due to heavy syllables and monomoraic cases, as discussed in the previous section. The regular pattern shows that the *bunsetsu* is the intonational domain for type A, seen for example in the alternations between /A.me/ and /a.ME-ga/, and between /NA.TSU.ya.SU.mi/ and /NA.TSU.YA.su.MI-ga/. Type B works analogously. For example, /a.ME/ alternates with /A.me-GA/.

At the phrase level, phrase-medial forms with two peaks lose the rightmost peak. For example, phrase-final /NA.TSU.ya.SU.mi/ alternates with phrase-medial /NA.TSU.ya.su.mi../. If a form has only one peak, there is no alternation. This also goes for peaks of forms that display the fusion process. For example, there is no difference between /SA,I.BO,o.gu/ and /SA,I.BO,o.gu../.

4.6.2 Previous Analyses

Kubozono (2012b) interprets the dialect as having HLHL and HLH autosegmental melodies for type A and B, respectively. He suggests that the language mixes TBUs, using the mora as TBU for the H2 and L2 tones, and (preferably) syllables as TBU for H1 and L1. This accounts for the L1 spreading phenomenon. Kubozono interprets the H tone shift as being due to the undesirability of associating H tones (exclusively) to weak moras. The fusion cases, although acknowledged, are not a central part of Kubozono's investigation.

Kubozono makes special note of the “paradoxical relationship” between the two H tones in the words, summarizing the phenomenon as follows:

“At the word level, H2 is distinctive and, moreover, determines the domain of H1. In this sense, H2 dominates H1 in the word domain. At the sentence level, however, H2 is deleted except in sentence-final position. What this means is that at the sentence level, H1 comes to bear a lexically distinctive role, while H2 (if manifested) serves as a boundary tone signaling the end of the sentence.” (p128)

4.6.3 Analysis

The analysis assumes HLHL and HLH underlying melodies for type A and B respectively. Furthermore, suffixation is defined to occur at the stem level. The motivation for this will become clear during the consideration of the word-level stratum.

The analysis will use a specific type of markedness constraint to derive the high tone shift, the L1 spreading, and the fusion phenomenon. The constraint is OCP(SYLHD,H/L), and is defined as follows:

OCP(SYLHD,H/L) Assign one violation mark for every pair of adjacent syllables whose syllable heads are associated with different H/L tones.

Under this view, the high tone shift and L1 spreading phenomena can be understood as repairs to push away identically intonated syllable heads. The fusion phenomenon, too, addresses this problem, by merging the tones into a single tone span. The interpretation will be described in more detail during the analysis of the various phenomena.

4.6.3.1 Stem Level Type A

The proximity of the two H tones is crucial for the decision to spread L1, fuse the peaks, or take no action. Since the type A H tone shift influences this proximity, it should become active as soon as possible, i.e. in the stem-level stratum. The H tone shift can be triggered by OCP(SYLHD,L), since an H2 tone assigned to a weak mora implies that the L tones to its left and right are on adjacent syllable heads. Furthermore, SPREAD-LEFT is added to the constraint ranking to derive the basic left-spreading nature of the tonal contour, and *SPREAD(H) is added to decide how to compensate for the H tone shift. Lastly, H tone shift will occur even if this means some of the tonal melody can no longer be associated. Consequently, OCP(SYLHD,L) should outrank NO-FLOAT. The derivation is shown in tableau 4.28 for *baree* suffixed with the particle *ga*.

Tableau 4.28: Koshikijima stem-level forms for type A. Input tonal melody: HLHL.

<i>baree</i> + <i>ga</i>	OCP(SYLHD,L)	NO-FLOAT	SPREAD-LEFT	*SPREAD(H)
a. ba.RE,e-ga		*	*	
b. BA.re,E-ga	*!			
c. ba.RE,E-ga		*	*	*!

Candidate 4.28a shows the winning, attested form, which leaves the H1 tone floating and spreads the L2 tone instead of H1, the leftmost tone, violating SPREAD-LEFT. Candidate 4.28b violates OCP(SYLHD,L). This is because /re/ and /ga/ are the syllable heads of adjacent syllables, and they are both low-toned, but derive this intonation from different underlying tones. The advantage of candidate 4.28b is that it manages to associate H1 to a TBU, but doing so at the cost of violating OCP(SYLHD,L) is suboptimal. Candidate 4.28c satisfies OCP(SYLHD,L) by spreading the H2 tone. This unnecessarily violates *SPREAD(H).

Next, the L1 spreading phenomenon can be accounted for by incorporating the H tone version of the OCP-type constraint, OCP(SYLHD,H). Note that this constraint is also responsible for triggering the fusion phenomenon, since both L1 spreading and fusion achieve the effect of eliminating the adjacency of H-toned syllable heads from different H tones. The division of labor between these two repairs is de-

terminated by NO-FLOAT. That is, fusion will occur in exactly those situations where spreading L1 would push the H1 tone out of the word. For example, the expected basic contour for *tonneru* is */TO,n.NE.ru/. Spreading L1 here to push apart the two peaks would produce */to,n.NE.ru/, leaving the H1 floating. Instead, this is a context where fusion occurs, and the attested form becomes /TO,N.NE.ru/. Consequently, to limit the application of the L1 spreading effect, OCP(SYLHD,H) should be ranked below NO-FLOAT. Tableau 4.29 shows a case of L1 spreading. Fusion will be considered afterwards, but for now, no candidates with tone fusion are included yet. Note that for space reasons, the names of some constraints are abbreviated: NO-FLOAT = NO-FLT, SPREAD-LEFT = SPRD-L, *SPREAD(H) = *SPR(H).

Tableau 4.29: Koshikijima stem-level interactions for type A, leading to L1 spreading. Input tonal melody: HLHL.

<i>kazaimono</i>	OCP(SYLHD,L)	NO-FLT	OCP(SYLHD,H)	SPRD-L	*SPR(H)
a. KA.ZA,i.MO.no			*!		*
b.  KA.za,i.MO.no				*	
c. ka.za,i.MO.no		*!		**	

Candidate 4.29a shows that the basic contour runs into a violation of OCP(SYLHD,H), because /ZA/ and /MO/ are syllable heads of adjacent syllables, and are both H due to different H tones. Candidate 4.29b fixes the problem by spreading the L1 tone instead, at the cost of a single violation of SPREAD-LEFT. This is the winning candidate. Candidate 4.29c spreads the L1 tone to the edge of the word, leaving H1 floating, which is unwarranted.

The way to add fusion as a viable repair strategy is by ranking the faithfulness constraint that blocks fusion below OCP(SYLHD,H), but above SPREAD-LEFT, the constraint blocking L1 spreading. The faithfulness constraints blocking fusion is UNIFORMITY(T), introduced in section 3.2.1.3. The definition is repeated below:

UNIFORMITY(T) For every output tone T, assign one violation mark for each correspondent of T in the input beyond the first.

The constraint is violated by fusion since several tones on the input level correspond to a single tone on the output level. Furthermore, the merged tones were not all H: they also include L1. Consequently, there is also a violation of the identity of the L1 tone, meaning that IDENT-TONE is also violated. Only one of these two constraints is needed to account for the fusion facts, so the discussion will be simplified by leaving IDENT-TONE unmentioned. It can be considered to be ranked equally high as UNIFORMITY(T).

There is one problem with adding this constraint to the stem-level ranking: it will introduce the option of tone fusion as a repair strategy for violations of OCP(SYLHD,L). The problem is demonstrated in tableau 4.30. The tableau reconsiders the *baree + ga* case treated earlier in tableau 4.28, which then resulted in H tone shift. In addition to the previous abbreviations, the OCP accounts are abbreviated here as OCP(σ ,H/L), and UNIFORMITY(T) as UNI(T).

Tableau 4.30: Failed Koshikijima stem-level derivation for type A, with fusion preferred over H tone shift. Input tonal melody: HLHL.

<i>baree + ga</i>	OCP(σ ,L)	NO-FLT	OCP(σ ,H)	UNI(T)	SPRD-L	*SPR(H)
a. ☹ ba.RE,e-ga		*!			*	
b. BA.re,E-ga	*!					
c. ba.RE,E-ga		*!			*	*
d. ☞ BA.RE,E-ga (<i>fused</i>)				*		

As before, candidate 4.30b is ruled out because of an OCP(SYLHD,L) violation, and candidate 4.30c is harmonically bounded by candidate 4.30a. Candidate 4.30a is the attested form, but not the winner of the tableau: candidate 4.30d fuses the two L tone with the two H tones around it, violating UNIFORMITY(T), but avoiding both an OCP(SYLHD,L) violation and a NO-FLOAT violation.

Because of the incompatibility of the fusion repair and L tone OCP, the fusion behavior will not be modeled at the stem level, but at the word level instead. This means that the UNIFORMITY(T) constraint can be in its default, high-ranked position, instead of its position as shown in tableau 4.30.

OCP(SYLHD,H) will remain in its specified position for the stem-level stratum, and L1 spreading will take place at the stem level. In fact, section 4.6.4.1 of the discussion will show that this is a necessary division between L1 spreading and fusion. Forms that are expected to undergo fusion will leave the stratum with the basic intonational contour. This is shown for *tonneru* in tableau 4.31.

Tableau 4.31: Koshikijima stem-level interactions for type A: no repair in spite of violated OCP(SYLHD,H). Input tonal melody: HLHL.

<i>tonneru</i>	OCP(SYLHD,L)	NO-FLT	OCP(SYLHD,H)	SPRD-L	*SPR(H)
a. ☞ TO,n.NE.ru			*		
b. to,n.NE.ru		*!		*	
c. to,N.ne.ru	*!	*		*	
d. to,N.NE.ru		*!		*	*

Candidate 4.31a shows the default pattern, which is the winning candidate of the tableau. Candidate 4.31b shows that L1 spreading is suboptimal, because of high-ranking NO-FLOAT. Candidate 4.31c

shows that the strategy used for OCP(SYLHD,L) violations, spreading L2, is out of the question. Candidate 4.31d shows that spreading H2, which avoids the OCP(SYLHD,H) violation, also causes a NO-FLOAT violation, in addition to violations of lower-ranked SPREAD-LEFT, since it is not H1, the leftmost tone, being spread, and *SPREAD(H), since it spreads an H tone. A candidate with fusion is not shown, since this is assumed to be ruled out by UNIFORMITY(T), which is back in its default, high-ranking position with the other faithfulness constraints, and hence not shown in the tableau.

4.6.3.2 Stem Level Type B

Type B has a HLH melody, so it has only a single L tone. This means it cannot violate OCP(SYLHD,L). Consequently, there is no H tone shift in type B. It is still possible for type B forms to violate OCP(SYLHD,H), so L1 spreading will occur if there are enough TBUs to keep the H1 tone in the word. An example of this is shown for *totan + ga*, shown in tableau 4.32.

Tableau 4.32: Koshikijima stem-level interactions for a type B form, showing L1 spreading. Input tonal melody: HLH.

<i>totan + ga</i>	OCP(SYLHD,L)	NO-FLOAT	OCP(SYLHD,H)	SPRD-L	*SPR(H)
a. TO.TA,n-GA			*!		*
b. \rightarrow TO.ta,n.-GA				*	

Candidate 4.32a shows the default pattern, which violates OCP(SYLHD,H) because of syllable-adjacent /TA/ and /GA/. Candidate 4.32b shows the winning form, minimally spreading the L1 tone to keep the H tones apart.

As was the case in type A, contexts that would trigger fusion are sent to the word level with both peaks intact, in spite of OCP(SYLHD,H). An example of this is shown in 4.33.

Tableau 4.33: Koshikijima stem-level interactions for type B: no repair in spite of violated OCP(SYLHD,H). Input tonal melody: HLH.

<i>ringo</i>	OCP(SYLHD,L)	NO-FLT	OCP(SYLHD,H)	SPRD-L	*SPR(H)
a. \rightarrow RI,n.GO			*		
b. ri,n.GO		*!		*	

Candidate 4.33a shows the default pattern. This form runs into a violation of OCP(SYLHD,H). However, it is still optimal compared to 4.33b, because the latter candidate leaves H1 floating. Consequently, the form will proceed to the word level with the fusion-triggering context intact.

The result of the last tableau may seem undesirable, since fusion is not attested in type B forms; type B forms show L1 spreading in such contexts instead. For example, the attested form is /ri,n.GO/, not */RI,N.GO/. However, the present approach is necessary to be able to successfully separate the L1 spreading and fusion phenomena for type A. Section 4.6.3.4 will deal with the correct derivation of type B forms.

Default forms in type B will simply show the left-spreading, one-to-one behavior, for example, *haruyasumi* leaves the stem level as /HA.RU.ya.SU.mi/.

4.6.3.3 Word Level Type A

The word level will account for the fusion repair strategy and type B L1 spreading. A sketch of the fusion and L1 spreading accounts was already provided for stem level type A derivations, but the word-level stratum is different in one respect: there are now already tonal association links present, and FAITH-LINK is active to retain these links. More specifically, L1 spreading, which was previously blocked by SPREAD-LEFT, is now blocked by FAITH-LINK, since an association to the H1 tone must be delinked in favor of spreading L1 across a whole syllable.

An example derivation of fusion is shown in tableau 4.34. The input is the stem output of underlying *tonneru*, which is the one-to-one mapping /TO,n.NE.ru/.

Tableau 4.34: Koshikijima word-level interactions for type A, leading to tone fusion. Input tonal melody: HLHL.

TO,n.NE.ru	OCP(σ ,H)	FAITH-LINK	UNIFORMITY(T)	NO-FLOAT
a. TO,n.NE.ru	*!			
b. \rightarrow TO,N.NE.ru (<i>fused</i>)			**	
c. to,n.NE.ru		*!		*

The faithful candidate, 4.34a, fatally violates OCP(SYLHD,H). Candidate 4.34b is the winner, and the attested form. This candidate applies fusion to avoid the OCP(SYLHD,H) violation, violating UNIFORMITY(T) twice because three tones from the input correspond to a single output tone. Candidate 4.34c shows the violations for an L1 spreading form. Spreading the L1 tone incurs a violation of FAITH-LINK, since the association to the H1 tone is delinked. Because of the high rank of FAITH-LINK, this strategy is suboptimal.

Forms that already underwent L1 spreading at the stem level will no longer violate OCP(SYLHD,H), so no fusion is warranted. This is shown in tableau 4.35. The input is the stem-level output of *kazaimono*,

which is /KA.za,i.MO.no/, with L1 spreading. This derivation also serves as an example of forms with a simpler prosodic structure, that never violated OCP(SYLHD,H) to begin with.

Tableau 4.35: Koshikijima word-level interactions for a type A form that does not violate OCP(SYLHD,H). Input tonal melody: HLHL.

KA.za,i.MO.no	OCP(σ ,H)	FAITH-LINK	UNIFORMITY(T)	NO-FLOAT
a. \Rightarrow KA.za,i.MO.no				
b. ka.za,i.MO.no		*!		*
c. KA.ZA,I.MO.no (<i>fused</i>)			*!*	

Candidate 4.35a is the faithful candidate, which is also the winning, attested form. Candidate 4.35b shows that further L1 spreading is unwarranted, and simply leaves H1 floating unnecessarily. The fusion candidate, 4.35c, is also suboptimal here, because there is no OCP(SYLHD,H) violation that warrants a violation of the UNIFORMITY(T) constraint.

Tableau 4.36 shows a case of H tone fusion in a form with shifted H2, demonstrating that the stem-level tone shift is preserved even in fusion cases.

Tableau 4.36: Koshikijima word-level interactions for a type A form showing H tone shift, leading to tone fusion. Input tonal melody: HLHL.

SA,i.BO,o.gu	OCP(σ ,H)	FAITH-LINK	UNIFORMITY(T)	NO-FLOAT
a. SA,i.BO,o.gu	*!			
b. \Rightarrow SA,I.BO,o.gu (<i>fused</i>)			**	
c. sa,i.BO,o.gu		*!		*
d. SA,I.bo,O.gu		*!*		
e. SA,i.bo,O.gu		*!		
f. SA,I.BO,O.gu (<i>fused</i>)		*!	**	

Candidate 4.36a again shows the faithful candidate from the stem level. It is ruled out by OCP(SYLHD,H). The winner is candidate 4.36b, which only applies fusion. Candidate 4.36c represents the L1 spreading repair, which violates high-ranked FAITH-LINK. Candidates 4.36d and 4.36e show two variations that push the H2 tone back from its shifted position to the default position, but this comes at no gain, and needlessly incurs FAITH-LINK violations. Candidate 4.36f also pushes back the H2 tone, but still fuses the two peaks. This, too, violates FAITH-LINK unnecessarily. Note that the number of UNIFORMITY(T) violations for candidate 4.36f does not increase, because the candidate still fuses only three tonal elements together, and is not sensitive to the length of the resulting tone span.

Finally, tableau 4.37 shows that forms with H2 tone shift and a floating H1 are also unaffected by the word-level stratum.

Tableau 4.37: Koshikijima word-level interactions for a type A form with H2 tone shift and a floating H1. Input tonal melody: HLHL.

ba.RE,e-ga	OCP(σ ,H)	FAITH-LINK	UNIFORMITY(T)	NO-FLOAT
a. \rightarrow ba.RE,e-ga				*
b. BA.RE,e-ga (<i>fused</i>)			*!*	
c. BA.re,E-ga		*!***		

Candidate 4.37a is the faithful form, which is optimal, since no OCP(SYLHD,H) violation triggers any repair. The form does violate NO-FLOAT once because H1 is unassociated. Candidate 4.37b shows the fusion repair, but since it is unnecessary, it is out due to UNIFORMITY(T) violations. Candidate 4.37c reverts the form back to the default, one-to-one mapping, but grossly violates FAITH-LINK in doing so.

4.6.3.4 Word Level Type B

There is no fusion in type B forms, even though fusion contexts do occur. For example, type B shows /ri,n.GO/ instead of */RI,N.GO/. However, the stem-level derivation does not account for this, outputting /RI,n.GO/ instead. Consequently, at the word level, type B should prefer L1 spreading over fusion.

A straightforward way to rule out fused forms is by stating that OBLIGATORINESS(L) is active. Since there is no L2 tone in type B, fused forms are all-H, which is punished by OBLIGATORINESS(L). The constraint has no influence on type A derivations, since all type A forms except for monomoraic forms will at least map L2. Monomoraic forms for both accent types will be considered at the phrasal level. For now, OBLIGATORINESS(L) is added at the top of the constraint ranking to derive type B /ri,n.GO/. The derivation is shown in tableau 4.38. The input is the stem-level output for *ringo*, which is the one-to-one mapping, /RI,n.GO/, derived in tableau 4.33. Note that FAITH-LINK is abbreviated as F-LINK.

Tableau 4.38: Koshikijima word-level interactions for type B, showing L1 spreading rather than fusion. Input tonal melody: HLH.

RI,n.GO	OBLIGATORINESS(L)	OCP(σ ,H)	F-LINK	UNI(T)	NO-FLOAT
a. RI,n.GO		*!			
b. \rightarrow ri,n.GO			*		*
c. RI,N.GO (<i>fused</i>)	*!			**	

Candidate 4.38a shows the faithful candidate, which is out because of an OCP(SYLHD,H) violation. Candidate 4.38b spreads the L1 tone, leaving H1 floating, which is normally fatal because of FAITH-LINK. However, in this case, it is the winning, attested form, because candidate 4.38c, the fusion candidate, violates OBLIGATORINESS(L) since it surfaces without an L tone.

Note that the OBLIGATORINESS(L) constraint is also active in monomoraic forms, both for type A and type B. This means that some forms, if not all, will leave the word-level stratum with an L tone. This is not explored here in detail, since the results for monomoraic forms will be overwritten by the phrase-level interactions.

4.6.3.5 Phrase Level Type A

At the phrase level, non-phrase-final words are restricted to a single peak. That is, non-phrase-final words are restricted by CULMINATIVITY(H), introduced in section 3.2.4. Its definition is repeated here:

CULMINATI- VITY(H)	Assign one violation mark for every prosodic word that has more than one H tone associated to it.
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As was the case for the phrase-level phenomena in Wan dialect, the phrase-final form is exempt from the pressures placed on phrase-medial forms. Consequently, we need a positional faithfulness constraint. The peak that is eliminated by CULMINATIVITY(H) surfaces as an L tone, which will be interpreted as a violation of IDENT-TONE, since an H tone in the input surfaces as an L tone in the output. The positional faithfulness version of this constraint is IDENT-TONE(PHRASEFINAL):

IDENT-TONE (PHRASEFINAL)	Every output correspondent to a tone T in the input of a phrase-final word should be identical to T.
-----------------------------	--

As before, the positional faithfulness effect is then achieved by the ranking IDENT-TONE(PHRASEFINAL) > CULMINATIVITY(H) > IDENT-TONE.

In phrase-medial forms, then, one of the two peaks will be changed to L. This is always the rightmost peak in the word. Put differently, the leftmost peak, at the left edge of the word, is always retained. This can be encoded through an alignment constraint: ALIGN-L(PRWD, H). This constraint is only needed to choose between peaks, and never drives a tonal change. Consequently, it should be ranked low.

Tableau 4.39 shows the derivation of a peak elimination. The input is word-level /KA.za,i.MO.no/, which was derived in tableau 4.35. CULMINATIVITY(H) has been abbreviated to CULM(H), and IDENT-TONE(PHRASEFINAL) to IDENT-T(PHRFIN).

Candidate 4.39a is the faithful candidate from the word level. This form is not acceptable because it has two peaks, running counter to CULMINATIVITY(H). Candidate 4.39b eliminates the rightmost of

Tableau 4.39: Koshikijima phrase-level interactions for type A, phrase-medial context. Input tonal melody: HLHL.

KA.za,i.MO.no + ..	IDENT-T(PHRFIN)	CULM(H)	IDENT-TONE	ALIGN-L(PRWD, H)
a. KA.za,i.MO.no..		*!		
b. \Rightarrow KA.za,i.mo.no..			*	
c. ka.za,i.MO.no..			*	*!

the two peaks, at the cost of one violation to IDENT-TONE. This is optimal, and is the attested form. Candidate 4.39c shows that eliminating the leftmost peak instead incurs an unnecessary violation of ALIGN-L(PRWD, H).

In phrase-final contexts, both peaks are preserved. The same form, /KA.za,i.MO.no/, is considered in tableau 4.40:

Tableau 4.40: Koshikijima phrase-level interactions for type A, phrase-final context. Input tonal melody: HLHL.

KA.za,i.MO.no	IDENT-T(PHRFIN)	CULM(H)	IDENT-TONE	ALIGN-L(PRWD, H)
a. \Rightarrow KA.za,i.MO.no		*!		
b. KA.za,i.mo.no	*!		*	
c. ka.za,i.MO.no	*!		*	*

Candidate 4.40b still harmonically bounds candidate 4.40c, but is no longer the winner of the tableau. This is because eliminating one of the peaks now violates IDENT-TONE(PHRASEFINAL), since this is a phrase-final context. Consequently, candidate 4.40a, the faithful candidate, is the winner, despite its violation of CULMINATIVITY(H).

Note that in both tableaux, the faithful candidate only violates CULMINATIVITY(H). Forms that have only one peak, including forms that underwent fusion, automatically satisfy CULMINATIVITY(H) because there is no second peak. Hence, they do not violate any of the active constraints in the phrasal stratum, and will go through the stratum unchanged.

Finally, the monomoraic forms must also be accounted for. While the default pattern predicts such forms to associate only L2, the attested form is H-toned, e.g. in /HI/. Positing an OBLIGATORINESS(H) constraint at the top of the constraint ranking accounts for this fact. Forms of two or more moras in length already associate an H tone, so they are not affected by this addition. Tableau 4.41 shows the derivation of the H-toned monomoraic form. The input is L-toned /HI/, the result of one-to-one association of the HLHL melody. The OBLIGATORINESS(H) constraint is abbreviated as OBLIG(H), and IDENT-TONE as IDENT-T.

Tableau 4.41: Koshikijima phrase-level interactions for a monomoraic type A form. Input tonal melody: HLHL.

hi	OBLIG(H)	IDENT-T(PHRFIN)	CULM(H)	IDENT-T	ALIGN-L(PRWD, H)
a. $\begin{array}{c} \sigma \\ \\ \text{hi} \\ \\ \text{HLHL} \\ \\ \sigma \end{array}$	*!				*
b. $\begin{array}{c} \text{HI} \\ \\ \text{HLHH} \end{array}$				*	

Candidate 4.41a shows the faithful candidate. This candidate fatally violates OBLIGATORINESS(H). The winning, attested form is 4.41b, which changes L2 into an H tone to satisfy OBLIGATORINESS(H).

In addition to violating OBLIGATORINESS(H), the faithful candidate incurs a violation of ALIGN-L(PRWD, H). However, this constraint by itself cannot drive the tonal change, since it is ranked below IDENT-TONE. It is not desirable to rerank the alignment constraint above IDENT-TONE, since this would drive tonal change in longer forms as well, e.g. trimoraic /ba.RE,e/ might instead come out as */BA.RE,e/.

As has been the case in other analyses of monomoraic forms, several other interpretations of the derivation are possible. For example, the monomoraic forms may be derivable through the use of tone-skipping or tonal deletion. Since the present account already has the tonal change-related faithfulness constraint, IDENT-TONE, in place, the monomoraic forms are accounted for in this way.

4.6.3.6 Phrase Level Type B

Type B functions completely analogously to type A. Since H1 is also the leftmost tone in type B, ALIGN-L(PRWD, H) will once again favor the leftmost peak in forms that associate two peaks to the word, while CULMINATIVITY(H) will force a change in the rightmost peak. This process occurs only phrase-medially, since phrase-final forms are protected by IDENT-TONE(PHRASEFINAL). Finally, monomoraic forms are output with an H tone, under pressure of high-ranked OBLIGATORINESS(H).

4.6.4 Discussion

4.6.4.1 L1 Spreading at the Word Level

The presented analysis proposes to have the OCP(SYLHD,H) constraint active at both the stem level, for L1 spreading, and the word level, for fusion. Intuitively, this seems like a redundancy that could be avoided by simply situating both the fusion and L1 spreading phenomena at the word level. However, it will be shown that such an attempt leads to a ranking paradox. In the following, a number of partial ranking requirements are deduced that cannot all be simultaneously satisfied.

Firstly, since OCP(SYLHD,L) is no longer active at the word level, the effects of H tone shift must be protected by FAITH-LINK. This is true even for cases where H tone shift has pushed a tone out of the word, for example in /ba.RE,e-ga/. Consequently, the first part of the ranking requirements can be deduced:

Ranking requirement: FAITH-LINK > NO-FLOAT

Note that reintroducing OCP(SYLHD,L) will recreate the problem that occurred at the stem level, i.e. the availability of fusion repairs to fix OCP(SYLHD,L) violations, rather than H tone shift.

As was discussed in the stem level stratum, NO-FLOAT is the motivating factor for fusion; fusion occurs to make sure the H1 tone is not pushed out of the word by an L1 spread. Consequently, constraints blocking fusion should rank below NO-FLOAT:

Ranking requirement: NO-FLOAT > UNIFORMITY(T), IDENT-TONE

Lastly, the constraint blocking L1 spreading is FAITH-LINK. L1 spreading is the default repair strategy, being overtaken by fusion only to prevent NO-FLOAT violations. Consequently, violating the constraints blocking L1 spreading should be ‘cheaper’ than violating those blocking fusion. This means that FAITH-LINK should rank below at least one of the constraints blocking fusion:

Ranking requirement: UNIFORMITY(T) and/or IDENT-TONE > FAITH-LINK

By combination of the three ranking requirements above, there is a ranking paradox: FAITH-LINK > NO-FLOAT > UNIFORMITY(T) > FAITH-LINK (where UNIFORMITY(T) also stands in for IDENT-TONE).

4.6.4.2 OCP(SYLHD,T)-type constraints

An alternative to the OCP(SYLHD,T)-type constraints is to posit two separate constraints for the different processes of pushing the peaks apart and shifting the H2 tone away from the weak mora. More specifically, the discussion will consider the pair of *CLASH, militating against H tones anywhere in adjacent syllables, and *WEAK-H, a constraint to militate against a relation between H tones and weak moras. The choice for OCP(SYLHD,T)-type constraints over such an alternative is motivated by two factors. Firstly, it provides a uniform type of constraint to model two interactions of the Koshikijima dialect that are quite different on the surface. On the other hand, the alternative account has to posit two very different types of constraint.

Secondly, the alternative constraints actually provide inferior coverage. There are attested forms that have the H tones in adjacent syllables, but one of the H tones is not a syllable head, for example in the case of type B /MI.ka,N/. This does not violate OCP(SYLHD,H), but would probably violate most conceptions of a *CLASH-type constraint. In the case of *WEAK-H, two variants come to mind: either a constraint that bars all cases of association between an H tone and a weak mora, which will be referred to here as *WEAK-H(STRICT), or one that bars cases where the H tone is associated exclusively to a weak mora, which will be referred to as *WEAK-H(SOFT). The former runs into problems in the situation of H1 spreading over heavy syllables, which is attested in many forms, e.g. /SA,I.BO,o.gu/. *WEAK-H(SOFT) does not have this problem, but there are still attested cases that violate the constraint in type B forms ending in a heavy syllable, such as /NI.WA.to,I/. In contrast, the OCP(SYLHD,T)-type constraints are never violated, and all cases of the default spreading behavior that would cause a violation of an OCP(SYLHD,T) constraint are avoided through repair strategies.

Despite the apparent superiority of the OCP(SYLHD,T) constraints for the Koshikijima dialect, further consideration in section 5.1.2 suggests that alternatives focusing on weak moras seem to offer a better typological picture.

4.6.5 Summary

Assuming underlying HLHL and HLH melodies, and suffixation at the stem-level, the derivations follow from the constraint rankings in table 4.42.

Table 4.42: Koshikijima constraint strata.

Stem	OCP(SYLHD,L) > NO-FLOAT > OCP(SYLHD,H) > SPREAD-LEFT > *SPREAD(H)
Word	OBLIGATORINESS(L) > OCP(SYLHD,H) > FAITH-LINK > NO-FLOAT > UNIFORMITY(T)
Phrase	OBLIGATORINESS(H) > IDENT-TONE(PHRASEFINAL) > CULMINATIVITY(H) > IDENT-TONE > ALIGN-L(PRWD, H)

4.7 Old Koshikijima

There exists earlier data on the dialect spoken on the Koshikijima islands. Kamimura (1937) reports an intonational pattern that is strikingly different from modern-day Koshikijima dialect. Example forms are given in table 4.43.

Table 4.43: Old Koshikijima forms.

Type	Noun	<i>N + mo</i>
A	HI	
	A.me	
	ki.NU,u	ki.NU,u-mo
	KE.da.MO,n	
	GE,n.SU,i	
	a.SU.re.MO,n	
	SU.zu.MU,u.shi	
	jo,O.ki.SE,n	
	mu.KA.shi.ba.NA.shi	
	ka.SU.ga.se,n.SHE,e	ka.SU.ga.se,n.SHE,e-mo
B	HI	
	a.ME	
	SA.to,U	
	u.GU,i.SU	
	o.TU.ki.sa.MA	
	o.KYA.ku.sa,N	
	ji,N.ba.o,I	

Glosses: *hi* (Type A) = ‘sunlight’, *ame* (Type A) = ‘candy’, *kinuu* = ‘yesterday’, *kedamon* = ‘wild animal (colloquial)’, *gensui* = field marshal, *asuremon* = ‘lost article’, *suzumuushi* = ‘bell cricket’, *jookisen* = ‘steamship’, *mukashibanashi* = ‘folklore’, *kasugasenshee* = ‘teacher Kasuga’, *hi* (Type B) = ‘fire’, *ame* (Type B) = ‘rain’, *satou* = ‘sugar’, *uguisu* = ‘Japanese bush warbler’, *otukisama* = ‘the moon’, *okyakusan* = ‘customer (polite form)’, *jinbaoi* = ‘battle surcoat’.

4.7.1 Descriptive Generalization

4.7.1.1 Basic Contours and Monomoraic Form

Relative to modern Koshikijima dialect, the Old Koshikijima dialect has an additional L tone at the left side of both melodies. Type A, then, features a maximal LHLHL melody assigned from right to left. For example, /a.SU.re.MO,n/. Excess moras associate to L2, as exemplified in the hexamoraic

form, /mu.KA.shi.ba.NA.shi/. Shorter forms display a rightmost substring of the LHLHL melody, as in /KE.da.MO,n/, /ki.NU,u/, and /A.me/. The monomoraic form for type A is H-toned, e.g. /HI/.

Type B features an LHLH melody in forms of length four or higher, for example in /u.GU,i.SU/. It is again L2 that is the accommodating mora, for example in /o.KYA.ku.sa,N/. Shorter forms display a rightmost substring, e.g. /SA.to,U/, and /a.ME/. In fact, this generalization also holds for monomoraic forms, which are H-toned, e.g. /HI/.

4.7.1.2 Morphology

The language shows no sensitivity to the noun-particle boundary; both accent classes use the bunsetsu as intonational domain. Furthermore, Kamimura does not report a phrase-level deletion process, as was attested in modern Koshikijima dialect, although phrase-level interactions generally are not mentioned in the report.

4.7.1.3 High Tone Shift

Like the modern dialect, the language displays high tone shift in type A: the H2 tone will shift one mora to the left if it were to be mapped to a weak mora under the default pattern. Examples of this are /ki.NU,u-mo/, which is preferred to */KI.nu,U-mo/, and /SU.zu.MU,u.shi/, instead of */su.ZU.mu,U.shi/. Type B is exempt from this generalization, as demonstrated by the lack of movement in /SA.to,U/. Strikingly, type A only displays high tone shift for H2. If H1 is associated to a weak mora, this situation is not repaired. For example, the attested form is /jo,O.ki.SE,n/, rather than */JO,o.ki.SE,n/. Type B, too, can associate H1 to weak moras, for example in /ji,N.ba.o,I/.

Unlike the modern dialect, Old Koshikijima does not feature H-tone fusion or L2 spreading to keep H-toned adjacent syllable heads apart. For example, type A /GE,n.SU,i/ is attested rather than */GE,N.SU,i/ or */ge,n.SU,i/. Similarly, type B displays /u.GU,i.SU/ instead of */u.GU,I.SU/ or */U.gu,i.SU/.

4.7.2 Previous Analyses

The work of Kamimura (1937) predated the N-pattern accent framework by several decades, so his analysis is not in terms of the two-type split. Rather, he reported the three different intonation patterns separately.

Kubozono (2012b) compares the relation of the peaks in the Old Koshikijima pattern with that of modern Koshikijima:

“[T]he domain of H1 differs between our [modern Koshikijima] data and Kamimura’s. In Kamimura’s data, the default location of H1 is the second mora of the word in both A-type and B-type, and does not move or spread either to the left or to the right even in long words[.] In this system, H1 is independent of H2 and does not function to distinguish between the two tonal types.” (p126)

4.7.3 Analysis

In line with the analysis of Koshikijima dialect, the high tone shift phenomenon can be modeled through the activity of OCP(SYLHD,L). For convenience, the definition of this constraint is repeated here:

OCP(SYLHD,L) Assign one violation mark for every pair of adjacent syllables whose syllable heads are associated with different L tones.

This immediately excludes the type B H2 tone from shifting, since it is not preceded by an L tone, so it can never repair an OCP(SYLHD,L) violation this way. The way that H1 tones will be excluded from the phenomenon is by inserting L1 at a later stratum; since L1 is not there during the activity of OCP(SYLHD,L), there will be no reason for H1 to move because there is no violation. Moreover, it is the insertion of L1 that will push H1 onto a weak mora, in the case of word-initial heavy syllables.

To accomplish this approach, it is necessary to derive the stem level forms with a left-spreading contour, i.e. a spread H1. This may seem counterintuitive, since the surface form spreads L2 to excess moras instead of H1. The reason for spreading H1 will become clear in the consideration of the word level. Furthermore, suffixation must also occur at the stem level, to prevent the stem-level melody having to shift to the right in a later stratum.

Note that since the L1 tone will be inserted at a later stratum, the melodies for the stem level are HLHL/HLH. However, the tone numbering still takes L1 into account. Consequently, the numbering for the stem-level tones is H1L2H2L3/H1L2H2.

4.7.3.1 Stem Level Type A

Since L1 will be inserted at the word level, the underlying tonal melody for type A is HLHL. As was stated, the objective for the stem-level output is to derive forms with a left-spread melody, i.e. spreading H1. Furthermore, OCP(SYLHD,L) should apply at this level. To prevent repairs of OCP(SYLHD,L) through H2 spreading, *SPREAD(H) is also required.

The constraint ranking and an example derivation of the default pattern are shown in tableau 4.44.

Tableau 4.44: Default Old Koshikijima type A stem-level interactions. Input tonal melody: HLHL.

<i>jookisen</i>	OCP(SYLHD,L)	SPREAD-LEFT	*SPREAD(H)
a. \Rightarrow JO,O.ki.SE,n			*
b. JO,o.ki.SE,n		*!	
c. JO,o.KI.SE,n		*!	*
d. JO,o.KI.se,n		*!	

Candidate 4.44a shows the left-spreading form, which is optimal at the stem level. Candidates 4.44b through 4.44d show that spreading any other tone is ruled out by SPREAD-LEFT, at least when OCP(SYLHD,L) does not play a role.

A case of H2 shift is shown in tableau 4.45.

Tableau 4.45: Old Koshikijima type A stem-level interactions for a form with H2 shift. Input tonal melody: HLHL.

<i>suzumuushi</i>	OCP(SYLHD,L)	SPREAD-LEFT	*SPREAD(H)
a. SU.ZU.mu,U.shi	*!		*
b. SU.zu.mu,U.shi	*!	*	
c. SU.zu.MU,U.shi		*	*!
d. \Rightarrow SU.zu.MU,u.shi		*	

Candidate 4.45a shows the default left-spreading behavior. This violates the OCP(SYLHD,L) constraint, as /mu/ and /shi/ are syllable-adjacent syllable heads from different low tones. Candidate 4.45b shows that spreading L2 does nothing to help the situation either. Candidate 4.45c repairs the OCP(SYLHD,L) constraint by spreading the H2 tone, but this is suboptimal compared to the winning candidate, 4.45d, which spreads the L3 tone.

Lastly, H2 shift occurs even when this means pushing a tone out of the word. Consequently, OCP(SYLHD,L) must outrank NO-FLOAT, as shown in tableau 4.46. The input is the trimoraic noun *kinuu*, combined with the monomoraic suffix *mo*.

Tableau 4.46: Old Koshikijima type A stem-level interactions for a short form. Input tonal melody: HLHL.

<i>kinuu + mo</i>	OCP(SYLHD,L)	NO-FLOAT	SPREAD-LEFT	*SPREAD(H)
a. KI.nu,U-mo	*!			
b. ki.nu,U-mo	*!	*	*	
c. ki.NU,U-mo		*	*	*!
d. \rightarrow ki.NU,u-mo		*	*	
e. KI.NU,u-mo		**!	**	*

Candidate 4.46a shows the default behavior, spreading all four tones. This violates OCP(SYLHD,L) on account of the /nu/ and /mo/ syllable heads. The same goes for candidate 4.46b, while candidate 4.46c unnecessarily repairs the OCP(SYLHD,L) violation with the spreading of an H tone. Candidate 4.46d then, is the optimal output for the stem stratum. Candidate 4.46e shows that spreading of the H2 tone, after shifting to the left, is undesirable, since it leaves both H1 and L2 unassociated, unnecessarily violating NO-FLOAT. It also runs into multiple violations of SPREAD-LEFT, since both the H2 and L3 tones have spread, despite not being leftmost.

For completeness, tableau 4.47 considers the derivation of a longer form, showing that in default cases, H1 is the spreading tone at the stem level. The input is the six-mora noun *mukashibanashi*.

Tableau 4.47: Old Koshikijima type A stem-level interactions for a long form, showing H1 spreading. Input tonal melody: HLHL.

<i>mukashibanashi</i>	OCP(SYLHD,L)	NO-FLOAT	SPREAD-LEFT	*SPREAD(H)
a. \rightarrow MU.KA.SHI.ba.NA.shi				**
b. MU.ka.shi.ba.NA.shi			*!*	
c. MU.ka.SHI.BA.NA.shi			*!*	**
d. MU.ka.SHI.ba.na.shi			*!*	

The four candidates show the spreading of the four tones of the HLHL melody, respectively. Candidate 4.47a spreads the leftmost tone, which is optimal, since it is the only way to avoid violating SPREAD-LEFT. The other three candidates are out because unnecessary violations of SPREAD-LEFT are incurred. Candidate 4.47c also incurs *SPREAD(H) violations because it spreads an H tone.

4.7.3.2 Stem Level Type B

Unlike type A, type B does not feature the H tone shift, because no L3 tone is present to trigger the OCP(SYLHD,L) violation. Consequently, all that needs to be shown is that type B, too, outputs a left-spread contour to the word level. An example derivation is shown in tableau 4.48 for the five-moraic

jinbaoi.

Tableau 4.48: Default Old Koshikijima type B stem-level interactions. Input tonal melody: HLH.

<i>jinbaoi</i>	OCP(SYLHD,L)	NO-FLOAT	SPREAD-LEFT	*SPREAD(H)
a. ☞ JI,N.BA.o,I				**
b. JI,n.ba.o,I			*!*	
c. JI,n.BA.O,I			*!*	**

4.7.3.3 Word Level Type A

At the word level, the L1 tone is prefixed to the tonal melody. Since OCP(SYLHD,L) is not active at this stratum, the L1 tone can safely be allowed into the word, at the cost of a FAITH-LINK violation. An example derivation is shown in tableau 4.49. The input is the five-mora form *jookisen*, intonated at the stem level with spread H1, /JO,O.ki.SE,n/.

Tableau 4.49: Default Old Koshikijima type A word-level interactions. Input tonal melody: HLHL. Additionally, an L tone is prefixed.

L + JO,O.ki.SE,n	NO-FLOAT	FAITH-LINK
a. JO,O.ki.SE,n	*!	
b. ☞ jo,O.ki.SE,n		*

Candidate 4.49a is the fully faithful candidate. The candidate is suboptimal because it does not associate L1 to any part of the word, leaving it floating on the left side of the melody. Candidate 4.49b shows that making room for the L1 tone, at the cost of violating FAITH-LINK, is the preferred option.

Without further stipulations, the analysis runs into a problem here, because it cannot account for the fact that type A H2 tones are never shifted back into a weak mora position. For example, the analysis has to derive /SU.zu.MU,u.shi/ rather than */su.ZU.mu,U.shi/. Paradoxically, FAITH-LINK is violated to allow the L1 tone to be associated, but, since OCP(SYLHD,L) can no longer be active, it is FAITH-LINK that has to stop such insertions in cases where H2 would be pushed back. The problem is demonstrated in tableau 4.50.

Tableau 4.50: Failed Old Koshikijima type A word-level interactions for words with H tone shift. Input tonal melody: HLHL. Additionally, an L tone is prefixed.

L + SU.zu.MU,u.shi	NO-FLOAT	FAITH-LINK
a. ☹ SU.zu.MU,u.shi	*!	
b. ☞ su.ZU.mu,U.shi		***

Candidate 4.50a shows the fully faithful candidate, which is the attested form. However, under the given ranking, candidate 4.50b, which undoes the L3 spread originally caused by H tone shift to in order to make room for L1, is optimal.

A crucial insight to solving the problem is that NO-FLOAT does not have to outrank FAITH-LINK if another constraint will do that for it. In other words, if FAITH-LINK is violated for other reasons already, then the L1 tone can get a ‘free ride’ to achieve its insertion. One generalization that can be made is that L1 can only be added to the melody in contexts where there is room for it in the H1 tone span, while the other tones cannot or will not give way. Consequently, the insertion process might be modeled successfully if the H1 tone span was already violating FAITH-LINK for different reasons.

Such an effect can be achieved by ruling out the spreading of H tones at the word level with *SPREAD(H), undoing the effect of the stem-level spreading. This will cause the H1 tone to shrink, so the L1 and L2 tones can occupy the newly available space. This is the motivation for the left-spreading nature of the stem stratum; if the L2 tone was already the spread tone, there would be no way to create the necessary faithfulness violations.

Since L2 is attested as the accomodating tone, the spreading of L1 must now be ruled out. This can be achieved with *SPREAD-LEFT. With these constraints added to the stratum, and the ranking of FAITH-LINK over NO-FLOAT, the above cases can be considered once more. First, the derivation of /SU.zu.MU,u.shi/ is considered in tableau 4.51.

Tableau 4.51: Old Koshikijima type A word-level derivation preserving the L3 spread. Input tonal melody: HLHL. Additionally, an L tone is prefixed.

L + SU.zu.MU,u.shi	*SPREAD-LEFT	*SPREAD(H)	FAITH-LINK	NO-FLOAT
a. SU.zu.MU,u.shi				*
b. su.ZU.mu,U.shi			*!***	
c. SU.zu.mu,U.shi			*!	*

Candidate 4.51a shows the faithful candidate, which is also the attested form. It violates NO-FLOAT once because it does not associate the prefixed L1 tone to any TBU. As before, candidate 4.51b violates FAITH-LINK three times in trying to make room for the L1 tone. Since FAITH-LINK is now ranked higher than NO-FLOAT, this candidate can be ruled out. Candidate 4.51c shows that, despite the status of L1 as accomodating tone, it will not push back the L3 tone, since this unnecessarily violates FAITH-LINK.

Next, the derivation of /jo,O.ki.SE,n/ is reconsidered in tableau 4.52:

Candidate 4.52a is the faithful candidate, which violates the newly introduced constraints. As before,

Tableau 4.52: Reconsidered default Old Koshikijima type A word-level interactions. Input tonal melody: HLHL. Additionally, an L tone is prefixed.

L + JO,O.ki.SE,n	*SPREAD-LEFT	*SPREAD(H)	FAITH-LINK	NO-FLOAT
a. JO,O.ki.SE,n	*!	*		*
b. \rightarrow jo,O.ki.SE,n			*	
c. JO,o.ki.SE,n			*	*!

candidate 4.52b, the attested form, is optimal. Candidate c shows that despite the accomodating nature of the L2 tone, it should not spread so far as to block the L1 insertion, since it now unnecessarily violates NO-FLOAT.

Finally, the previously discussed phenomena are combined in the derivation of a longer form with H tone shift in tableau 4.53. The input is /KA.SU.GA.SE,n.SHE,e-mo/. Note that this input has a spread H1 because of the stem-level derivation, and that the suffix *mo* was also already appended at the stem level.

Tableau 4.53: Old Koshikijima type A word-level interactions for a long form with shifted H2. Input tonal melody: HLHL. Additionally, an L tone is prefixed.

L + KA.SU.GA.SE,n.SHE,e-mo	*SPREAD-LEFT	*SPREAD(H)	FAITH-LINK	NO-FLOAT
a. KA.SU.GA.SE,n.SHE,e-mo		*!***		*
b. \rightarrow ka.SU.ga.se,n.SHE,e-mo			***	
c. KA.su.ga.se,n.SHE,e-mo			***	*!
d. ka.SU.ga.se,n.she,E-mo			****!	
e. ka.SU.GA.SE,n.SHE,e-mo		*!*	*	
f. ka.su.ga.SE,n.SHE,e-mo	*!*		***	

Candidate 4.53a shows the faithful candidate, which retains the H1 spread, going against the requirements of high-ranked *SPREAD(H). Candidate 4.53b is the winning, attested form, shrinking the H1 span, allowing L1 into the word, and spreading L2 where necessary.

Candidate 4.53c shows that simply spreading L2 is suboptimal, since this leaves the L1 tone unnecessarily floating. This is where the H1 spread is crucial; since shrinking the H1 spread causes FAITH-LINK violations already, inserting L1 is ‘free’. Candidate 4.53d shows that pushing the H2 tone back onto a weak mora is an unnecessary violation of FAITH-LINK. Candidate 4.53e shows that, under the influence of *SPREAD(H), the H1 tone is no longer a suitable accomodating tone. Finally, candidate 4.53f shows the necessity of *SPREAD-LEFT to rule out L1 as the spreading tone.

4.7.3.4 Word Level Type B

The type B derivations run analogously to those shown in type A. For completeness, the case of /ji,N.ba.o,I/ is shown in tableau 4.54.

Tableau 4.54: Default Old Koshikijima type B word-level interactions. Input tonal melody: HLH. Additionally, an L tone is prefixed.

L + JI,N.BA.o,I	*SPREAD-LEFT	*SPREAD(H)	FAITH-LINK	NO-FLOAT
a. JI,N.BA.o,I		*!*		*
b. ☞ ji,N.ba.o,I			**	
c. ji,N.BA.o,I		*!	*	
d. ji,n.BA.o,I	*!		**	

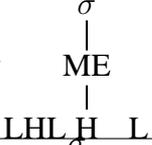
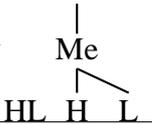
Candidate 4.54a is the faithful candidate, failing to make room for L1 and incorrectly retaining the H1 spread. The winning candidate is 4.54b, showing L1 insertion and L2 as the accommodating tone. Candidate 4.54c shows the violations incurred by keeping H1 as the spreading tone, even when inserting the L1 tone. Finally, candidate 4.54d shows that L1 cannot be the spreading tone either, due to *SPREAD-LEFT.

4.7.3.5 Type A Monomoraic Cases

Monomoraic cases neutralize to a high tone output. While this is part of the default behavior in type B, it is exceptional for type A, which would be expected to map the L3 tone. This can be accounted for by ranking OBLIGATORINESS(H) over FAITH-LINK. Defining this interaction as taking place at the phrasal level prevents any unintended interactions, since the phrasal level is otherwise vacuous. Both a delinking and double association repair will be considered. Tableau 4.55 shows that the L3 delinking repair can be accounted for by ranking μ -TO-TONE over LINK-FINAL.

Candidate 4.55a is the faithful candidate, mapping the L3 tone. This violates OBLIGATORINESS(H). The winning candidate, 4.55b, repairs this by unlinking the final tone and linking the H2 tone instead. A suboptimal approach is taken by candidate 4.55c, where double association runs into a violation of high-ranked μ -TO-TONE.

Tableau 4.55: Old Koshikijima phrase-level interactions for a type A monomoraic form. Input tonal melody: LHLHL.

me	OBLIGATORINESS(H)	μ -TO-TONE	LINK-FINAL	FAITH-LINK
a. me	*!			
b. 			*	*
c. 		*!		

4.7.4 Summary

Under the assumption of HLHL/HLH tonal melodies for the two accent types and suffixation at the stem level, the constraint strata as shown in table 4.56 should suffice to derive the required forms.

Table 4.56: Old Koshikijima constraint strata.

Stem	OCP(SYLHD,L) > NO-FLOAT > SPREAD-LEFT > *SPREAD(H)
Word	*SPREAD-LEFT > *SPREAD(H) > FAITH-LINK > NO-FLOAT
Phrase	OBLIGATORINESS(H) > μ -TO-TONE > LINK-FINAL > FAITH-LINK

4.8 Kokonogi

Kokonogi is a village in Fukui prefecture, located near the center of Japan’s main islands and geographically relatively far removed from the other dialects discussed here, which are all from smaller islands to the south of Japan’s main islands. Table 4.57 shows data reinterpreted from Nitta (2012). The dialect is a relatively rare case among Japanese dialects of a threeway split between accent types. Note that the suffix string in the final column, *N + ni + nara*, often collapses the *ni* into the nasal coda consonant. Note also that some forms are stated to have an (*H,HL*) contour. This is explained in section 4.8.1.4.

Table 4.57: Kokonogi forms.

Type	Noun	<i>N + ga</i>	<i>N + nara</i>	<i>N + ni + nara</i>
A	Ka (<i>HL</i>)	KA-ga ka-GA		ka-NI.NA.ra
	KA,a (<i>H,HL</i>)	KA,A-GA	KA,A-NA.ra	KA,A-NI.NA.ra
	HA.ko	ha.KO-ga	ha.KO-NA.ra	ha.KO-N.NA.ra
	ku.RU.ma	ku.RU.MA-ga	ku.RU.MA-NA.ra	ku.RU.MA-N.NA.ra
	ka.NE.MO.chi	ka.NE.MO.CHI-ga	ka.NE.MO.CHI-NA.ra	
	o.TE,n.ki	o.TE,N.KI-ga	o.TE,N.KI-NA.ra	
	ya.MA.ZA.KU.ra	ya.MA.ZA.KU.RA-ga	ya.MA.ZA.KU.RA-NA.ra	
	ki,N.YO,o.bi	ki,N.YO,O.BI-ga	ki,N.YO,O.BI-NA.ra	
B	HA	ha-GA		ha-NI.NA.RA
	HA,A	HA,A-GA	HA,A-NA.RA	HA,A-NI.NA.RA
	ka.WA	ka.WA-GA	ka.WA-NA.RA	ka.WA-N.NA.RA
	ma.KU.RA	ma.KU.RA-GA	ma.KU.RA-NA.RA	ma.KU.RA-N.NA.RA
	se,N.SE,E	se,N.SE,E-GA	se,N.SE,E-NA.RA	
	da,I.DO.KO.RO	da,I.DO.KO.RO-GA	da,I.DO.KO.RO-NA.RA	
C	Me (<i>HL</i>)	ME-ga		me-NI.na.ra
	ME,e (<i>H,HL</i>)	ME,E-ga	ME,E-na.ra	ME,E-ni.na.ra
	FU.ne	fu.NE-ga	fu.NE-na.ra	fu.NE-n.na.ra
	hi.DA.ri	hi.DA.ri-ga	hi.DA.ri-na.ra	hi.DA.ri-n.na.ra
	no.KO.gi.ri	no.KO.gi.ri-ga	no.KO.gi.ri-na.ra	
	HO,O.cho,o	HO,O.cho,o-ga	HO,O.cho,o-na.ra	
	ka.TA.gu.ru.ma	ka.TA.gu.ru.ma-ga	ka.TA.gu.ru.ma-na.ra	
	KA,I.ba.shi.ra	KA,I.ba.shi.ra-ga	KA,I.ba.shi.ra-na.ra	

Glosses: *ka* = ‘mosquito’, *hako* = ‘box’, *kuruma* = ‘car’, *kanemochi* = ‘rich person’, *otenki* = ‘weather (polite)’, *yamazakura* = ‘Japanese Cherry’, *kinyoobi* = ‘Friday’, *ha* = ‘leaf’, *kawa* = ‘river’, *makura* = ‘pillow’, *sensee* = ‘teacher’, *daidokoro* = ‘kitchen’, *me* = ‘eye’, *fune* = ‘boat’, *hidari* = ‘left’, *nokogiri* = ‘saw’, *hoochoo* = ‘kitchen knife’, *kataguruma* = ‘piggyback riding’, *kaibashira* = ‘(dried) scallops’.

4.8.1 Descriptive Generalization

4.8.1.1 Basic Contours

The maximal type A contour is seen in forms of length three or higher. It is an LHL melody, as exemplified by the form /ku.RU.ma/. In longer forms, the H1 tone accommodates excess moras, for example in /ka.NE.MO.chi/ and /ya.MA.ZA.KU.ra/. Shorter forms show a rightmost substring of the tonal melody, such as the bimoraic /HA.ko/.

Type B displays an LH tonal contour, as exemplified by /ka.WA/. In longer forms, it is again the H tone that accommodates excess moras, for example in /ma.KU.RA/ and /da,I.DO.KO.RO/.

Type C, similarly to type A, shows a maximal, LHL contour in forms of length three or higher, for example in the form /hi.DA.ri/. However, the accent type has a different accommodating tone, as it is the L2 tone that spreads to excess moras in this accent type. For example, the attested form is /no.KO.gi.ri/, where type A would be expected to form */no.KO.GI.ri/. Likewise, type C shows /ka.TA.gu.ru.ma/, not */ka.TA.GU.RU.ma/. Like type A, shorter forms show the rightmost substring of the LHL melody, such as in /FU.ne/. Nitta further reports a sequence of pitch drops in the type C L2 tone span, reminiscent of pitch-drops in Isaneku, but still settles on referring only to the second mora as the high part of the word.

4.8.1.2 Morphology

Contrary to some of the dialects discussed previously, none of the accent types displays any sensitivity to the noun-particle boundary. This can be checked by applying the serialization tests, which hold for all three types. For example, in type A, the suffixed form /ku.RU.MA-ga/ shows the same intonational contour as an isolated noun form of equal length, such as /ka.NE.MO.chi/. Similarly, type B /ka.WA-GA/ corresponds to /ma.KU.RA/, and type C /hi.DA.ri-ga/ to /no.KO.gi.ri/.

Nitta also does not report any sensitivity to the position of a form in the phrase for any of the three accent types.

4.8.1.3 Heavy Syllable Sensitivity

Some of the forms point to a sensitivity to heavy syllables. In type A, H-tone spans prefer not to end on a weak mora. For example, /o.TE,n.ki/ and /ki,N.YO,o.bi/ are preferred over */o.TE,N.ki/ and */ki,N.YO,O.bi/, going against the tendency of the accent type to spread H to all excess moras. The de-

fault spreading behavior is resumed in suffixed forms of the word, where H can spread beyond the weak mora, e.g. /o.TE,N.KI-NA.ra/.

In type C forms, instead of avoiding moras, the H tone will spread from a weak mora to fill the whole syllable. For example, speakers produce /HO,O.cho,o/ instead of the expected */ho,O.cho,o/. Since the location of the H tone is restricted to the second mora in this accent type, this phenomenon occurs only with word-initial heavy syllables.

Although the heavy syllable facts are reported here for completeness, it is beyond the scope of the project to provide a full analysis.

4.8.1.4 Short and Long Monomoraic Forms

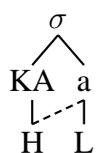
Nitta reports a short and long form for monomoraic words. The short monomoraic forms are truly monomoraic, while the long forms display vowel lengthening.

As seen in the type A form /Ka (HL)/, and the type C form /Me (HL)/, these two types assign two tones to the single mora, forming an HL contour, reminiscent of monosyllabic words in Kagoshima dialect. Type B assigns only the H tone, e.g. in /HA/. Suffixed forms behave no different from the basic pattern, with the exception of an alternation in type A between the expected /KA-ga/ and the deviating, but also attested /ka-GA/.

The dialect displays a further idiosyncrasy in monomoraic short forms: Nitta reports that such forms sometimes take an entire phrase as the accentual domain, but states that more research on this phenomenon is required.

The long-form monomoraic words show the same intonational contours for the three types: HL, H, and HL, respectively. However, for the HL cases, Nitta reports a mora-internal fall on the second mora, suggesting that the autosegmental representation, instead of simply associating H to the first and L to the second mora, might be better interpreted as that in figure 4.3.

Figure 4.3: An autosegmental representation of a mora-internal fall in a heavy syllable



Type B has an H-only tonal contour in the long form, and even in suffixed forms. This corresponds with the behavior already shown in forms with heavy syllables in type C, discussed in the previous

section; like type C, type B extends its H tone from the second, weak mora of the word to the initial mora. Type A and C, too, forgo their L1 tones, instead forming a word-initial H-toned heavy syllable. For example, type C shows /ME,E-na.ra/ instead of the basic pattern's LHLL sequence, */me,E-na.ra/.

Type A does show one further exception. It delays the association of its L2 tone until a fourth mora is available. In the trimoraic long form, the tonal contour is still only H: /KA,A-GA/. Mapping L2 according to the basic pattern would produce */KA,A-ga/, which may be out because type A does not usually end its H span on a weak mora, as mentioned in the previous section. However, it is unclear why the alternative of a contour syllable is not preferred over an all-H form: the form */KA,a-ga/ would seem to be analogous to the accent type's behavior in other forms, e.g. /o.TE,n.ki/, /ki,N.YO,o.bi/.

The issues of long form monomoraic are closely linked to those of other heavy syllable forms, and will not be part of the present analysis. However, the short monomoraic forms are closely related to the basic pattern, and will be included in the analysis.

4.8.2 Analysis

The analysis will focus on deriving the short monomoraic forms and the basic intonational patterns, while a consideration of the influence of prosodic structure (i.e. the behavior of heavy syllables) will be considered in the discussion section.

Instead of stipulating the entire surface tonal contours as underlying melody, it is proposed that the underlying melodies are HL, H, and L, respectively. This means that L1, for all types, and H1 for type C will be the result of grammatical interactions. Additionally, as will be shown, the analysis requires suffixation to occur at the stem level. There is no need to place any part of the derivation at the phrasal level, so this stratum will be considered vacuous in Kokonogi dialect.

4.8.2.1 Stem Level: Leftwise Spreading

The advantage of stipulating HL/H/L melodies is that the accommodating tone is now always the leftmost tone in the melody. At the stem level, all that is needed now is to spread this tone, which can be achieved with the single constraint SPREAD-LEFT.

Although the derivation with SPREAD-LEFT is deemed straightforward enough not to warrant a tableau, the results for the stem level are summarised in table 4.58.

Table 4.58: Summary of the Kokonogi stem-level derivations for all three types.

Type	Melody	Input	Output
A	HL	<i>kuruma + ga</i>	/KU.RU.MA-ga/
B	H	<i>makura + ga</i>	/MA.KU.RA-GA/
C	L	<i>hidari + ga</i>	/hi.da.ri-ga/

4.8.2.2 Word Level Type A

At the word level, an L boundary tone is prefixed to all forms: the L1 tone. The accomodating tone, which was previously leftmost, will give up part of its spread to make room for the L1 tone, but otherwise remains the same. This is achieved by ranking NO-FLOAT over FAITH-LINK, as demonstrated in tableau 4.59.

Tableau 4.59: Kokonogi word-level interactions for type A. Input tonal melody: HL. Additionally, an L tone is prefixed.

L + KU.RU.MA-ga	NO-FLOAT	FAITH-LINK
a. KU.RU.MA-ga	*!	
b. ☞ ku.RU.MA-ga		*
c. ku.ru.MA-ga		**!

The faithful candidate is 4.59a, which retains the H tone span, but thereby leaves the L1 tone floating, running into a fatal violation. Candidate 4.59b is the winning form, allowing the L1 tone into the word, minimally violating FAITH-LINK. Candidate 4.59c shows that at the word level, type A is no longer left-spreading, since no SPREAD-LEFT constraint drives the process and FAITH-LINK does block it.

4.8.2.3 Word Level Type B

Similarly to type A, type B forms give up the initial mora of the H tone stretch to accomodate the prefixed L1 tone. The derivation is shown in tableau 4.60, and is analogous to that of word-level type A.

Tableau 4.60: Kokonogi word-level interactions for type B. Input tonal melody: H. Additionally, an L tone is prefixed.

L + MA.KU.RA-GA	NO-FLOAT	FAITH-LINK
a. MA.KU.RA-GA	*!	
b. ☞ ma.KU.RA-GA		*
c. ma.ku.ra-GA		**!*

4.8.2.4 Word Level Type C

Since type C came out of the stem level exclusively low-toned, the result of prefixing the L1 boundary tone would be a sequence of two low tones. However, the forms surface with an H tone intervening between these two L tones. This will be ascribed to the effect of an OCP-type constraint, OCP(L):

OCP(L)	Assign one violation mark for every adjacent pair of low tones on the tonal tier.
--------	---

This constraint bears some resemblance to LAPSE as used by Zoll (2003), which was defined as “There is no non-H sequence on adjacent TBUs [...]”. However, a major difference is that OCP(L) is formulated in reference to tones on the tonal tier, instead of on TBUs. This means the constraint is active even for adjacent tone pairs that contain floating tones. This difference will be crucial when considering the short monomoraic forms, later on.

Using OCP(L) in conjunction with the earlier constraints, both the L1 and H1 tone can be inserted into the stem-level output of type C. While the origins of L1 are morphological, since it is a prefix, the insertion of H1 must be allowed by a faithfulness constraint. Consequently, OCP(L) will be stated to outrank DEP-TONE. The derivation is shown in tableau 4.61.

Tableau 4.61: Kokonogi word-level interactions for type C. Input tonal melody: L. Additionally, an L tone is prefixed.

L + hi.da.ri-ga	OCP(L)	DEP-TONE	NO-FLOAT	FAITH-LINK
a. σ σ σ σ hi da ri ga └───┬───┘ L L	#!		*	
b. σ σ σ σ hi da ri ga └───┬───┘ L L	#!			*
c. ☞ hi.DA.ri-ga		*		**
d. hi.da.RI-ga		*		***!
e. σ σ σ σ HI da ri ga └───┬───┘ L H L		*	#!	*
f. σ σ σ σ hi da ri ga └───┬───┘ L H L		*	*!*	

Candidate 4.61a is the faithful candidate. As was mentioned, OCP(L) is sensitive even to floating tones, so the addition of the floating L1 tone to the all-low stem output causes a violation of this constraint. Candidate 4.61b shows a similar situation where L1 is allowed into the word; OCP(L) is still violated, and although it is no longer floating, which appeases NO-FLOAT, this goes at the cost of violating FAITH-LINK. Candidate 4.61c fixes the OCP(L) by inserting the H tone between the two L tones, and mapping all tones to the word, but not unnecessarily destroying any of the L2 tone span. This is the winning, attested form. This is preferred over the highly similar 4.61d, which spreads the L1 tone, unnecessarily incurring FAITH-LINK violations since the L2 tone span has had to shrink for L1 to spread. Candidates 4.61e and 4.61f show floating tone variations on the winning candidate, but these are ruled out because NO-FLOAT outranks FAITH-LINK.

The constraints introduced for type C, OCP(L) and DEP-TONE, have no effect on the derivation of type A and B forms. This is because those accent types never feature adjacent pairs of L tones, and DEP-TONE outranks the other active markedness constraint, NO-FLOAT. Even if DEP-TONE were lower-ranked, though, inserting an additional tone is never beneficial to the satisfaction of NO-FLOAT.

With the word-level derivations in place, and the phrasal stratum vacuous, the attested shape of basic forms has been accounted for. However, the exceptional behavior of short monomoraic forms still remains. As will be shown, this behavior can be united with the general account.

4.8.2.5 Short Monomoraic Forms

Type A and C short monomoraic forms show a familiar effect; the association of a second, high tone. This is an exception to the default one-to-one tonal association behavior of the language. As was the case in Kagoshima dialect (section 4.2.3.2), the additional association of the H tone can be interpreted as the result of an OBLIGATORINESS(H) constraint. Since longer forms in all three accent types will always carry an H tone, the constraint can safely be added to the word-level stratum. It must outrank the faithfulness constraint which normally blocks double association to a mora, which is μ -TO-TONE. Furthermore, the analysis must account for the fact that double association is preferred as a repair strategy over tone skipping. This is achieved by ranking LINK-FINAL above μ -TO-TONE.

The derivation for a type C short monomoraic form is shown in tableau 4.62. Type C is the most complicated case, since the melody is achieved mostly through insertion, so the order of the tones is more flexible. Consequently, the type C derivation subsumes the type A and B derivations, which will

not be shown, but work analogously. Note that for space reasons, some constraint names have been abbreviated; DEP-T stands for DEP-TONE, OBLIG(H) for OBLIGATORINESS(H), μ -TO-T for μ -TO-TONE, and F-LINK for FAITH-LINK.

Tableau 4.62: Kokonogi word-level interactions for a type C short monomoraic form. Input tonal melody: L. Additionally, an L tone is prefixed.

L + <i>me</i>	OCP(L)	DEP-T	OBLIG(H)	LINK-FINAL	μ -TO-T	NO-FLOAT	F-LINK
a. $\begin{array}{c} \sigma \\ \\ \text{me} \\ \\ \text{L} \quad \text{L} \end{array}$	*!		*				
b. $\begin{array}{c} \sigma \\ \\ \text{me} \\ \\ \text{LH} \quad \text{L} \end{array}$		*	*!			**	
c. $\begin{array}{c} \sigma \\ \\ \text{Me} \\ / \quad \backslash \\ \text{L} \quad \text{H} \quad \text{L} \end{array}$		*			*	*	
d. $\begin{array}{c} \sigma \\ \\ \text{ME} \\ \\ \text{L} \quad \text{H} \quad \text{L} \end{array}$		*		*!		**	*
e. $\begin{array}{c} \sigma \\ \\ \text{ME} \\ \\ \text{LL} \quad \text{H} \end{array}$	*!	*				**	*
f. $\begin{array}{c} \sigma \\ \\ \text{ME} \\ \\ \text{LHL} \quad \text{H} \end{array}$		**!				***	*

Candidate 4.62a shows the faithful candidate coming in from the stem stratum, prefixed with the word-level boundary tone, L1. As was shown in earlier derivations, this candidate is out due to an OCP(L) violation. In the previous type C tableau, this situation was mended by inserting the H1 tone, which is what happens in all of the other candidates. For candidate 4.62b, this is the only difference from the faithful form, but that is not sufficient, because the form then surfaces without an H tone, thus violating highly-ranked OBLIGATORINESS(H).

The winning, attested form is shown in candidate 4.62c. Inserting and associating the H tone while retaining the association with the L2 tone is optimal under the given constraint ranking.

Candidate 4.62d resembles the winning candidate closely, but unlinks the L2 tone. While this is favorable with regards to μ -TO-TONE, it runs into a violation of higher-ranking LINK-FINAL. Note that

ranking FAITH-LINK above μ -TO-TONE would also help the winning candidate against 4.62d, but doing so would predict double association effects in other positions where FAITH-LINK might otherwise be violated. This goes against the observed data; previous derivations have shown that the spread tone gives up some of its span to make room for the floating tones. Consequently, candidate 4.62d is the motivation for including LINK-FINAL in the tableau and ranking it above μ -TO-TONE.

Candidate 4.62e circumvents the LINK-FINAL violation by inserting the H1 tone at the right edge of the word. However, giving up on the usual insertion spot of the H1 tone means that OCP(L) is once again violated. Candidate 4.62f shows yet another attempt, this time inserting a second H tone, so that, in addition to satisfying OBLIGATORINESS(H) and LINK-FINAL, OCP(L) can also be satisfied. While the candidate is successful in its goals, the insertion of a second tone is superfluous, since the winning candidate can meet these goals with a single inserted tone. However, 4.62f does demonstrate that the DEP-TONE constraint should be ranked relatively high, at least above μ -TO-TONE, which is the highest constraint violated by the winner, but not by 4.62f.

Three new constraints were added to the word level to account for the short monomoraic forms: OBLIGATORINESS(H), LINK-FINAL and μ -TO-TONE. These constraints do not interfere with the results from previous tableaux. As mentioned above, all winning candidates in previous tableaux satisfied OBLIGATORINESS(H). Furthermore, the violability of LINK-FINAL and μ -TO-TONE enable tone skipping and double association repair strategies. However, neither of these repairs can help avoid an OCP(L) violation, so the repair strategies used by the winning candidates are still optimal.

It is interesting to note that the OBLIGATORINESS(H) effect cannot be active at the stem level. Doing so would force the insertion of an H tone in type C at this stratum, which would then interfere with the left-spreading of the L2 tone. A similar relation holds between the L1 insertion analysis and the stem-level suffixation stipulation. If suffixation and L1 insertion coincide, there is no way to achieve the spreading of the three accent types in a uniform fashion, since spreading is no longer unidirectional. Since L1 is a word-level boundary tone, i.e. it is inserted before the beginning of every word, instead of only before the beginning of a phrase, the L1 insertion process must be stipulated at the word stratum at the latest. Since left-spreading must precede it, it follows that suffixation must occur at stem-level.

4.8.3 Summary

Under the assumption of HL/H/L tonal melodies for the three accent types, the constraint strata as shown in 4.63 should suffice to derive the required forms.

Table 4.63: Kokonogi constraint strata.

Stem	SPREAD-LEFT
Word	OCP(L) > DEP-TONE > OBLIGATORINESS(H) > LINK-FINAL > μ -TO-TONE > NO-FLOAT > FAITH-LINK
Phrase	<i>(no phrase-level interactions)</i>

Chapter 5

Discussion

The discussion is split up into three parts. First, some additional implementational issues regarding the framework are considered in section 5.1. Next, Section 5.2 considers the typological predictions following from the framework. A miscellaneous point of criticism is considered in section 5.3.

5.1 Details and Extensions of the Framework

5.1.1 Compound Nouns

The present investigation has not considered the interactions involved in noun compounding. However, it is believed that the presented framework is not at all incompatible with the compound accent facts.

Japanese tonal dialects derive compound accent by a variety of rules. A prototypical case is the compound accent rule of Kagoshima dialect, where the intonational melody of the lefthand word serves as the melody for the entire compound (Hirayama, 1951; Kubozono, 2012b). In general, a uniting factor seems to be that the resulting compound noun follows the intonation of one of the intonational classes of the dialect. However, this class does not have to correspond to either of the nouns in the compound; Uwano (2012a) reports that Wan dialect compounds almost invariably follow type beta intonation, even if both of the involved nouns are of type alpha.

Regardless of the interactions leading to the selection of an intonational melody for compound nouns, what is crucial for the integration of compound accent rules with the present framework is that this selection is made very early on in the derivation. This follows from the fact that compound nouns behave no different from morphologically simple nouns with regard to intonation. Consequently, compound accent intonation must be completed by the end of the first active stratum of a language. If this condition is met, the resulting form with intonational melody can be handled just as any other form.

The exact workings of compound accent intonation are deserving of further research, and will undoubtedly warrant the stipulation of additional constraints or rules. Although the morphological component of the grammar may play a large role in such processes, some compound accent rules show sensitivity to phonological factors as well. For example, Kibe (2012) reports that for Hondo dialect, compound accent takes the melody of the leftmost word (i.e. type A or type B) if that word is mono- or bimoraic, and will take type B intonation in all other cases. Sensitivity to the length of the dominant noun has also been reported for Tokyo Japanese (Kubozono, 1997; Tanaka, 2001).

5.1.2 Weak Moras in Koshikijima and Wan dialect

Several of the investigated dialects showed a sensitivity to prosodic configurations involving heavy syllables. In the Koshikijima dialects, an OCP(SYLHD,T)-type constraint was defined, framing this sensitivity from the perspective of adjacent, identically intonated syllable heads. Unlike simpler constraints targeting weak moras, the OCP(SYLHD,T) constraints had the advantage of going completely unviolated in Koshikijima surface forms. The heavy syllable data of Wan dialect is reminiscent of this behavior. For example, type beta Wan dialect repairs the default */ko,ON-nga/ to /KO,ON-nga/, and */po,T.to/ to /PO,T.to/. These repairs, too can be interpreted as preventing the adjacency of L-toned syllable heads.

However, one aspect of the Wan dialect facts cannot be captured by the OCP(SYLHD,T) interpretation: the sensitivity to the *type* of weak mora in the heavy syllable. That is, while type beta Wan dialect repairs geminates and nasal codas, long vowels follow the default behavior, e.g. in /ho,O.zji/, instead of repaired */HO,O.zji/. In principle, such differences can be accounted for by formulating a constraint that is sensitive to the status of the weak mora. However, this is not possible for the OCP(SYLHD,T) constraint, since it is defined only by the status of the two syllable heads neighbouring the weak mora.

Consequently, a constraint type *WEAK- μ seems deserving of further investigation. As suggested by the Wan and Koshikijima data, such a constraint type should be highly flexible. The Wan facts warrant flexibility in terms of weak mora type, and the Koshikijima facts warrant flexibility in terms of tonal quality (recalling that modern Koshikijima needed both an OCP(SYLHD,L) and OCP(SYLHD,H) constraint). This is reflected in the tentative definition below:

*WEAK- μ (X,Y) For a mora M meeting conditions X and a tone T meeting conditions Y, T cannot be associated exclusively to M.

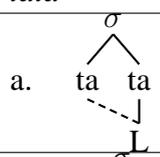
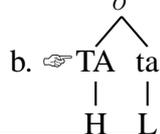
5.1.3 Alignment Constraint Overlap

In the presented analyses, alignment has played a relatively minor role. One case of tonal alignment was defined in the case of phrase-level Koshikijima dialect, where alignment of an H tone on the left of the word caused the language to disfavor that peak for tonal change (leading to the change of the word-internal, H2, peak instead). Interestingly, this effect could have been mimicked by defining a positional faithfulness account, that operates at the left edge of the word. Consequently, there seems to be some

overlap between the function of alignment constraints and other constraints. Such overlap should be regarded with suspicion, since there is a risk that multiple constraints have been defined to account for (portions of) a single phenomenon.

Although not employed in the present analyses, another effect that can be achieved through alignment constraint is tonal insertion. This is the case if an alignment constraint outranks DEP-TONE. An example is shown in tableau 5.1, for a bimoraic nonce input form *tata*, with an L-toned melody.

Tableau 5.1: Alignment-driven tonal insertion. Input tonal melody: L.

<i>tata</i>	ALIGN-L(PRWD, H)	DEP-TONE
a. 	*!	
b. 		*

The candidate that stays faithful to the intonation, 5.1a, is suboptimal because no H tone is aligned to the leftmost TBU of the prosodic word. Consequently, inserting the H-tone, at the cost of violating DEP-TONE, is optimal, as shown by candidate 5.1b.

In the present analyses, tonal insertion is modeled morphologically, by affixing additional tonal material to the melody. This appears to be another instance of overlap, although the overlap is only partial, since there is some difference: alignment-driven insertion can only insert tones into a melody that differ from the tone at the relevant edge; in the above example, if the tonal melody had already been H, no insertion would have been warranted.

The present investigation considered one type of effect that can only be modelled with alignment constraints. The analysis of the Wan dialect used alignment of an H tone to the right edge to account for the phrasal deletion phenomenon. This accounted for the phrase-medial deletion of a word-final L tone in type beta, while type alpha, which ends in an H tone, seemed to be transparent to the phenomenon. This is the strongest piece of evidence suggesting that tonal alignment constraints are a necessary addition to the framework. Nonetheless, further research should be vigilant of the role that alignment constraints play in tonal phenomena.

5.1.4 Tone deletion and FAITH-LINK

The phrase-level type beta derivations in Wan dialect were modeled with a process of tone deletion. In that context, the question was raised whether deletion of tones that are associated to TBUs should lead to FAITH-LINK violations.

This question is motivated by the idea that association links only exist by the grace of the elements they link. That is, the association link is not an independently existing element in the phonological representation, but is a relation between elements. When one of the elements is deleted, there can also no longer be a relation. The existence of an autosegmental link that only connects to an element on one tier (either the segmental or tonal one), if at all allowed in a framework, is meaningless; there is no motivation for the ability to make this type of distinction in the representation.

Having established the concept that deletion of associated material leads to deletion of the autosegmental link, the question is whether such deletion should lead to a violation of FAITH-LINK. Stating that this should be so seems intuitive; something regarding the association link has changed. In fact, more common violations of FAITH-LINK also involve the deletion of association links, the only difference being that the previously linked elements still both remain in the output.

A main problem with counting associated tone deletion as a FAITH-LINK violation is that this creates a large overlap with MAX-TONE, since both constraints will violate the deletion of associated tones. This suggests that two constraints are posited to account for one phenomenon. However, FAITH-LINK will not punish the deletion of unassociated tones, while MAX-TONE will. This means that MAX-TONE cannot be subsumed by FAITH-LINK.

The scope of FAITH-LINK was limited by stating in the definition that it marks a violation for every pair of elements that is linked in the input, but unlinked in the output. Implicit in such a definition is the condition that there is still an element pair present in the output. The definition is repeated below:

FAITH-LINK	Assign one violation mark for each pair of TBU and tone that was associated in the input, but is not associated in the output.
------------	--

Under this definition, FAITH-LINK is not affected if one of the elements of a related element pair is deleted, so the governance of deletion is once again the sole propriety of MAX-TONE. In this situation, it is possible to model interactions where a tone will not move or give up a part of its spread, but can be deleted. Consequently, strong support for this view could come from data of a language where partial

delinking of a tone (i.e. delinking the tone from some, but not all of its associated TBUs) would be a sufficient repair strategy to satisfy an active markedness constraint, but tone deletion is nonetheless applied instead.

5.2 Typological Predictions of the Framework

The present framework has afforded itself considerably flexibility, since differences between accent types in a language can be modeled both through differences in stratal specification and through different lexical tonal melodies. Nonetheless, this flexibility has limits, and predictions of crosslinguistically unattested patterns stem from these limits. The following subsections will outline several types of patterns that are expected to fall outside natural language given the present framework. The existence of such patterns would serve as strong grounds for the rejection of the framework in its present form.

5.2.1 Limits on the Derivational Chain

One limit on the patterns predicted by the framework is due simply to the length of the derivational chain. Some dialects need the multiple derivational steps provided by the Stratal OT framework simply to account for the complex pattern of their intonation, without even taking into account specifically morphological factors. For example, Old Koshikijima needed two levels to account for the difference between H1 and H2 behavior. An even more extreme example is modern Koshikijima dialect, where the stem and word levels were needed to derive the basic word-level intonation, and the result of this had to precede the phrasal level, where the tonal change of the secondary peak, if applicable, was based off of the word-level form.

Recall that Wan and Isaneku dialect had one accent type that was sensitive to this boundary, and one that was not. In contrast, the Koshikijima dialects did not show any sensitivity to the boundary between nouns and particles. Given the present framework, the fact that such a sensitivity to the noun-particle boundary was absent is not a coincidence. This is because if such an effect was present in the Koshikijima dialect, this would have to be accounted for by stating that one of the accent types starts its derivation at the word level. This goes counter to the observation that the Koshikijima dialects need both the stem and word level to account for their intonation.

Phrased more generally, the framework does not allow for patterns that feature more than three levels

of opacity. In particular, the framework does not allow for accent type-specific noun-particle boundary sensitivity in combination with phenomena in the non-sensitive accent type(s) requiring both the stem and word level.

5.2.2 Less Divergence Between Types in Later Strata

In dialects with less complex word-level intonation, accent types may differ in whether they start at the stem level or skip it. However, no such optionality holds for the later levels: all accent types go through the word and phrase level derivation. Consequently, at these levels there is less room for divergence between the accent types.

An example of this can be taken from the phrase-level Koshikijima behavior, where both types eliminate the secondary (i.e. non-leftmost) peak. This is driven by a high-ranked CULMINATIVITY(H) constraint. An imaginable variation on this pattern would be that only one of the two accent types shows this behavior, while the other accent type retains both peaks. However, this kind of pattern is excluded by the present framework; both accent types go through the same phrase-level derivation, and are therefore subject to the high-ranked CULMINATIVITY(H) constraint.

Exceptions to this generalization are found in cases where the optionality of a phenomenon is built into the formulation of the constraints. For example, Wan dialect shows an alternation in phrase-level forms for final and non-final contexts for type beta forms, but not for type alpha. This is not because the accent types are somehow treated differently, but because the process is alignment-driven; type alpha appears transparent to the phenomenon because it already satisfied the alignment constraint at the input form, while the alternation in type beta is due to an interaction between the alignment constraint and a positional faithfulness constraint.

The generalization that can be made is that, to the extent that accent types differ in their behavior, such differences mainly find their source in a difference of stem-level entry specification, and in a different sensitivity to the conditions set by constraints, in particular alignment constraints.

5.2.3 Limits on Contrasting Spreading Tone Direction and Quality

Another type of limit on the divergence between accent types is found in the freedom that accent types have in choosing a spreading tone. Since accent types generally follow the same derivation, differences in

the type of spreading performed by the dialects are generally not expected. Indeed, most of the presented dialects have the ‘same’ spreading tone even in different accent types. It is deemed unlikely that dialects would show the same intonational melody but with differently spread tones. Strikingly, this is exactly what was attested in Kokonogi dialect, where type A and C both showed an LHL melody, with type A spreading the leftmost tone, and type C the rightmost. This phenomenon was accounted for by stating that some of the tones of the type C melody were inserted at a later point; both melodies were left-spreading at the stem level, unifying the spreading behavior as expected.

Kokonogi shows that it is possible in some cases to show an identical melody with different spreading. However, the pattern becomes increasingly unlikely, if not impossible, in longer melodies, where the differences cannot all be due to tonal insertion. For example, it is not expected that a language will show two accent types with an HLHL melody, one spreading the leftmost, and the other the rightmost tone. A similar prediction can be made for melody-internal tones, where tonal quality is involved in deriving the correct spreading tone (see section 3.2.5). Specifically, it is not expected, barring alignment-driven insertion processes, that a language will show two accent types with an HLHL melody where one accent type spreads the L1 tone and the other type the H1 tone.

5.2.4 Limits Caused by the Number of Accent Types

Alignment-driven processes have come up several times in the consideration of the typological predictions of the presented framework. Although such processes introduce a certain optionality, as seen in phrase-level Wan dialect behavior, this aspect of the framework is also limited.

Specifically, alignment-driven processes have only two modes: either the alignment is vacuously achieved, and the form undergoes no repair strategy, or there is misalignment, and a repair strategy may be executed. Consequently, the divergence between accent types due to alignment-driven processes does not grow if the number of accent types grows, even if each accent type has a unique melody.

For example, suppose Wan dialect had a third accent type with an LHL tonal melody. In terms of the phrase-level alternation, which is driven by the constraint *ALIGN-R(PRWD, H)*, the third accent type must then be grouped with Wan type beta (with an HLHL melody), since both melodies end in an L tone and may need to undergo repair to satisfy the alignment constraint. It is expected that no variation of Wan is possible where type alpha and the third accent type defined here are transparent in terms of the

phrasal phenomenon, while type beta is susceptible to it.

5.3 Miscellaneous

5.3.1 The “Too Many Degrees of Freedom” Criticism

One criticism that may be leveled against the present framework is that there are so many degrees of freedom that the phenomena of any one dialect can trivially be modeled; the framework offers freedom both in the stipulation of lexical tonal melodies, as well as in the stipulation of entry levels for different intonational classes, and it has access to three levels of opacity to model complex interactions.

Firstly, the preceding section has argued that despite its flexibility, there are still limits to the types of patterns that the framework can account for. Secondly, each of the degrees of freedom is motivated independently. The latter point will be considered in some more detail.

The stipulation of lexical tonal melodies may seem to leave too much room for the needs of the analysis; for most dialects, the difference between the two intonational classes is only a single tone. It seems plausible that there is some shared part of the intonation that the accent types start from. However, Kokonogi dialect strongly goes against this generalization, showing three accent types with underlying melodies that seem hard to unite (HL/H/L). To a lesser extent, this may be said of Hondo dialect as well (H/LHL). Instead, an alternative that may be considered is that the similarities observed between accent types within a dialect are an epiphenomenon of the dialect’s tonogenesis; if the accent types derived from a single intonational pattern, it stands to reason that both melodies resemble each other.

The choice of stratal insertion point for different accent types has proven to be a necessary option in the framework to account for the difference in stem-level sensitivity between accent types within a dialect. No other OT method of achieving this effect is known to the author.

The most interesting part of the criticism may be the fact that the present framework introduces an unnecessarily long derivational chain, which can even be used to model phenomena that do not appear to relate directly to the morphological levels associated with the chain. Although not part of the original motivation of the framework, it seems that this part, too, is motivated by the investigated facts. In particular, as discussed above, the Koshikijima phenomena appear to require no less than three derivational steps, and Kokonogi dialect requires two pre-phrasal levels in the present framework.

Chapter 6

Conclusion

In conclusion, the present thesis has proposed a constraint set in the context of Stratal OT to account for seven Japanese N-pattern accent dialects. The analysis has exposed some intricate stem-level, word-level and phrase-level derivations, stretching the limits of the adopted framework. Consequently, the freedoms afforded by the framework are considered justified.

Naturally, avenues for future research abound. Not all heavy syllable behavior of the presented dialects has been accounted for. Many related Japanese dialects, posing further challenges, also remain to be analysed. Furthermore, the framework has not yet integrated a view on Japanese compound accent rules.

Outside the Japanese language sphere, the languages investigated by previous accounts are a valuable testing ground, possibly paving the way for integration with other proposals. Finally, the issues of modeling language acquisition and language change in the context of the presented framework also present a major challenge, but understanding of such issues may also be considered a major reward.

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