WH-PROSODY, LOCALITY, AND LEXICAL PITCH ACCENT IN WH-IN-SITU LANGUAGES

A Dissertation

Presented to the Faculty of the Graduate School

of Cornell University

in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

by

Hitomi Minamida

August 2023

WH-PROSODY, LOCALITY, AND LEXICAL PITCH ACCENT IN WH-IN-SITU LANGUAGES

Hitomi Minamida, Ph.D.

Cornell University 2023

In this dissertation, I investigate how prosody interacts with *wh*-scope in *wh*-in-situ languages, focusing on Japanese and Korean. In addition to this question, I also discuss why there is so much variation in the prosodic realization of *wh*-scope in Japanese and Korean, which is relevant to the main research question. In order to address these questions, I also clarify the accent classes and the prosodic structure of Gyeongsang (Daegu and Busan) Korean because the contrast between accented and unaccented classes and the prosodic structure of each language is crucial for the discussion of the research questions.

First, I show that the final-accented lexical pitch accent class, which has been claimed to exist in the native Gyeongsang lexicon by researchers such as Kenstowicz and Sohn (1997) and Jun et al. (2006), is in fact an unaccented class. My claim is supported by the tone interaction between nouns and enclitic particles and phrasal prosody. The absence of a final-accented class in the native lexicon is also made plausible by the historical Gyeongsang Accent Shift proposed by Ramsey (1978). I also show that loanwords serve to fill the gap created by the accent shift because in loanwords, pitch accent assignment depends on syllable weight (Chung 2000; Lee 2009, among others), so that loanwords with final heavy syllables end up supplying the lexicon with a true final-accented class. The prosodic structure of Gyeongsang Korean based on the autosegmental-metrical framework (see Ladd 1996/2008) further supports my analysis.

Next, I discuss the variation in *wh*-prosody in Japanese and Korean. I claim that *wh*-in-situ languages use the lowest possible prosodic phrase level in the prosodic hierarchy to realize *wh*-prosody. I show that in addition to the accentedness/unaccentedess

of *wh*-words as posited by Kuroda (2005/2013) and Hwang (2011a,b), the parameter [±multiword AP] (Igarashi 2012, 2014) for each language is required to determine which prosodic phrase level can be used.

Finally, I come back to my main research question. It has been claimed that prosody can override *wh*-islands in Japanese (and Korean) (Deguchi and Kitagawa 2002; Ishihara 2003; Hwang 2011a, 2015, among others). I show that the traditional claim that Japanese is sensitive to *wh*-islands (Nishigauchi 1990; Watanabe 1992) is correct through a perception experiment with Osaka Japanese speakers. My data also suggest that what has been claimed to be ambiguity between yes/no (polar) and *wh*-questions in Japanese (and Korean) is partially due to what I dub "super-informative answers", triggered by pragmatics.

BIOGRAPHICAL SKETCH

MINAMIDA Hitomi was born and raised in Osaka, Japan. She attended Osaka University (B.A. in Humanities) and Syracuse University (M.A. in Linguistics). She is graduating from Cornell University with a Ph.D. in Linguistics in 2023. Her research interests are Japanese and Korean linguistics, with a focus on prosody, lexical pitch accent, and understudied varieties of these languages.

難波津に　咲くやこの花　冬ごもり　今は春べと　咲くやこの花

王仁（生没年不詳）

瀬をはやみ　岩にせかるる　滝川の　われても末に　逢はむとぞ思ふ

崇徳院（1119-1164）

ACKNOWLEDGEMENTS

I would like to thank my dissertation committee members John Whitman (chair), Mats Rooth, Draga Zec, and Jiwon Yun (Stony Brook University, external member) for comments and discussion. I would also like to thank everyone, including, but not limited to my cohort, my Japanese and Korean language consultants, the participants of my experiments, my friends, and my family, for making this dissertation possible. This research has been supported by the Einaudi Center International Research Travel Grant and countless fellowships and TA/RAships from Cornell University. All errors are my own.

では、ここからは日本語で書きます。

まず最初に、指導教官であるJohn Whitman先生に感謝を申し上げたいと思います。ホイットマン先生からは、日本語、韓国・朝鮮語（以下、韓国語）、研究の仕方、論文の書き方など、本当にたくさんのことを学びました。高校生の時に父を亡くした私にとって、先生は父親のような存在でした。

審査委員のMats Rooth先生、Draga Zec先生からは、プロソディーの面白さについてたくさん教えていただきました。ストーニーブルック大学の尹芝元先生には外部から審査委員になっていただいたのですが、日本語と韓国語の比較や実験のデザインなどについて、さまざまな助言をいただきました。

私に「プロソディーの研究をするのはどうか」と初めに提案してくださったのは、Miloje Despić先生でした。私が精神的に疲れていた時に、先生のご自宅に招待していただいたことがありました。ご家族と一緒に食事をさせていただいて、本当に嬉しかったです。そして、シラキュース大学での修士の頃は、Jaklin Kornfilt先生にお世話になりました。先生の紹介がなければ、コーネル大学に来ることはできなかったと思います。

コーネル大学言語学科の皆さんには、いろいろな面で本当にお世話になりました。まず、私と同じ2016年に入学した同期生、Francesco Burroniさん、Sireemas “Siree” Maspongさん、Eszter Ótott-Kovácsさん、Brynhildur “Binna” Stefánsdóttirさん、荘凌梓さん（アルファベット順）に感謝を申し上げたいです。一緒に必修授業を受けていた時や、1学期に1回一緒に食事に行っていた時のことを、今でもよく覚えています。6人

一緒に卒業式に出席することができて、本当によかったです。特にSireeには、精神的なことや研究のこと、機材やソフトウェアの使い方など、いろいろなことを助けてもらいました。名前を全員書くことはできませんが、他の言語学科の教授や大学院生の皆さんにも大変お世話になりました。そして、言語学科のスタッフの皆さん、特にHolly Bouliaさん、Bruce McKeeさん、Gretchen Ryanさん、Jenny Tindallさんには、直接研究に関わらないところでお世話になりました。

この博論はデータを提供してくださる方々のご協力なしには完成できませんでした。私の周囲に慶尚道方言の話者がたくさんいらっしゃったことは本当に幸運でした。まず、金한결さん全恩雅さんご夫妻には本当にお世話になりました。何度も何度もPhonetics Labに来ていただき、ありがとうございました。金한결さん、そして金承恩さんは、私の韓国語の先生でもあり、授業でもお世話になりました。黄賢暻先輩のコーネル大学の博論は、この博論の出発点でした。日本（黄さん）とイサカ（私）で時差がある中、何度もZoomで面談していただき、本当にありがとうございました。黄さんとはいつも日本語で話すのですが、私もいつか黄さんと韓国語で話せるように努力したいです。日本語については、ラーソン尚美先生をはじめとするコーネル日本語プログラムの方々に、日本語の授業を含めお世話になりました。また、私の母校大阪府立高津高校の同窓会会員の皆さんには、実験に協力していただきました。初めは50人ほどの参加者を想定していたのですが、最終的には300人以上の方々にご連絡をいただき、本当に驚きました。いつか皆さんの前で、この研究の発表ができれば嬉しいです。Dedicationのページには、「高津」に関連する和歌を2首載せてあります。

コーネル大学からは、たくさんの奨学金をいただきました。学費や生活費を考えずに学問や研究に打ち込むことができて、本当に幸せでした。また、コーネル大学からは、学会や研究の旅費もいただきました。

奨学金といえば、アメリカ言語学会（LSA）からJames McCawley奨学金をいただき、2017年のケンタッキー大学でのLSA Summer Instituteに行けたのは幸運でした。いろいろな方々と出会い、とても楽しい1ヶ月間でした。もし戻れるなら、もう一度戻りたいです。そこで学んだことはこの博論にもつながっています。例えば、Experimental

Syntaxの授業を通して、実験言語学の基礎を学びました。第5章の実験は、この授業で習ったことをもとにデザインしました。また、奨学金の名前に“James McCawley”の名前が付いていたのは、日本語のピッチアクセントやプロソディーに興味がある私にとって、とても面白い偶然でした。

Geneva “Gigi” Notarioさんとの出会いは、私にとってとても大きなものでした。2020年のKOREA 2201の授業でクラスメイトになって以来、毎週ZoomやFaceTimeで（しかも韓国語で）お話をしているなんて、信じられません。免疫学を勉強している人と言語学について話すのは、いつもとても新鮮です。Gigiには、韓国で釜山方言のデータを集める協力もしてもらいました。今まで一度しか対面で会ったことがないので、いつか一緒に日本や韓国を旅行できたらいいなと思っています。

最後に、大阪方言についての議論や実験のテストを含め、ずっと私を応援してきてくれた母に感謝します。それからぴーちゃん、いつもありがとう。

2023年8月

南田　仁美

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ACC	accusative
ADN	adnominal
ASP	aspect
C	complementizer
COP	copula
DAT	dative
DECL	declarative
ES	embedded scope
GEN	genitive
GER	gerund
H	high
HON	honorific
INF	infinitive
L	low
LOC	locative
MS	matrix scope
NEG	negation
NOM	nominative
NPST	non-past
NZR	nominalizer
PASS	passive
PERF	perfect
PST	past
Q	question marker
SFP	sentence-final particle
t	trace
TOP	topic

U/IP	Utterance/Intonation Phrase
ip	Intermediate Phrase
AP	Accentual Phrase
PWd	Prosodic Word

LIST OF SYMBOLS

* ungrammatical
? marginal
semantically or pragmatically ill-formed

. syllable boundary
= clitic boundary
- verbal suffix boundary

σ syllable
μ mora

´ accented
H H-beginning
L L-beginning
R Rising

CHAPTER 1

INTRODUCTION

1.1 Overview

In this dissertation, I investigate how prosody interacts with *wh*-scope. In particular, I investigate whether in-situ *wh*-phrases can be interpreted as taking scope outside of *wh*-islands, and whether *wh*-islands can be ameliorated by prosody, focusing on the two *wh*-in-situ languages Japanese and Korean. I also address the question of the relationship between *wh*-prosody and prosodic structure, focusing on the role of accented and unaccented words in determining *wh*-prosody in lexical pitch accent languages.

1.1.1 Background

English exhibits *wh*-islands (and *whether*-islands) when *wh*-phrases undergo movement (Chomsky 1964, 1973; Ross 1967) as in (1.1). When *wh*-phrases stay in-situ, however, English becomes insensitive to *wh*-island effects (Baker 1970). (1.2) is ambiguous in terms of where the in-situ *wh*-phrase *which book* is interpreted; when it is interpreted in the embedded clause as in (1.3a), the question can be answered like (1.2a), while when it is interpreted in the matrix clause as in (1.3b), the question can be answered like (1.2b). This matrix scope interpretation would be predicted to be unavailable if island effects were observed in *wh*-in-situ in English.

(1.1) *English*

*[**What**$_j$ do you wonder [**who**$_i$ t_i bought t_i]]? (adapted from Goodall 2015: (4a))

(1.2) *English*

[**Who** remembers [**where** we bought **which book**]]?

a. John and Martha remember where we bought which book.

b. John remembers where we bought the physics book and Martha and Ted remember where we bought *The Wizard of Oz*. (Baker 1970: (67), (69), (70))

(1.3) *LF representations of (1.2)*

a. [who_x] [x remembers [[*which* $book_z$ $where_y$] [we bought z y]]]

b. [*which* $book_z$ who_x] [x remembers [[$where_y$] [we bought z y]]]

(adapted from Nishigauchi 1990: (30), (31))

Mandarin, a *wh*-in-situ language, is also known to be insensitive to *wh*-islands (Huang 1982). The interrogative sentence in (1.4) is two-way ambiguous; both readings would be ill-formed if Mandarin were sensitive to *wh*-islands.

(1.4) *Mandarin*

你想知道谁买了什么?

[Ni xiang-zhidao [**shui** mai-le **shenme**]]?
you wonder who buy-ASP what

a. 'What is the thing x such that you wonder who bought x?'

b. 'Who is the person x such that you wonder what x bought?'

(Huang 1982: (7.1))

In more recent work, Lee et al. (2017) report that the sentence in (1.5) is potentially ambiguous between the matrix yes/no question interpretation in (1.5a) and the matrix *wh*-question interpretation in (1.5b). The wide scope interpretation in (1.5b) would be predicted to be unacceptable if Mandarin exhibited *wh*-island effects.

(1.5) *Mandarin*

政之问过丽思见过谁?

[Zhengzhi wen-guo [Lisi jian-guo **shui**]]?
Zhengzhi ask-PERF Lisi meet-PERF who

a. '[Did Zhengzhi ask [who$_i$ Lisi met t_i]]?'

b. '[Who$_i$ did Zhengzhi ask [whether Lisi met t_i]]?' (Lee et al. 2017: (3))

Since both English and Mandarin can violate *wh*-islands when there is no overt *wh*-movement, one might expect that *wh*-in-situ in Japanese and Korean is also not sensitive to *wh*-islands. However, Nishigauchi (1990) and Watanabe (1992) assert that Japanese is sensitive to *wh*-islands, due to Subjacency constraining the interpretation of *wh*-in-situ. (1.6) is an example from Nishigauchi (1990) with his own judgments; the sentence can only be interpreted as a matrix yes/no question as in (1.6a) and the *wh*-phrases in the embedded clause cannot take wide scope as in (1.6b) and (1.6c). Han (1992) and Choe (1995) state that embedded *wh*-phrases also cannot take wide scope in Korean, as shown in (1.7); the judgments are due to Han (1992).

(1.6) *Japanese*

田中くんは誰が何を食べたか覚えていますか？

[Tanaka-kun=wa [**dare**=ga **nani**=o tabe-ta-ka]
Tanaka=TOP who=NOM what=ACC eat-PST-Q

oboe-te-i-mas-u-ka]?
remember-GER-be-NPST-Q

a. '[Does Tanaka remember [who ate what]]?'

b. '*For which *x*, *x* a person, does Tanaka remember what *x* ate?'

c. '*For which *y*, *y* a thing, does Tanaka remember who ate *y*?'

(Nishigauchi 1990: (2.32))

(1.7) *Korean*

철수는 영희가 왜 자신을 좋아하는지 아니?

[Chelswu=nun [Yenghi=ka **way** casin=ul cohaha-nun-ci] a-ni]?
Chelswu=TOP Yenghi=NOM why self=ACC like-ADN-Q know-Q

a. '[Does Chelswu$_i$ know [why Yenghi likes him$_i$]]?'

b. '*[Why does Chelswu$_i$ know [whether Yenghi likes him$_i$]]?' (Han 1992: (1))

There are some well-known cross-linguistic strategies that lessen the severity of *wh*-island effects. For example, D(iscourse)-linking (Pesetsky 1987) is one such strategy. (1.8) is minimally different from (1.1), which violates the *wh*-island condition; the D-linked *wh*-phrase *which car* makes (1.8) more acceptable (perfectly acceptable for some speakers).

(1.8) *English*

[**Which car**$_j$ do you wonder [**who**$_i$ t_i bought t_i]]?

(adapted from Goodall 2015: (5a))

Nishigauchi (1990) observes that *wh*-island effects can be ameliorated with D-linked *wh*-phrases in Japanese as well; for example, the sentence in (1.9) can be interpreted as a matrix *wh*-question thanks to the D-linked *wh*-phrase *dono sensei* 'which prof.'. Note that Nishigauchi mentions that "still many speakers appear to reject the wide-scope interpretation for *dono sensei* in this sentence" (p. 37).

(1.9) *Japanese*

井上先生と、加藤先生と、佐藤先生の中で、ジョンはどの先生がどのコンピューターをお持ちか覚えているのですか？

Inoue-sensei to, Katoo-sensei to, Satoo-sensei no naka=de, [
Inoue-prof. and Kato-prof. and Sato-prof. of among=at

Zyon=wa [**dono-sensei**=ga **dono-konpyuutaa**=o o-moti-ka]
John=TOP which-prof.=NOM which-computer=ACC HON-have-Q

oboe-te-ir-u-no-des-u-ka]?
remember-GER-be-NPST-C-COP-NPST-Q

'Among Profs. Inoue, Kato, and Sato, for which *x*, *x* a professor, [does John remember [which computer *y*, *x* has *y*]]?' (Nishigauchi 1990: (2.51))

Prosody has also been claimed to be a possible strategy for weakening *wh*-islands in *wh*-in-situ languages. It has been claimed that *wh*-islands can be overcome with appropriate prosody in Tokyo Japanese (Deguchi and Kitagawa 2002; Ishihara 2003, among others). According to this view, the Tokyo Japanese sentence in (1.10) is ambiguous between the matrix yes/no question interpretation in (1.10a) and the matrix *wh*-question interpretation in (1.10b). It is claimed that the range of F0 pitch compression after the pitch boost on a *wh*-phrase determines the interpretation: the prosody in Figure 1.1 corresponds to the former interpretation, while the prosody in Figure 1.2 corresponds to the latter interpretation.[1] In short, the wide scope interpretation in (1.10b), which previous research claimed to be ungrammatical, is asserted to be more available if the appropriate prosody is assigned. I refer to the prosody or intonational patterns observed in *wh*-domains as ***wh*-prosody**; the factors determining these patterns in *wh*-in-situ languages with lexical pitch accent, and their semantic interpretation, is the main focus of this dissertation.

[1] I received Shinichiro Ishihara's permission to cite these figures.

(1.10) *Tokyo Japanese*

なおやはまりが何を飲み屋で飲んだか今でも覚えてるの？

[Náoya=wa [Mári=ga **náni**=o nomíya=de nón-da-ka] íma=de=mo
Naoya=TOP Mari=NOM what=ACC bar=LOC drink-PST-Q now=at=even

obóe-te-r-u-no]?
remember-GER-be-NPST-Q

a. '[Does Naoya still remember [what$_i$ Mari drank t_i at the bar]]?'

b. '?[What$_i$ does Naoya still remember [whether Mari drank t_i at the bar]]?'

(Ishihara 2003: (34))

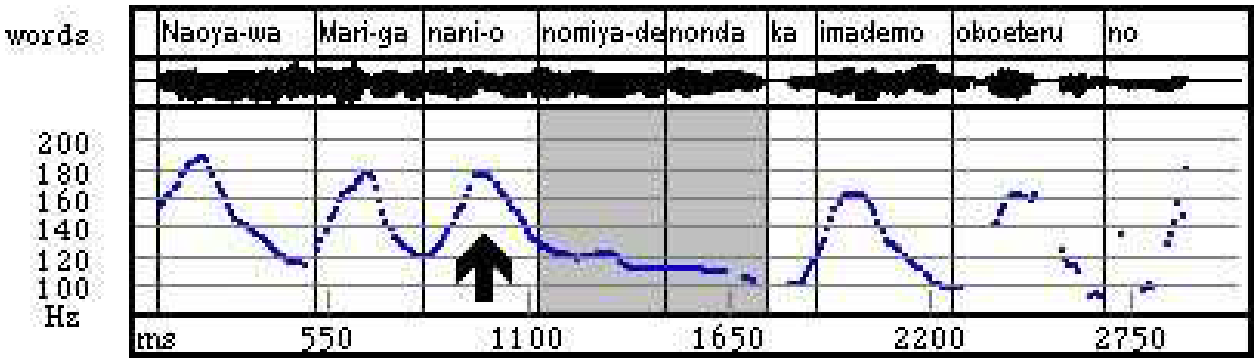


Figure 1.1: Embedded scope prosody in Tokyo Japanese (Ishihara 2003: (34a))

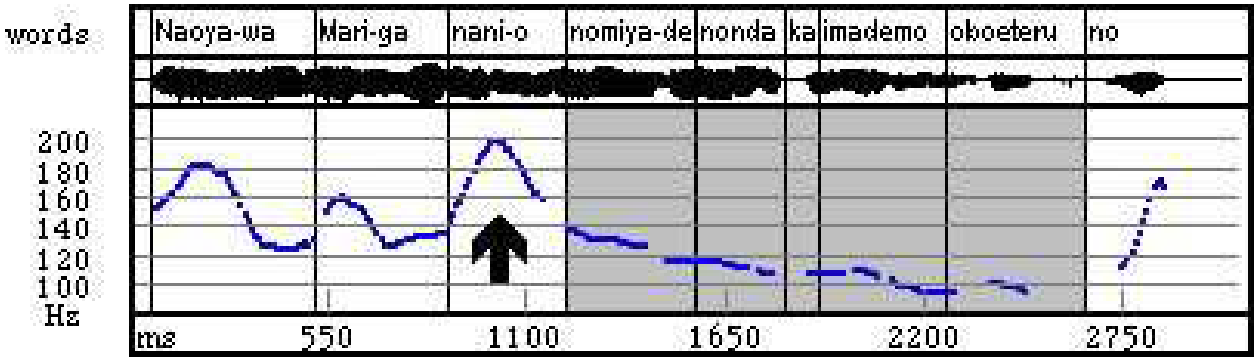


Figure 1.2: Matrix scope prosody in Tokyo Japanese (Ishihara 2003: (34b))

The same claim that prosody can ameliorate *wh*-island effects has also been made for Korean (Hwang 2009; Hwang 2011a, 2015). The two Busan Korean sentences in (1.11) from Hwang (2011a) are minimally different in the shape of the matrix question marker: *-na* in (1.11a) is for yes/no questions, while *-no* in (1.11b) is for *wh*-questions. There is no problem with (1.11a), where the embedded *wh*-word *nwukwu* 'who' takes embedded scope, but (1.11b), where the embedded *wh*-word *nwukwu* 'who' takes matrix scope, violates the *wh*-island constraint. However, Hwang claims that (1.11b) becomes acceptable with the appropriate prosody. Note that the prosodic pattern in (1.11) is not the same as the F0 pitch compression pattern used to mark *wh*-scope in Tokyo Japanese, as shown in Figures 1.1 and 1.2. Concretely, the range of a pitch plateau determines *wh*-scope in Busan Korean (Gim 1970; Kubo 2001; Hwang 2011a,b, 2015, among others) and Fukuoka Japanese (Hayata 1985; Kubo 1989, among others). This is claimed to apply in Figures 1.3 and 1.4.[2] Figure 1.3 corresponds to Busan (1.11a), while Figure 1.4 corresponds to Busan (1.11b); pitch plateau prosody extends to the first question marker in the former, while it extends to the second question marker in the latter, including the matrix predicate. As we will see in this dissertation, there are varieties that use neither of these patterns such as Seoul Korean (Jun and Oh 1996; Yun 2019). Which factors determine which *wh*-scope marking pattern is chosen in a specific *wh*-in-situ language is another major focus of this dissertation.

[2]I received Hyun Kyung Hwang's permission to cite these figures.

(1.11) *Busan Korean*

a. *Embedded scope*

민호는 유미가 누구를 만났는지 궁금해하나?

[Minho=nun [Yumi=ka **nwukwu**=lul manna-ss-nun-ci]
Minho=TOP Yumi=NOM who=ACC meet-PST-ADN-Q

kwungkumhayha-na]?
wonder-$Q_{[-wh]}$
'[Does Minho wonder [who$_i$ Yumi met t_i]]?'

b. *Matrix scope*

민호는 유미가 누구를 만났는지 궁금해하노?

[Minho=nun [Yumi=ka **nwukwu**=lul manna-ss-nun-ci]
Minho=TOP Yumi=NOM who=ACC met-PST-ADN-Q

kwungkumhayha-no]?
wonder-$Q_{[+wh]}$
'[Who$_i$ does Minho wonder [whether Yumi met t_i]]?' (Hwang 2011a: (2.9))

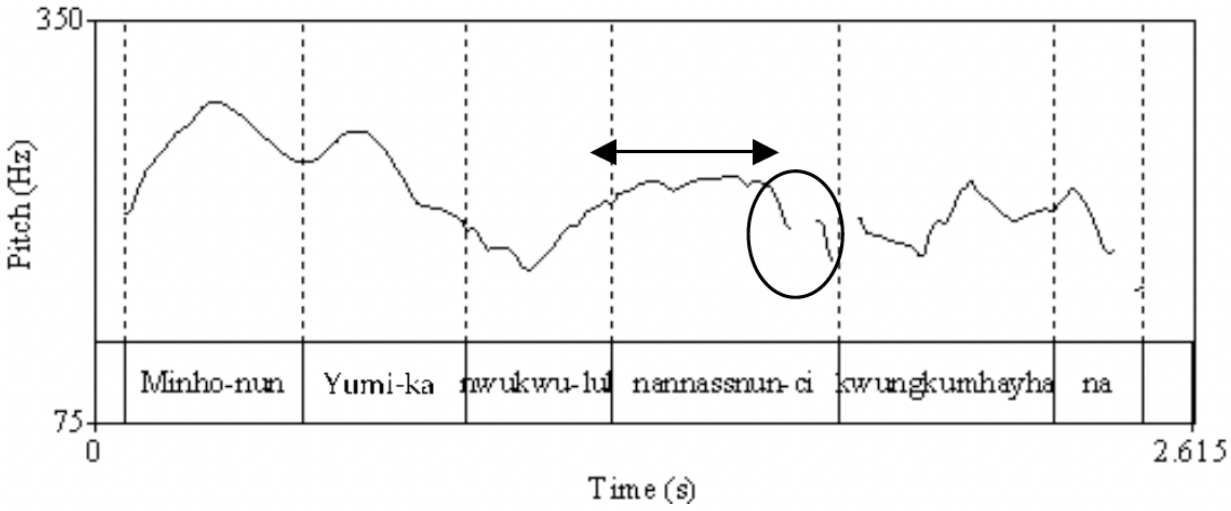


Figure 1.3: Embedded scope prosody in Busan Korean (Hwang 2011a: Figure 2.8)

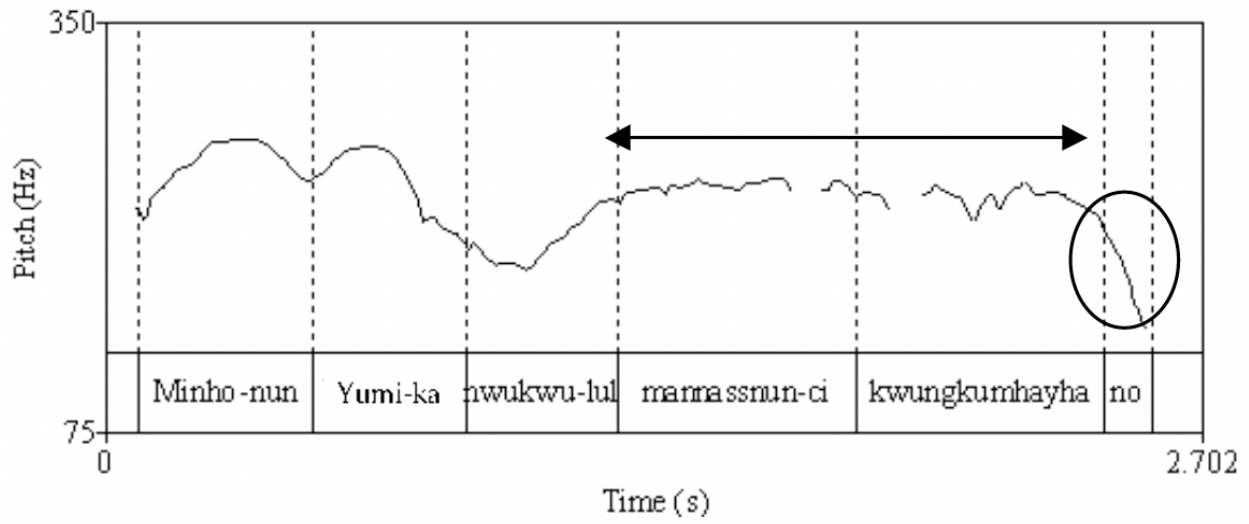


Figure 1.4: Matrix scope prosody in Busan Korean (Hwang 2011a: Figure 2.9)

In this dissertation, I abstract away from D-linking for two reasons. First, D-linking effects can be observed in both *wh*-movement and *wh*-in-situ languages. Second, Goodall (2015) found that D-linking improves the acceptability of sentences with *wh*-islands and without *wh*-islands. My focus is instead the relationship between prosody and *wh*-island effects in *wh* in-situ languages, specifically those with lexical pitch accent. One problem with the claim that *wh*-islands can be overcome with prosody in Japanese and Korean is that empirical data have generally not been provided in adequate quantity or quality in the literature on this topic. For example, Deguchi and Kitagawa (2002) and Ishihara (2003) did not attempt to conduct experiments to support the claim that F0 suppression can overcome the *wh*-island effect in Tokyo Japanese. Hwang (2009) and Hwang (2011a, 2015) conducted experiments, but they did not test whether the matrix scope prosody is acceptable.

A more recent approach by Richards (2010, 2016) attempts to relate *wh*-scope to prosodic structure. Richards (2016) claims that *wh*-in-situ languages manipulate prosodic structure so that a *wh*-phrase and its associated complementizer are in the same prosodic

unit, which explains why special prosody is used within *wh*-domains in Japanese (and Korean). The outstanding question that is not answered by Richards (2016) is, however, why there is so much variation in the prosodic realization of *wh*-scope in Japanese and Korean.

1.1.2 My claims

Thus, one of my main research questions is whether *wh*-islands can be overridden by prosody in *wh*-in-situ languages. A second and more important question is what accounts for the variation in prosodic *wh*-scope marking strategies in Japanese and Korean.

I will first address the second question about the typology in Chapter 4. I claim that *wh*-prosody has multiple patterns in Japanese and Korean because *wh*-in-situ languages form a prosodic phrase at the lowest possible level in the prosodic hierarchy to mark *wh*-scope. I modify Kuroda's (2005/2013) and Hwang's (2011a; 2011b) claim that accentedness and unaccentedness of *wh*-phrases determine the realization of *wh*-prosody, and show whether an Accentual Phrase can contain more than one Prosodic Word also determines which prosodic phrase is used for *wh*-scope marking. In order to establish this hypothesis, it will be necessary to clarify the accent classes and the prosodic structure of Gyeongsang (Daegu and Busan) Korean in Chapters 2 and 3, respectively.

The first research question will be addressed in Chapter 5. I argue that Japanese is indeed sensitive to *wh*-islands, as originally claimed by Nishigauchi (1990) and Watanabe (1992), based on my experimental data from Osaka Japanese. I will compare my Osaka Japanese data with the data on other varieties of Japanese and Korean in the previous literature, taking different *wh*-prosodies discussed in Chapter 4 into consideration, and show that this hypothesis applies to Japanese and Korean in general. In this chapter, I also present a possible pragmatic account of the interpretations that have led some researchers to claim that *wh*-islands can be overcome in Japanese with the appropriate prosody.

1.2 Structure of the dissertation

This dissertation consists of six chapters and an appendix. The remainder of this chapter is organized as follows. In Section 1.3, I provide basic background information of Japanese and Korean. Section 1.4 is about the lexical and phrasal prosody of multiple varieties of Japanese and Korean, introducing the two accent domain parameters [±lexical tone] and [±multiword AP] proposed by Igarashi (2012, 2014).

Chapter 2 clarifies the basic accent classes of Gyeongsang Korean (Daegu and Busan Korean). I claim that what has been analyzed by a final-accented class in Gyeongsang Korean (Rah 1974; Kenstowicz and Sohn 1997; Jun et al. 2006; Utsugi 2007; Lee and Davis 2009, 2010, among others) is in fact an unaccented class. I show that loanwords can be interpreted as filling the final-accented class in the accent classes, which is left vacant as a diachronic consequence of the Gyeongsang Accent Shift (Ramsey 1978). I further discuss the properties of final-accented words, comparing Gyeongsang Korean and Tokyo Japanese, and clarify the properties of unaccented words in both languages. Chapter 3 describes the prosodic structure of Gyeongsang Korean within the autosegmental-metrical framework (see Ladd 1996/2008), based on what I showed in Chapter 2. Chapter 4 discusses the typology of prosodic *wh*-scope marking strategies. I show that *wh*-in-situ languages determine which prosodic phrase level is used for *wh*-scope marking based on the (un)accentedness of each *wh*-phrase and the value of the accent domain parameters for each language. Chapter 5 is centered on the results of a perception experiment with Osaka Japanese speakers to investigate how prosody interacts with *wh*-scope. I show that there is a one-to-one mapping between prosody and interpretation in (Osaka) Japanese, but that prosody cannot override *wh*-islands. In this chapter, I also present a pragmatic explanation for intuitions that have been claimed to indicate matrix scope interpretation of *wh*-phrases in *wh*-islands. The final chapter concludes the dissertation. Appendix A presents the stimuli for the perception experiment in Chapter 5.

1.3 Language background

This subsection presents basic background on Japanese and Korean. Section 1.3.1 provides the language profile of Japanese, followed by the consonant and vowel inventories, the writing system, and the romanization of the language. Section 1.3.2 provides the Korean counterparts.

1.3.1 Japanese

Japanese (日本語) is a Japonic language spoken in Japan and is the de facto national language (*Glottolog 4.8*: Hammarström et al. 2023). There are 123,285,670 native speakers of Japanese in the world, around 122,000,000 of whom live in Japan (*Ethnologue*: Eberhard et al. 2023). Figure 1.5 shows the map of Japan; note that small islands are omitted from the map.[3] This dissertation deals with four varieties: Tokyo (東京), Osaka (大阪), Fukuoka (福岡), and Kobayashi (小林)[4] Japanese.

[3] https://upload.wikimedia.org/wikipedia/commons/b/bc/Regions_and_Prefectures_of_Japan_2.svg

[4] Kobayashi is located in southwestern Miyazaki Prefecture.

Figure 1.5: Map of Japan (Public Domain)

The consonant inventory and the vowel inventory of (Tokyo) Japanese are given in Table 1.1 and Table 1.2, respectively. In general, Japanese has the syllable structure (C)V, but the moraic consonant /Q/ and the moraic nasal /N/ can occupy the coda position of a syllable; /Q/ is realized as the same consonant as the following consonant (see (1.12)) and /N/ is realized as a nasal with the same place of articulation as the following segment (see (1.13)) (Shibatani 1990, Kubozono 2015, among others). A recent study by Maekawa (2021) revealed that /N/ in utterance-final position is realized with the place features of the preceding vowel. Most of the consonants have palatalized counterparts (Hasegawa 2015). The number of vowels ranges from three to eight between varieties; major varieties

such as Tokyo Japanese and Osaka(-Kyoto) Japanese have five vowels as in Table 1.2 (Shibatani 1990). The roundedness of the vowel /u/ (/ɯ/) is also different between varieties; for example, the Osaka Japanese /u/ is more rounded than the Tokyo Japanese counterpart (Shibatani 1990; Hasegawa 2015).[5] For phonological rules, refer to the sources cited in this chapter; Vance (2008) is helpful for English speakers to learn the pronunciation of Tokyo Japanese.

		Labial	**Coronal**	**Palatal**	**Velar**	**Glottal**
Stop	**Voiceless**	p	t		k	
	Voiced	b	d		g	
Fricative	**Voiceless**		s			h
	Voiced		z			
Nasal		m	n			
Liquid				ɾ		
Approximant		w		j		

Table 1.1: Japanese consonants (adapted from Shibatani 1990: Table 8.2)

	Front	**Back**
High	i	u
	e	o
Low		a

Table 1.2: Japanese vowels (based on Kubozono 2015: (1))

(1.12) *Moraic consonant /Q/*

a. /iQ.pai/ → [ippai] 'one cup' (一杯)

b. /iQ.tai/ → [ittai] 'one body' (一体)

c. /iQ.kai/ → [ikkai] 'one time' (一回) (Kubozono 2015: (12))

[5] Shibatani (1990) and Kubozono (2015) use the IPA symbol [ɯ] to describe the /u/ sound in Tokyo Japanese. Korean has /ɯ/, too (see Table 1.6), but I observe that the Tokyo [ɯ] is more rounded than the Korean /ɯ/.

(1.13) *Moraic nasal /N/*

a. /aN.ma/ → [amma] 'massage' (按摩)

b. /aN.na/ → [anna] 'Anna (girl's name)' (アンナ)

c. /maN.ga/ → [maŋga] 'cartoon, *manga*' (漫画) (Kubozono 2015: (13))

Modern Japanese utilizes three distinct scripts: Chinese characters, which are logographic and called *kanji* (漢字) 'lit. Han (漢) characters', and the two *kana* (仮名) syllabaries *hiragana* (平仮名) 'lit. plain kana', which are cursive forms of Chinese characters, and *katakana* (片仮名) 'lit. partial kana', which adopt parts of Chinese characters (Shibatani 1990; Hasegawa 2015). In general, kanji are used to write content words, hiragana are used to write grammatical function words, and katakana are used to write Western loanwords (Shibatani 1990). Hiragana and katakana have two diacritics that place the upper right corner of each character: the diacritic ゛ makes voiceless consonants voiced, while the diacritic ゜ turns /h/ into /p/ (Hasegawa 2015). Some hiragana and katakana letters have the small counterparts; small *ya* (ゃ), *yu* (ゅ), and *yo* (ょ) are used to write letters with a palatalized consonant, and small *tu* (っ) is used to write a geminate (/Q/) (Hasegawa 2015). Small ァ, ィ, ゥ, ェ, and ォ (usually in katakana) are used to write foreign sounds (see Vance 2008). Hiragana and katakana use different ways to represent long vowels; two vowels are repeated in hiragana (*(X)aa* (ああ, かあ, ...) for long /a/, *(X)ii* (いい, きい, ...) for long /i/, *(X)uu* (うう, くう, ...) for long /u/, *(X)ei* (えい, けい, ...) or *(X)ee* (ええ, ねえ, ...) for long /e/, and *(X)ou* (おう, こう, ...) or *(X)oo* (おお, とお, ...) for long /o/), while the letter ー is used in katakana (Hasegawa 2015).

There are two ways to romanize Japanese: *kunrei-shiki* (訓令式) 'lit. Cabinet ordinance system' and *Hebon-shiki* (ヘボン式) 'lit. Hepburn system' (Shibatani 1990; Vance 2008; Hasegawa 2015, among others). Table 1.3 is a chart of Kunrei Romanization with hiragana and IPA, while Table 1.4 is a chart of Hepburn Romanization with katakana and IPA. As the charts show, Kunrei Romanization is phonemic, while Hepburn Romanization

includes subphonemic contrasts because it is designed for English speakers (Shibatani 1990); thus, Hepburn Romanization can accommodate foreign sounds (e.g. チ *chi* vs. ティ *ti*) (see Vance 2008 for the discussion on the romanization of Japanese). Enclitic particles are written using the so-called historical orthography (e.g. は '=TOP' and を '=ACC'), but the actual modern pronunciation is used in romanization (e.g. *=wa* '=TOP' and *=o* '=ACC') (Hasegawa 2015). In this dissertation, I use Kunrei Romanization for linguistic examples and conventional transcriptions for proper nouns in text, following the style sheet of *Gengo Kenkyu* (Journal of the Linguistic Society of Japan).[6] A space is supposed to be used to mark a morpheme boundary in Kunrei Romanization, but I use an equal sign to mark a clitic boundary and a hyphen to mark a verbal suffix boundary. I use double letters to write long vowels and consonants although I use *ei* even when it is pronounced as a long vowel (see Vance 2008). This dissertation deals with lexical pitch accent varieties of Japanese; I mark the location of a pitch accent with the acute symbol ´ (see e.g. (1.10)).

[6] http://www.ls-japan.org/modules/documents/LSJpapers/j-gkstyle2010e.pdf

あ a [a]	い i [i]	う u [u]	え e [e]	お o [o]			
か ka [ka]	き ki [ki]	く ku [ku]	け ke [ke]	こ ko [ko]	きゃ kya [kʲa]	きゅ kyu [kʲu]	きょ kyo [kʲo]
が ga [ga]	ぎ gi [gi]	ぐ gu [gu]	げ ge [ge]	ご go [go]	ぎゃ gya [gʲa]	ぎゅ gyu [gʲu]	ぎょ gyo [gʲo]
さ sa [sa]	し si [ʃi]	す su [su]	せ se [se]	そ so [so]	しゃ sya [ʃa]	しゅ syu [ʃu]	しょ syo [ʃo]
ざ za [za]	じ zi [d͡ʒi]	ず zu [d͡zu]	ぜ ze [ze]	ぞ zo [zo]	じゃ zya [d͡ʒa]	じゅ zyu [d͡ʒu]	じょ zyo [d͡ʒo]
た ta [ta]	ち ti [t͡ʃi]	つ tu [t͡su]	て te [te]	と to [to]	ちゃ tya [t͡ʃa]	ちゅ tyu [t͡ʃu]	ちょ tyo [t͡ʃo]
だ da [da]	ぢ zi [d͡ʒi]	づ zu [d͡zu]	で de [de]	ど do [do]	ぢゃ zya [d͡ʒa]	ぢゅ zyu [d͡ʒu]	ぢょ zyo [d͡ʒo]
な na [na]	に ni [ni]	ぬ nu [nu]	ね ne [ne]	の no [no]	にゃ nya [nʲa]	にゅ nyu [nʲu]	にょ nyo [nʲo]
は ha [ha]	ひ hi [çi]	ふ hu [ɸu]	へ he [he]	ほ ho [ho]	ひゃ hya [ça]	ひゅ hyu [çu]	ひょ hyo [ço]
ば ba [ba]	び bi [bi]	ぶ bu [bu]	べ be [be]	ぼ bo [bo]	びゃ bya [bʲa]	びゅ byu [bʲu]	びょ byo [bʲo]
ぱ pa [pa]	ぴ pi [pi]	ぷ pu [pu]	ぺ pe [pe]	ぽ po [po]	ぴゃ pya [pʲa]	ぴゅ pyu [pʲu]	ぴょ pyo [pʲo]
ま ma [ma]	み mi [mi]	む mu [mu]	め me [me]	も mo [mo]	みゃ mya [mʲa]	みゅ myu [mʲu]	みょ myo [mʲo]
や ya [ja]		ゆ yu [ju]		よ yo [jo]			
ら ra [ɾa]	り ri [ɾi]	る ru [ɾu]	れ re [ɾe]	ろ ro [ɾo]	りゃ rya [ɾʲa]	りゅ ryu [ɾʲu]	りょ ryo [ɾʲo]
わ wa [wa]				を o [o]			
ん n /N/							

Table 1.3: Hiragana and Kunrei Romanization (adapted from Vance 2008)

ア a [a]	イ i [i]	ウ u [u]	エ e [e]	オ o [o]					
カ ka [ka]	キ ki [ki]	ク ku [ku]	ケ ke [ke]	コ ko [ko]	キャ kya [kʲa]		キュ kyu [kʲu]		キョ kyo [kʲo]
ガ ga [ga]	ギ gi [gi]	グ gu [gu]	ゲ ge [ge]	ゴ go [go]	ギャ gya [gʲa]		ギュ gyu [gʲu]		ギョ gyo [gʲo]
サ sa [sa]	シ shi [ʃi]	ス su [su]	セ se [se]	ソ so [so]	シャ sha [ʃa]	スィ si [si]	シュ shu [ʃu]	シェ she [ʃe]	ショ sho [ʃo]
ザ za [za]	ジ ji [d͡ʒi]	ズ zu [d͡zu]	ゼ ze [ze]	ゾ zo [zo]	ジャ ja [d͡ʒa]	ズィ zi [zi]	ジュ ju [d͡ʒu]	ジェ je [d͡ʒe]	ジョ jo [d͡ʒo]
タ ta [ta]	チ chi [t͡ʃi]	ツ tsu [t͡su]	テ te [te]	ト to [to]	チャ cha [t͡ʃa]		チュ chu [t͡ʃu]	チェ che [t͡ʃe]	チョ cho [t͡ʃo]
					ツァ tsa [t͡sa]	ツィ tsi [t͡si]		ツェ tse [t͡se]	ツォ tso [t͡so]
						ティ ti [ti]	トゥ tu [tu]		テュ tyu [tʲu]
ダ da [da]	ヂ ji [d͡ʒi]	ヅ zu [d͡zu]	デ de [de]	ド do [do]	ヂャ ja [d͡ʒa]		ヂュ ju [d͡ʒu]	ヂェ je [d͡ʒe]	ヂョ jo [d͡ʒo]
						ディ di [di]	ドゥ do [du]		デュ dyu [dʲu]
ナ na [na]	ニ ni [ni]	ヌ nu [nu]	ネ ne [ne]	ノ no [no]	ニャ nya [nʲa]		ニュ nyu [nʲu]		ニョ nyo [nʲo]
ハ ha [ha]	ヒ hi [çi]	フ fu [ɸu]	ヘ he [he]	ホ ho [ho]	ヒャ hya [ça]		ヒュ hyu [çu]		ヒョ hyo [ço]
					ファ fa [ɸa]	フィ fi [ɸi]	フュ fyu [ɸʲu]	フェ fe [ɸe]	フォ fo [ɸo]
バ ba [ba]	ビ bi [bi]	ブ bu [bu]	ベ be [be]	ボ bo [bo]	ビャ bya [bʲa]		ビュ byu [bʲu]		ビョ byo [bʲo]
パ pa [pa]	ピ pi [pi]	プ pu [pu]	ペ pe [pe]	ポ po [po]	ピャ pya [pʲa]		ピュ pyu [pʲu]		ピョ pyo [pʲo]
マ ma [ma]	ミ mi [mi]	ム mu [mu]	メ me [me]	モ mo [mo]	ミャ mya [mʲa]		ミュ myu [mʲu]		ミョ myo [mʲo]
ヤ ya [ja]		ユ yu [ju]	イェ ye [je]	ヨ yo [jo]					
ラ ra [ɾa]	リ ri [ɾi]	ル ru [ɾu]	レ re [ɾe]	ロ ro [ɾo]	リャ rya [ɾʲa]		リュ ryu [ɾʲu]		リョ ryo [ɾʲo]
ワ wa [wa]	ウィ wi [wi]		ウェ we [we]	ウォ wo [wo]					
ン n/m /N/									

Table 1.4: Katakana and Hepburn Romanization (adapted from Vance 2008)

1.3.2 Korean

Korean (한국어 in South Korea; 조선말 in North Korea) is a Koreanic language, which is primarily spoken in the Republic of Korea (South Korea) and the Democratic People's Republic of Korea (North Korea) (*Glottolog 4.8*: Hammarström et al. 2023). It is also spoken in the area around the Korean Peninsula, such as Yanbian Korean Autonomous Prefecture (延边朝鲜族自治州) in China (Sohn 1999, Cho and Whitman 2020). Korean is the de facto national language in both South Korea and North Korea, and as of 2020, there are 81,721,540 speakers of Korean around the world, 50.2 million of whom are in South Korea; in 2019, there were 25.4 million speakers in North Korea (*Ethnologue*: Eberhard et al. 2023). Figure 1.6 shows the map of Korea.[7] In this dissertation, I take a look at the varieties of Korean spoken in the following regions in the map: (2) Hamgyeong (함경도), (3) Central including Seoul (서울), and (5) Gyeongsang (경상도). Both Hamgyeong Korean and Gyeongsang Korean have two subvarieties: North Hamgyeong (함경북도) and South Hamgyeong (함경남도) for Hamgyeong Korean and North Gyeongsang (경상북도) and South Gyeongsang (경상남도) for Gyeongsang Korean. The variety spoken in Yanbian Korean Autonomous Prefecture is North Hamgyeong Korean because many residents are immigrants from Hamgyeong Province in North Korea (Son 2017). North Gyeongsang Korean and South Gyeongsang Korean are called Daegu (대구) Korean and Busan (부산) Korean, respectively, in this dissertation because each city is the large city in each region. I will not take a close look at the varieties spoken in North Korea and China (i.e. Hamgyeong Korean and Yanbian Korean) due to limited access to the data, but I refer to them when required.

[7] https://upload.wikimedia.org/wikipedia/commons/b/bb/Map_of_Korean_dialects.png

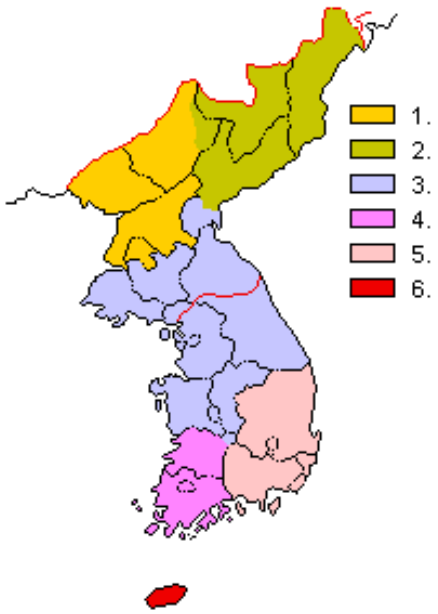


Figure 1.6: Map of Korea (based on Ogura 1944: Public Domain)

Table 1.5 presents the consonant inventory of Korean; for each segment, the left symbol represents an IPA symbol, while the right symbol represents the corresponding Hangul (한글) letter. This consonant inventory from Cho and Whitman (2020) shows the consonants used in Seoul Korean, but the other varieties seem to have the same consonant inventory (see Ramsey 1978 for South Hamgyeong Korean; Son 2017 for Daegu Korean and Yanbian Korean; Son 2021 for Busan Korean). However, Yanbian Korean seems to have /f/ due to the influence of Mandarin (Park 2001) and Rah (1974) mentions that the tense fricative ㅆ /s͈/ is missing in Daegu Korean contra the observation by Son (2017).

		Labial	Coronal	Alveopalatal	Velar	Glottal
Stop/Affricate	**Plain**	p ㅂ	t ㄷ	tɕ ㅈ	k ㄱ	
	Tense	p͈ ㅃ	t͈ ㄸ	tɕ͈ ㅉ	k͈ ㄲ	
	Aspirated	pʰ ㅍ	tʰ ㅌ	tɕʰ ㅊ	kʰ ㅋ	
Fricative	**Plain**		s ㅅ			h ㅎ
	Tense		s͈ ㅆ			
Nasal		m ㅁ	n ㄴ		ŋ ㅇ	
Liquid			l ㄹ			
Approximant		w ㅗ/ㅜ		j ㅣ		

Table 1.5: (Seoul) Korean consonants (duplication of Cho and Whitman 2020: Table 4.1)

Table 1.6 is the vowel inventory of contemporary Seoul Korean from Cho and Whitman (2020), based on the data in Shin (2015). According to Shin (2015), young Seoul Korean speakers have only seven vowels. They do not make a distinction between ㅖ /e/ and ㅐ /ɛ/; they have been merged into /e/. In addition, young Seoul Korean speakers do not pronounce the front rounded vowels ㅟ /y/ and ㅚ /ø/ as monophthongs; they pronounce them as a combination of a glide and a vowel /wi/ and /we/, respectively. The other combinations of a glide and a vowel (or a vowel and a glide) are ㅙ /we/, ㅞ /we/, ㅝ /wʌ/, ㅘ /wa/, ㅜ /ju/, ㅖ /je/, ㅕ /jʌ/, ㅛ /jo/, ㅑ /ja/, and ㅢ /ɯj/ (Cho and Whitman 2020: p. 71).[8] The other varieties have different vowel inventories. For instance, ㅖ /e/ and ㅐ /ɛ/ are not merged and ㅟ /y/ and ㅚ /ø/ are pronounced as monophthongs in South Hamgyeong Korean (Ramsey 1978). ㅟ and ㅚ are not pronounced as monophthongs, and the distinction between ㅖ /e/ and ㅐ /ɛ/ is still maintained in Yanbian Korean (Son 2017). ㅖ /e/ and ㅐ /ɛ/ are merged in Daegu Korean (Son 2017) and Busan Korean (Son 2021). Some speakers of Daegu and Busan Korean seem to merge ㅡ /ɯ/ and ㅓ /ʌ/ into /ʌ/, too (Cho and Whitman 2020, Seung-Eun Kim, p.c.).

[8]Speakers who do not merge ㅖ /e/ and ㅐ /ɛ/ have ㅒ /jɛ/.

	Front		Back	
	Unrounded	**Rounded**	**Unrounded**	**Rounded**
High	i ㅣ	(y) ㅟ	ɯ ㅡ	u ㅜ
	e ㅔ	(ø) ㅚ	ʌ ㅓ	o ㅗ
Low	(ɛ) ㅐ		a ㅏ	

Table 1.6: Seoul Korean vowels (adapted from Cho and Whitman 2020: Table 4.3)

Let us move on to the writing system of Korean, summarizing the introduction of *Integrated Korean: Beginning 1* (Cho et al. 2019). Modern Korean is written using the alphabet called *Hangul* (한글), which is called 조선글 in North Korea. The Hangul writing is syllable-based. For example, 한 represents the first syllable of the word *Hangul*. ㅎ, ㅏ, and ㄴ correspond to /h/, /a/, and /n/, respectively (see Tables 1.5 and 1.6). There are three things to note. First, when a syllable is onsetless, ㅇ is used as a placeholder; for example, 아 represents /a/. Second, although the syllable template for Korean is (C)(G)V(C) (Cho and Whitman 2020), some Hangul letters have two coda consonants (e.g. 값 /kaps/ 'price') underlyingly. In such cases, either one of the consonants gets deleted in pronunciation; in 값 'price', for example, only ㅂ is pronounced and the surface pronunciation of the word is [kap]. Finally, Modern Korean adopts a morphophonemic writing system (Cho and Whitman 2020), and Korean always follows the Maximum Onset Principle. For example, 값 'price' followed by the enclitic case particle 이 '=NOM' is spelled 값이; the coda consonant cluster of 값 'price' is broken up into the two syllables and 값이 is pronounced /kap.si/. For other pronunciation rules, including phonological rules, refer to the sources cited in this chapter; Shin et al. (2013) is helpful for English speakers to learn the pronunciation of Seoul Korean.

In this dissertation, I use Yale Romanization (see Martin 1992) to romanize linguistic examples in Korean because Yale Romanization is "phonemic, and phonemic analysis is the foundation of all further linguistic analysis" (Cho and Whitman 2020: p. 58). For proper nouns such as place names, I use ROK Revised Romanization because it is widely

used to transcribe Korean in South Korea (Cho and Whitman 2020). Tables 1.7 and 1.8 show the correspondences between Hangul and Yale Romanization and between Hangul and Revised Romanization, respectively. As in Japanese, I use an equal sign to mark a clitic boundary, a hyphen to mark a verbal suffix boundary, and an acute symbol to indicate the location of a pitch accent in lexical pitch accent varieties of Korean.

ㄱ	ㄲ	ㄴ	ㄷ	ㄸ	ㄹ	ㅁ	ㅂ	ㅃ		
k	kk	n	t	tt	l	m	p	pp		
ㅅ	ㅆ	ㅇ	ㅈ	ㅉ	ㅊ	ㅋ	ㅌ	ㅍ	ㅎ	
s	ss	-/ng	c	cc	ch	kh	th	ph	h	
ㅏ	ㅐ	ㅑ	ㅒ	ㅓ	ㅔ	ㅕ	ㅖ	ㅗ	ㅘ	
a	ay	ya	yay	e	ey	ye	yey	o	wa	
ㅙ	ㅚ	ㅛ	ㅜ	ㅝ	ㅞ	ㅟ	ㅠ	ㅡ	ㅢ	ㅣ
way	oy	yo	wu	we	wey	wi	yu	u	uy	i

Table 1.7: Yale Romanization of Korean (based on Martin 1992)

ㄱ	ㄲ	ㄴ	ㄷ	ㄸ	ㄹ	ㅁ	ㅂ	ㅃ		
g/k	kk	n	d/t	tt	r/l	m	b/p	pp		
ㅅ	ㅆ	ㅇ	ㅈ	ㅉ	ㅊ	ㅋ	ㅌ	ㅍ	ㅎ	
s	ss	-/ng	j	jj	ch	k	t	p	h	
ㅏ	ㅐ	ㅑ	ㅒ	ㅓ	ㅔ	ㅕ	ㅖ	ㅗ	ㅘ	
a	ae	ya	yae	eo	e	yeo	ye	o	wa	
ㅙ	ㅚ	ㅛ	ㅜ	ㅝ	ㅞ	ㅟ	ㅠ	ㅡ	ㅢ	ㅣ
wae	oe	yo	u	wo	we	wi	yu	eu	ui	i

Table 1.8: Revised Romanization of Korean (based on National Institute of Korean Language n.d.)

1.4 Classification of Japanese and Korean by prosodic properties

In this dissertation, I adopt the autosegmental-metrical framework (see Ladd 1996/2008) to discuss the intonational phonology of Japanese and Korean. I assume the hierarchical prosodic structure in Figure 1.7 for Japanese and Korean, following Pierrehumbert and Beckman (1988) and Jun (2006). In this version of the prosodic hierarchy, there are three

prosodic phrase levels above the Prosodic Word (PWd) level: Accentual Phrase (AP) < Intermediate Phrase (ip) < Utterance (U) or Intonation Phrase (IP).[9] The prosodic hierarchy follows the Strict Layer Hypothesis (Selkirk 1984); thus, a prosodic phrase level cannot be skipped or repeated.

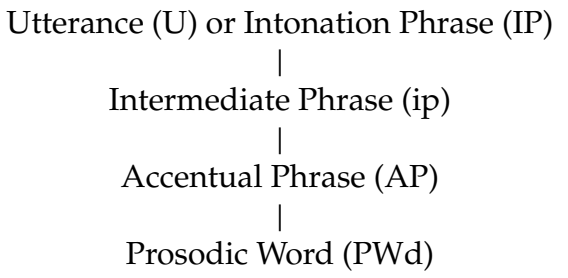


Figure 1.7: Prosodic hierarchy of Japanese and Korean (based on Pierrehumbert and Beckman 1988 and Jun 2006)

Generally speaking, PWd is a free morpheme with an optional particle or particles (see Igarashi 2012, 2014). AP is a prosodic unit with at most one lexical pitch accent (Pierrehumbert and Beckman 1988). ip is the domain for focus and downstep in Pierrehumbert and Beckman (1988). ip also marks syntactic boundaries (Selkirk and Tateishi 1991, Kubozono 1993, Jun 2006). U/IP conveys pragmatic information such as the clause type of an utterance with a final boundary tone (see Maekawa et al. 2002 for the U/IP-final boundary tones in Tokyo Japanese and Jun 2006 for the Seoul Korean counterparts). I will use the term IP in this dissertation.

Igarashi (2012, 2014) classifies varieties of Japanese and Korean, using two binary parameters. The first parameter is [±lexical tone]. [+lexical tone] languages are languages with lexically specified tones such as lexical pitch accent melodies, while [−lexical tone] languages are languages without such tones. Following Pierrehumbert and Beckman (1988), I assume that tones at the PWd level are lexical, while tones at the AP level or above are all post-lexical. The second parameter is [±multiword AP]. This parameter is based on how many PWds an AP can include. In [+multiword AP] languages, an AP can

[9] Pierrehumbert and Beckman (1988) use the term *Utterance*, while Jun (2006) uses the term *Intonation Phrase* for this prosodic phrase level.

contain more than one PWd. In [−multiword AP] languages, on the other hand, an AP can contain only one PWd. The two binary parameters suggest that there are four possible combinations. In this section, I will go over the combinations one by one. Section 1.4.1 is [+lexical tone, +multiword AP] (Tokyo and Fukuoka Japanese), Section 1.4.2 is [+lexical tone, −multiword AP] (Osaka Japanese), Section 1.4.3 is [−lexical tone, +multiword AP] (Seoul Korean), and Section 1.4.4 is [−lexical tone, −multiword AP] (Kobayashi Japanese). Section 1.4.5 is the summary of the section.

1.4.1 [+lexical tone, +multiword AP] (Tokyo and Fukuoka Japanese)

Tokyo Japanese is a lexical pitch accent language ([+lexical tone]), where the accentedness or unaccentedness of each word and the location of pitch accent, if a given word is accented, are lexically specified; accented words have a lexical pitch fall (HL) and unaccented words do not have such a pitch fall (McCawley 1968; Haraguchi 1977; Pierrehumbert and Beckman 1988, among others for sources written in English). Tokyo Japanese is what McCawley (1968) calls a "mora-counting syllable language": the accent bearing unit is the syllable, while the tone bearing unit is the mora. Examples of accented words and unaccented words are given in (1.14) with surface melodies. Final-accented words such as *atamá* 'head' in (1.14a) and unaccented words such as *miyako* 'capital' in (1.14b) have the same surface melody in isolation with no final pitch fall, but a pitch fall appears in final-accented words with an unaccented enclitic particle, as shown in (1.15) (McCawley 1968; Haraguchi 1977, among others).[10] The surface melody of Tokyo Japanese words cannot start with two or more L tones (see Kubozono 2018); this is why there are H tones on moras without a pitch accent in (1.14) and (1.15).

[10]When a pitch accent is assigned to a long final syllable, there is a contrast between final-accented words and unaccented words even in isolation (e.g. *senséi* 'teacher' (LHHL 先生) vs. *sensei* 'despotism' (LHHH 専制) (McCawley 1968: p. 139).

(1.14) *Accent classes in Tokyo Japanese*

a. *Accented*

ínoti 'life' (HLL 命), kokóro 'heart' (LHL 心), atamá 'head' (LHH 頭)

b. *Unaccented*

miyako 'capital' (LHH 都) (Haraguchi 1977: (1.1))

(1.15) *Final-accented vs. Unaccented in Tokyo Japanese*

a. *Final-accented*

atamá 'head' (LHH 頭) + =ga '=NOM' (が) → atamá=ga 'head=NOM' (LHH=L 頭が)

b. *Unaccented*

miyako 'capital' (LHH 都) + =ga '=NOM' (が) → miyako=ga 'capital=NOM' (LHH=H 都が) (Haraguchi 1977: (1.1))

Pierrehumbert and Beckman (1988) state that only a single pitch accent melody, H*+L, is motivated at the lexical level in Tokyo Japanese. They posit two post-lexical tones at the AP level: L% and H−. An AP-final L% boundary tone is linked to the right periphery of an AP, which is secondarily linked to the first mora of the following AP if there is no tone. H− is called a phrasal H− tone; it is primarily linked to the left periphery of an AP and can be secondarily linked to the second mora of an AP if the first and second moras of the AP are toneless.[11][12] Pierrehumbert and Beckman posit two types of tones at the IP level. An IP starts with an IP-initial %L boundary tone, which can be secondarily linked to the first mora of the first AP. Because of this tone and an AP-final L% boundary tone, each AP starts with low F0, which is called **Initial Lowering** in the previous literature such as

[11] Pierrehumbert and Beckman (1988) claim that H− is linked to the first mora if the first syllable of an AP is (C)VV or (C)VN (see Hattori 1954).

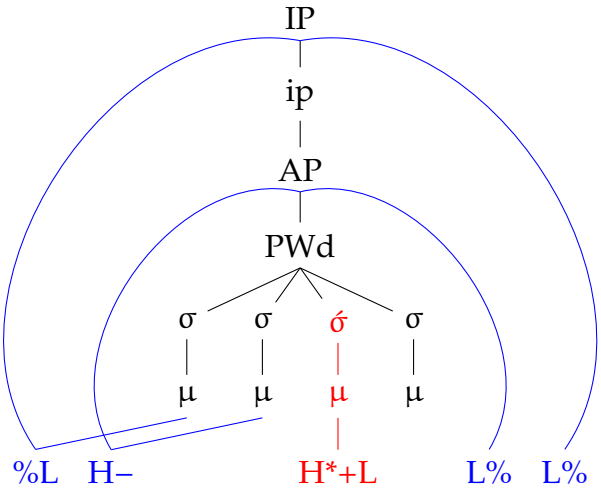
[12] When an AP consists of only one syllable with one mora and is unaccented, a phrasal H− tone seems to be linked with the mora secondarily because the surface melody is H (see Haraguchi 1977: (23a)).

Haraguchi (1977) and Poser (1984).[13] An IP-final boundary tone delivers the type of an utterance and pragmatic information; for example, an IP-final L% boundary tone marks declaratives. (1.16) illustrates the prosodic structure of the accented PWd in (1.15a) and that of the unaccented PWd in (1.15b) based on Pierrehumbert and Beckman's analysis. There are two things to note. First, lexical tones (PWd-level tones) are in red, while post-lexical tones (AP-level and IP-level tones) are in blue in the prosodic trees in this section. Second, Pierrehumbert and Beckman claim that not every tone bearing unit is assigned a tone; in their treatment, the F0 values of the moras that are not specified with tones are filled with a linear interpolation algorithm. Linear interpolation is different from tone spreading proposed by Haraguchi (1977) and Poser (1984); in their tone spreading analyses, tones can spread from right to left and every tone bearing unit carries a tone, but linear interpolation is always done from left to right.

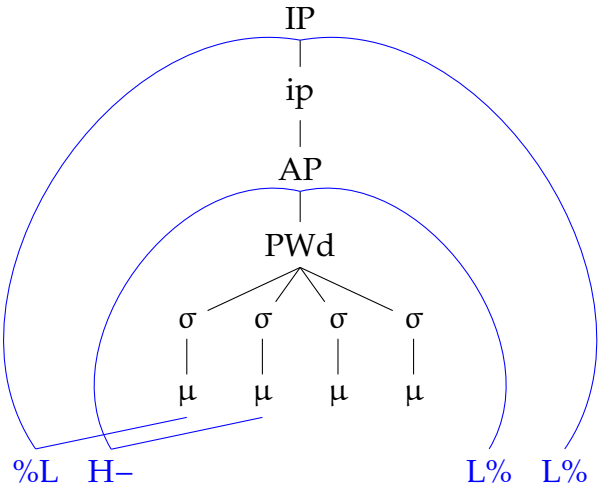
[13] In the traditional view such as Hattori (1954) and Haraguchi (1977), an AP-initial L tone does not exist when an AP is initial-accented or has a long vowel, but Poser (1984) and Pierrehumbert and Beckman (1988) found that an AP always starts with low F0 with production experiments. Pierrehumbert and Beckman claim that there are two types of L boundary tones depending on secondary linking; they call the AP-final L% (or the IP-initial %L) without secondary linking **weak L**, in contrast to **strong L**, which undergoes secondary linking. That is, weak L was not described in the previous literature before Poser (1984) and Pierrehumbert and Beckman (1988) and is missing in the surface melody of *ínoti* 'life' in (1.14a).

(1.16) *Tokyo Japanese*

a. *Accented*[14] = (1.15a)



b. *Unaccented* = (1.15b)



Fukuoka Japanese appears to have the same prosodic system as Tokyo Japanese (Hayata 1985; Kubo 1989). Thus, I apply Pierrehumbert and Beckman's (1988) analysis of Tokyo Japanese to Fukuoka Japanese.[15] However, Hayata's data reveal that most words

[14]When final-accented words are pronounced in isolation, the trailing +L tone in the pitch accent melody seems to get deleted in Pierrehumbert and Beckman's (1988) model (see (1.15)).

[15]Smith (2011) applies Pierrehumbert and Beckman's (1988) model to Fukuoka Japanese.

in Fukuoka Japanese belong to different accent classes or have a pitch accent on different locations from Tokyo Japanese words. (1.17) shows the correspondences between the Tokyo Japanese words in (1.14) and the Fukuoka Japanese counterparts.

(1.17) *Accent classes in Fukuoka Japanese* (cf. (1.14))

a. *Accented*

inóti 'life' (LHL 命), kokóro 'heart' (LHL 心), miyáko 'capital' (LHL 都)

b. *Unaccented*

atama 'head' (LHH 頭) (Hayata 1985: pp. 111–214)

Both Tokyo Japanese and Fukuoka Japanese are classified as [+multiword AP] by Igarashi (2012, 2014). Recall that one AP can bear at most one pitch accent. Previous studies such as Kubozono's (1993) study show that when there is no large syntactic boundary between two PWds, two APs must be formed when PWd1 is accented, while one AP can be formed when PWd1 is unaccented. (1.18) and (1.19) show this contrast. The former has initial-accented PWd1, while the latter has unaccented PWd1 in OV sentences. The verb *mamór-u* 'protect-NPST' is medial-accented. I recorded a female native speaker of Tokyo Japanese and made pitch tracks using Praat (Boersma 2001); Figure 1.8 corresponds to (1.18) and Figure 1.9 corresponds to (1.19). In Figure 1.8 with initial-accented PWd1, the two PWds form two separate APs; we can see two pitch peaks due to the pitch accents in the figure. Notice that the pitch peak of AP2 is reduced compared to that of AP1. This phenomenon is called **downstep**. As mentioned earlier, the domain for downstep is claimed to be ip in Pierrehumbert and Beckman's (1988) analysis. Thus, the two APs in Figure 1.8 is under the same ip. Pierrehumbert and Beckman also argue that downstep is triggered by the pitch accent melody H*+L in Tokyo Japanese, as claimed by Poser (1984); I state what causes downstep in prose in (1.20). Downstep occurs in Figure 1.8 because AP1 is accented. In contrast, the two PWds in Figure 1.9 form a single AP. PWd2 *mamór-u* 'protect-NPST' is medial-accented and has the surface melody LHL in isolation

(see (1.14)), but the word-initial pitch rise is not observable in the figure because PWd2 is not AP-initial now due to unaccented PWd1. In other words, PWd2 lacks Initial Lowering because it is not AP-initial. Downstep does not occur in Figure 1.9 because PWd1 is unaccented.

(1.18) *Initial-accented + Accented → Two APs in Tokyo Japanese*

屋根守る。

pro yáne mamór-u.
roof(=ACC) protect-NPST

'*pro* protects a roof.'

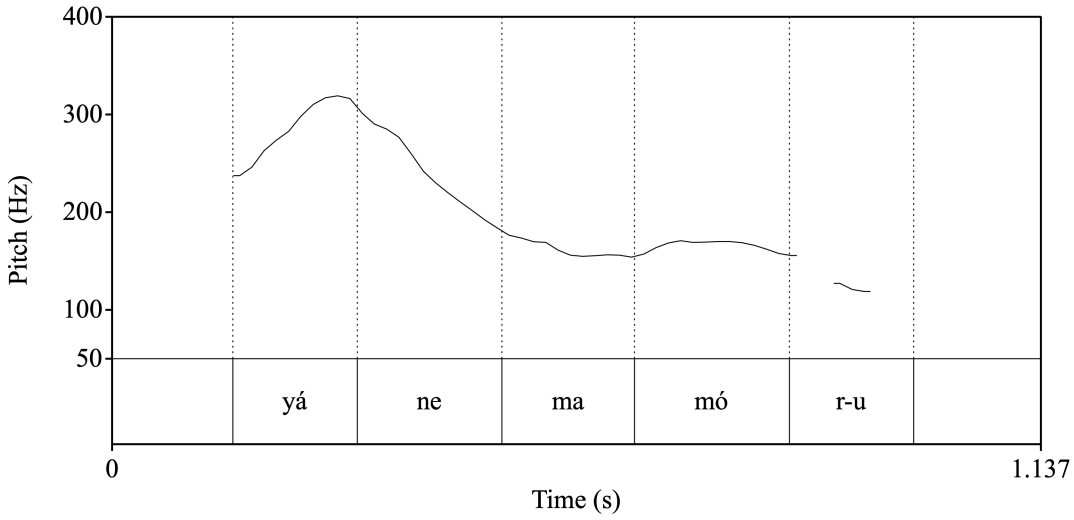


Figure 1.8: Initial-accented + Accented → Two APs in Tokyo Japanese

(1.19) *Unaccented + Accented → One AP in Tokyo Japanese*

森守る。

pro mori mamór-u.

forest(=ACC) protect-NPST

'*pro* protects forests.'

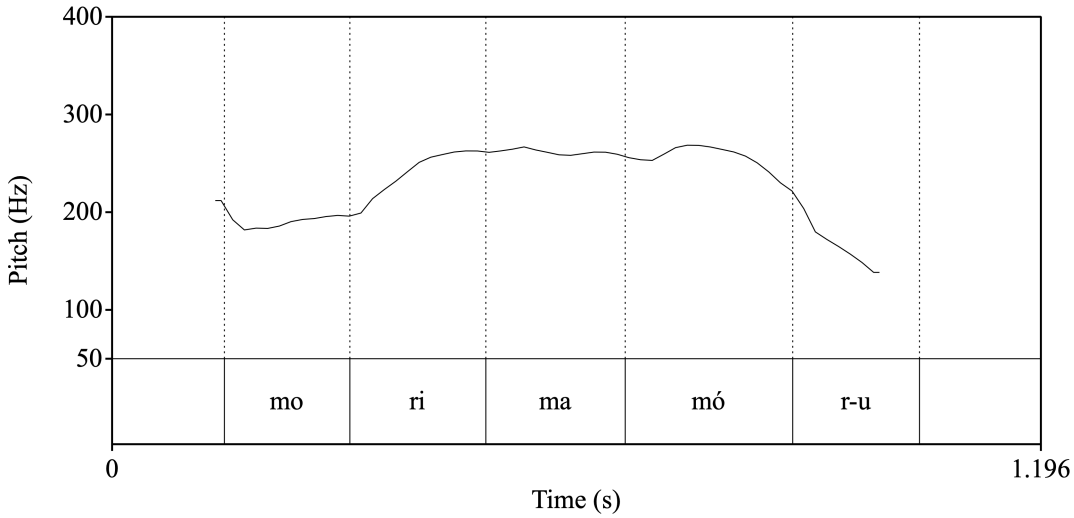


Figure 1.9: Unaccented + Accented → One AP in Tokyo Japanese

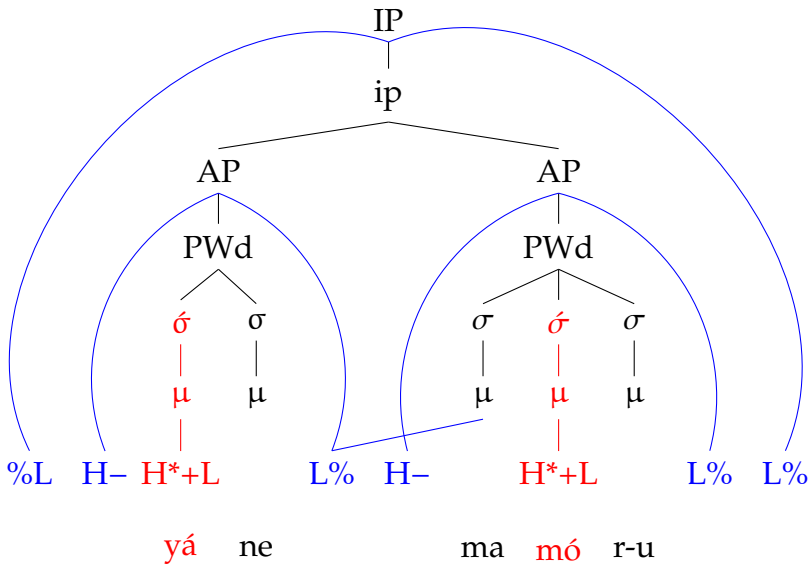
(1.20) *Downstep trigger (to be revised)*

The pitch accent melody H*+L triggers downstep in an ip.

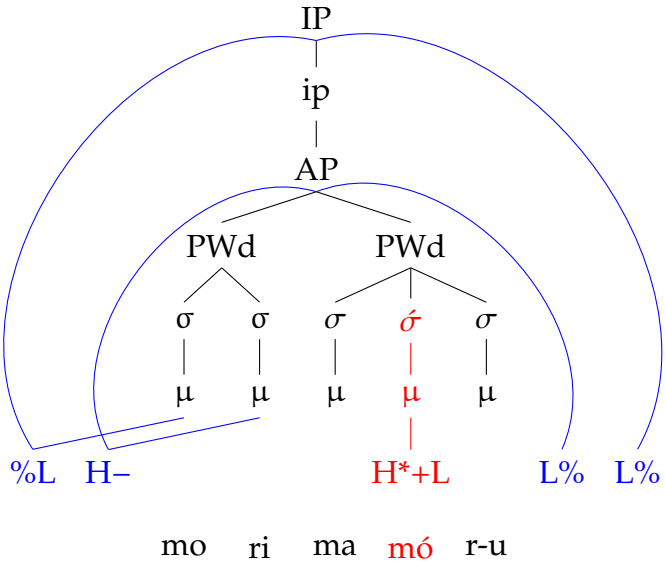
(based on Poser 1984; Pierrehumbert and Beckman 1988)

Under Pierrehumbert and Beckman's (1988) framework, the prosodic structure of (1.18) and that of (1.19) can be illustrated as in (1.21) and (1.22), respectively.

(1.21) *Phrasal prosody (Tokyo Japanese): Accented + Accented → Two APs* = (1.18)



(1.22) *Phrasal prosody (Tokyo Japanese): Unaccented + Accented → One AP* = (1.19)



Recall that final-accented words and unaccented words exhibit different surface melodies when an enclitic particle is attached to them (see (1.15)). Final-accented words and unaccented words also show a difference in phrasal prosody. (1.23) has a final-accented word as PWd1. The pitch track of (1.23) recorded by the same speaker is presented in Figure 1.10. Unlike (1.19) with unaccented PWd1, two separate APs are formed

and the pitch peak of AP2 is downstepped due to the accentedness of AP1.

(1.23) *Final-accented + Accented → Two APs in Tokyo Japanese*

山守る。

pro yamá mamór-u.

mountain(=ACC) protect-NPST

'*pro* protects mountains.'

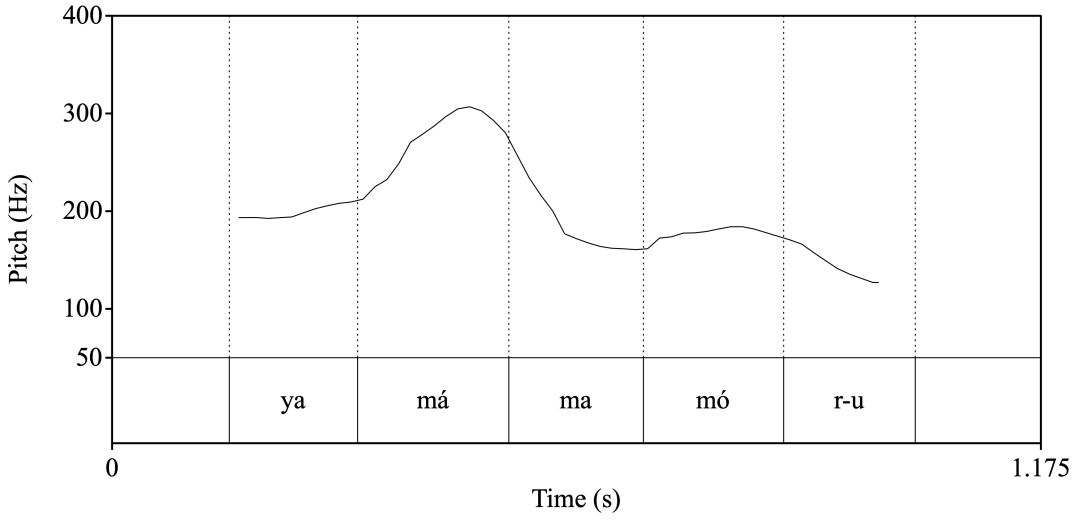
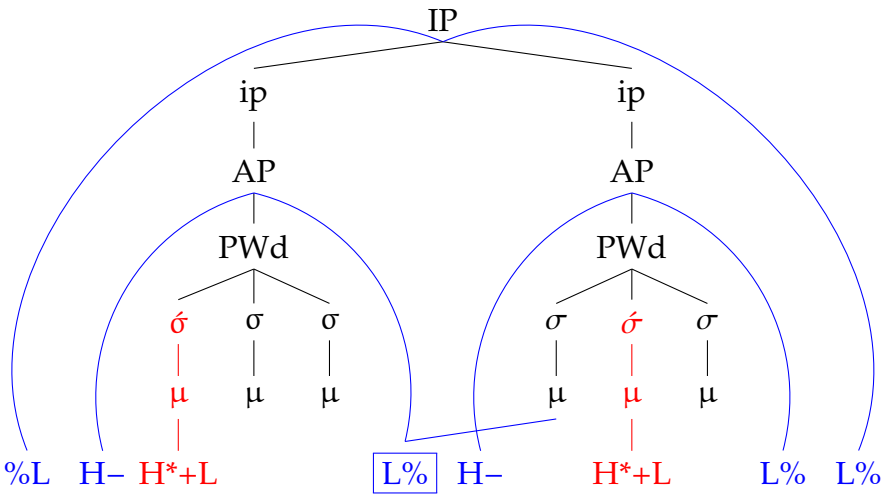


Figure 1.10: Final-accented + Accented → Two APs in Tokyo Japanese

Each AP starts with Initial Lowering in Tokyo Japanese, but Pierrehumbert and Beckman (1988) posit an AP-*final* L% boundary tone as well as an IP-initial %L boundary tone for the phenomenon. The motivation behind this analysis is illustrated in (1.24), where two APs form two separate ips. With production experiments, Pierrehumbert and Beckman discovered that the L boundary tone in the box in (1.24), which constitutes the Initial Lowering of the second AP, undergoes downstep. This cannot be accounted for if an AP-*initial* %L boundary tone were posited because the domain for downstep is ip. This also made Pierrehumbert and Beckman posit an IP-initial %L boundary tone because an L boundary tone for the Initial Lowering of the first AP is required.

(1.24) *Two types of L boundary tones in Tokyo Japanese*



1.4.2 [+lexical tone, −multiword AP] (Osaka Japanese)

Osaka Japanese is also a lexical pitch accent language ([+lexical tone]) and has accented words (with a lexical pitch fall) and unaccented words (without a lexical pitch fall), but unlike Tokyo and Fukuoka Japanese words, Osaka Japanese words begin with one of the two initial register tones H or L (Kori 1987; Pierrehumbert and Beckman 1988, among others for sources written in English). H-beginningness/L-beginningness and accentedness/unaccentedness give Osaka Japanese four accent classes. (1.25) presents the four accent classes and their examples with surface melodies; note that I mark H-beginning words with a superscript $^{\text{H}}$ and L-beginning words with a superscript $^{\text{L}}$. Osaka Japanese is a "mora-counting mora language" according to the classification by McCawley (1968) because both the accent bearing unit and the tone bearing unit are the mora (Kori 1987, Pierrehumbert and Beckman 1988). The surface melody of L-beginning Osaka Japanese words can start with LL... unlike the surface melody of Tokyo Japanese words (Kubozono 2018; see (1.25c) and (1.25d)). As in (1.25d), L-beginning unaccented words end in an H tone (Kori 1987, Pierrehumbert and Beckman 1988).

(1.25) *Accent classes in Osaka Japanese*

a. *H-beginning accented*

^{H}yamazákura 'wild cherry' (HHHLL 山桜)

b. *H-beginning unaccented*

^{H}niwatori 'chicken' (HHHH ニワトリ)

c. *L-beginning accented*

^{L}nokogíri 'file, saw' (LLHL のこぎり)

d. *L-beginning unaccented*

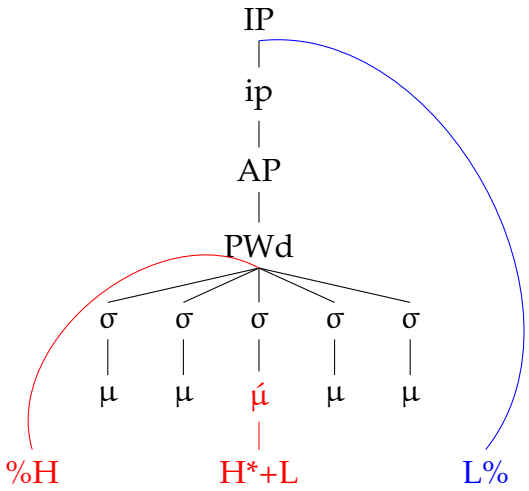
^{L}tukemono 'pickles' (LLLH 漬物)

(Pierrehumbert and Beckman 1988: Figure 8.1)

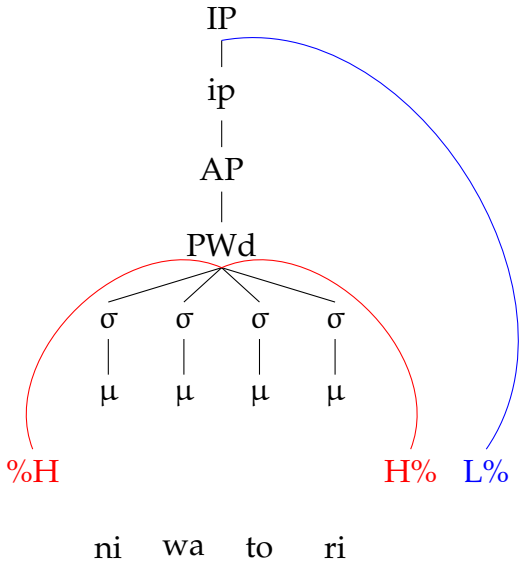
The prosodic structure of each example in (1.25) analyzed by Pierrehumbert and Beckman (1988) is presented in (1.26). Pierrehumbert and Beckman posit PWd-initial %H and %L boundary tones to mark H-beginningness (see (1.26a) and (1.26b)) and L-beginningness (see (1.26c) and (1.26d)), respectively. The pitch accent melody H*+L is linked with the accented mora in H-beginning and L-beginning accented words (see (1.26a) and (1.26c)). Pierrehumbert and Beckman also posit a PWd-final H% boundary tone for unaccented words (see (1.26b) and (1.26d)) due to the pitch shapes in (1.25b) and (1.25d). Pierrehumbert and Beckman assume an IP-final L% boundary tone for declarative sentences and an IP-final H% boundary tone for interrogative sentences as in Tokyo Japanese; an IP-final L% boundary tone is presented in (1.26). As in Tokyo Japanese, Pierrehumbert and Beckman assume that not every tone bearing unit has a tone in Osaka Japanese, which results in linear interpolation between the tones. One important difference between Tokyo Japanese (see (1.16)) and Osaka Japanese is that Osaka Japanese does not have AP-level post-lexical tones.

(1.26) *Osaka Japanese*

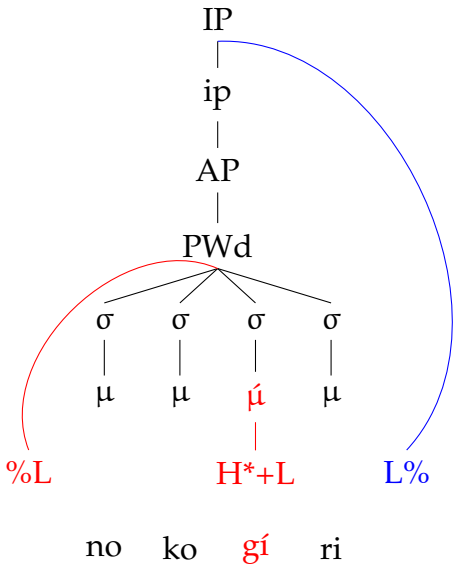
a. *H-beginning accented* = (1.25a)



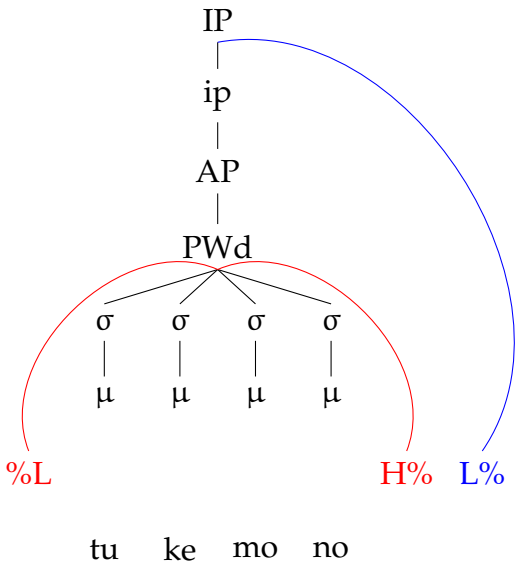
b. *H-beginning unaccented* = (1.25b)



c. *L-beginning accented*[16] = (1.25c)



d. *L-beginning unaccented* = (1.25d)



(based on Pierrehumbert and Beckman 1988: Figure 8.9)

Osaka Japanese is analyzed as a [−multiword AP] language by Igarashi (2012, 2014) because even unaccented PWds do not trigger large AP formation. I, a native speaker of Osaka Japanese, recorded myself for the pitch tracks in Figure 1.11, using the words in

[16]Only bimoraic words can be L-beginning final-accented in Osaka Japanese (Haraguchi 1977). There is a generational difference in how L-beginning final-accented words in isolation are realized; the accented final mora has a pitch fall due to the pitch accent melody H*+L in older speakers' speech, while the +L tone gets deleted in younger speakers' speech (Kori 1987).

Igarashi's (2007b) Figure 4.10; I used Praat (Boersma 2001) to make the pitch tracks. The figure shows the phrasal prosody of every accent class combination in Osaka Japanese (4 accent classes × 4 accent classes = 16 combinations). Igarashi made 16 sentences in the X=*no* Y 'X's Y' construction using the words in (1.27), but I slightly changed the words so that every PWd contains only sonorants.

(1.27) *Osaka Japanese PWds used in Figure 1.11*

a. *H-beginning accented*

[H]Manami=no 'Manami=GEN' (HHH=H まなみの)

[H]norimono 'vehicle' (HHH 乗り物)

b. *H-beginning unaccented*

[H]Yámano=no 'Yamano=GEN' (HLL=L 山野の)

[H]naminóri 'surfing' (HHHL 波乗り)

c. *L-beginning accented*

[L]Iwáo=no 'Iwao=GEN' (LHL=L 岩尾の)

[L]yomáwari 'night watch' (LHHL 夜回り)

d. *L-beginning unaccented*

[L]Imai=no 'Imai=GEN' (LLL=H 今井の)

[L]yaneura 'attic' (LLLH 屋根裏)

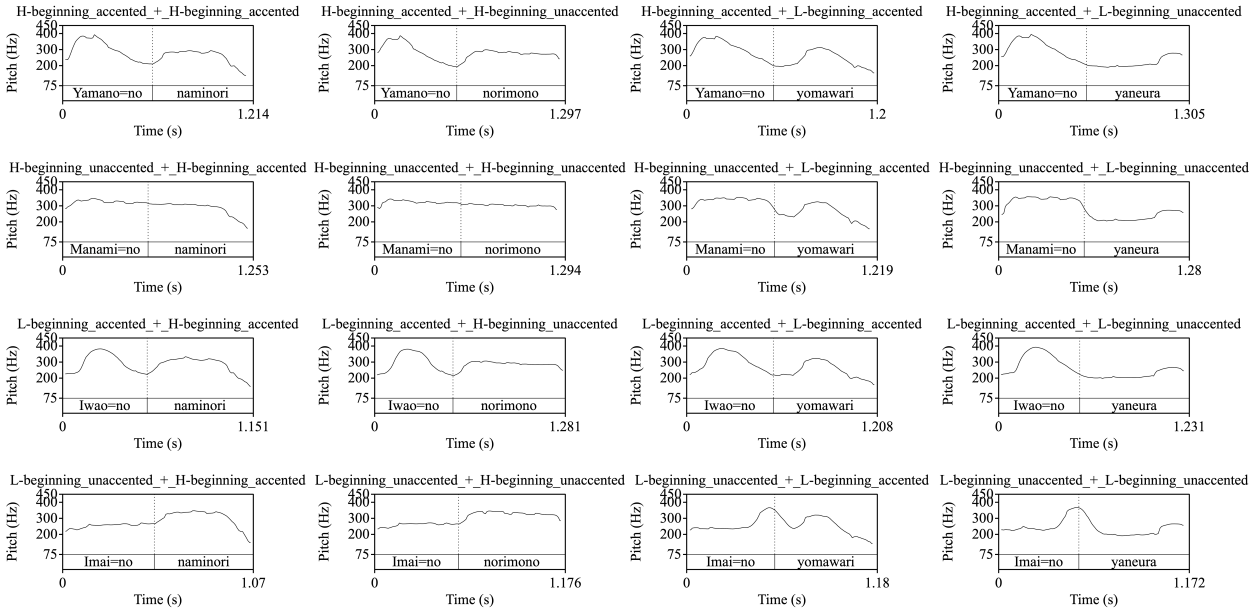
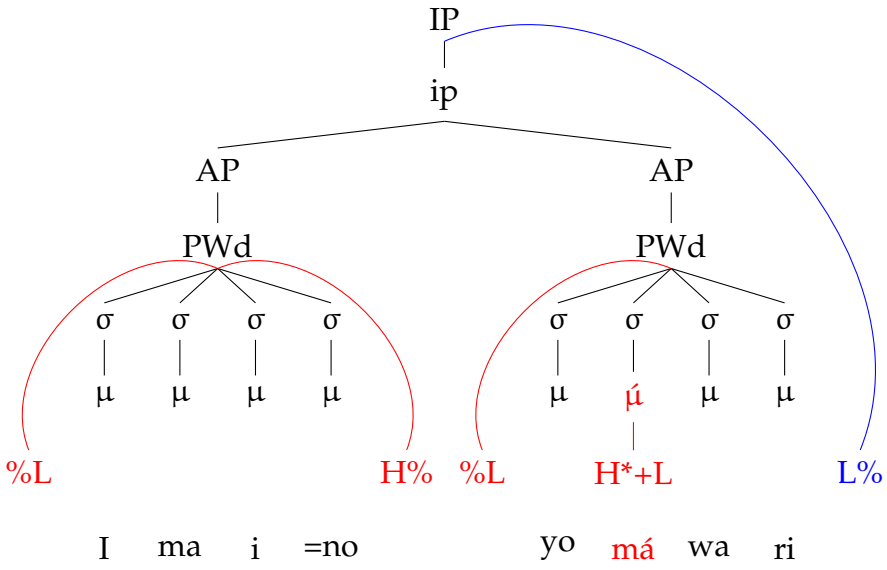


Figure 1.11: Phrasal prosody (Osaka Japanese)

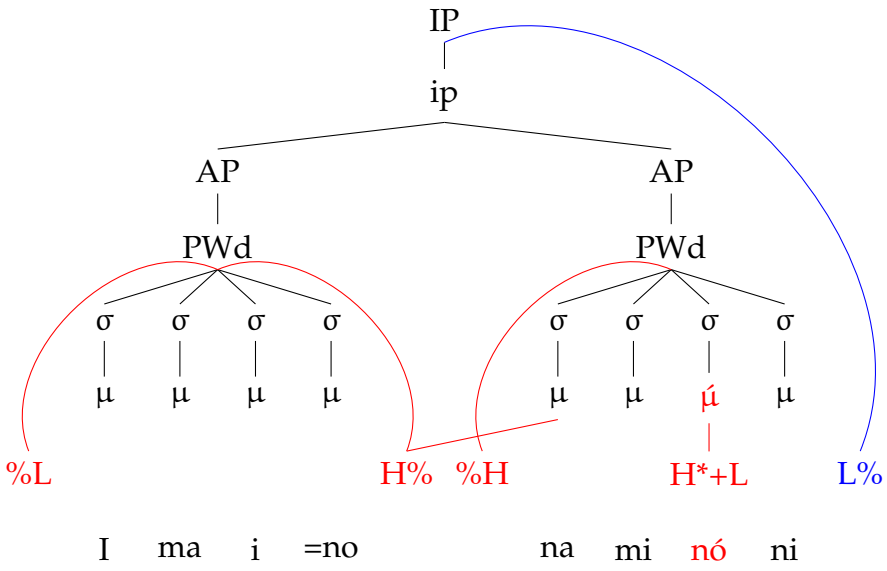
Notice that in Figure 1.11, the pitch shape of PWd1 is quasi-consistent in each row and that the pitch shape of PWd2 is quasi-consistent in each column. This means that each PWd maintains its lexical prosody even in phrases, which makes Osaka Japanese [−multiword AP]; one AP can dominate only one PWd. One exception is the case where PWd1 is L-beginning unaccented and PWd2 is H-beginning; PWd1 ^{L}*Imai=no* 'Imai=GEN' does not have the final H tone. Pierrehumbert and Beckman (1988) claim that the PWd-final H% boundary tone in PWd1 is not missing in this case, but is linked with the first mora of the following H-beginning PWd (see Pierrehumbert and Beckman 1988: Figure 8.8). (1.28) shows the contrast between L-beginning PWd2 and H-beginning PWd2, where PWd1 is L-beginning unaccented; PWd-final H% boundary tone linking does not occur when PWd2 is L-beginning as in (1.28a), while it does occur when PWd2 is H-beginning as in (1.28b).

(1.28) *Phrasal prosody (Osaka Japanese)*

a. *L-beginning unaccented + L-beginning accented*



b. *L-beginning unaccented + H-beginning accented*



(based on Pierrehumbert and Beckman's 1988 analysis)

Pierrehumbert and Beckman (1988) claim that downstep is caused by the pitch accent melody H*+L in Tokyo Japanese (see (1.20)), but they modified this hypothesis to explain the downstep phenomenon in Osaka Japanese. Examining Kori's (1987) data, Pierrehum-

bert and Beckman found that any HL sequence can cause downstep in an ip in Osaka Japanese. We can see this in Figure 1.11. For example, in ^{L}*Imai=no* ^{L}*yomáwari* 'Imai's night watch', where PWd1 is L-beginning unaccented and PWd2 is L-beginning accented, the PWd-final H% boundary tone in PWd1 and the PWd-initial %L boundary tone in PWd2 make an HL sequence, causing downstep on the pitch peak of PWd2. What makes Osaka Japanese different from Tokyo Japanese is the fact that only the pitch accent melody H*+L is lexical in Tokyo Japanese, whereas Osaka Japanese also has boundary tones at the PWd level. Thus, the condition of downstep in (1.20) can be revised as in (1.29).

(1.29) *Downstep trigger (final version)*

An HL sequence at the PWd level triggers downstep in an ip.

(based on Pierrehumbert and Beckman 1988: Chapter 8.1.4)

1.4.3 [−lexical tone, +multiword AP] (Seoul Korean)

Seoul Korean is not a lexical pitch accent language (Jun 1993, 1998). Recall that in Pierrehumbert and Beckman's (1988) definition, AP is a prosodic phrase with at most one pitch accent, but there is no category of accented words contrasting with unaccented words in this language. That is, Seoul Korean lacks contrastive lexical pitch accent. Because of this, Jun (1993, 1998) defined the AP in Seoul Korean in terms of post-lexical tones XHLH, not in terms of the number of pitch accents. X in the post-lexical tone template is realized as an H tone when the first segment of the AP is a tense or aspirated consonant (see Table 1.5) or ㅅ /s/ or ㅎ /h/, and is realized as an L tone in the other cases. The two words in (1.30) show the contrast. The surface lexical prosody of (1.30a) is LHLH because the first syllable is a vowel, while the surface lexical prosody of (1.30b) is HHLH because the first syllable begins with ㅎ /h/. Note that when there are three or fewer syllables in one AP, undershoot of the HL in the middle of the AP melody occurs (Jun 1993, 1998). The prosodic structure of (1.30a) and that of (1.30b) are presented in (1.31). In (1.31), I put an

IP-final L% boundary tone to mark declaratives.[17]

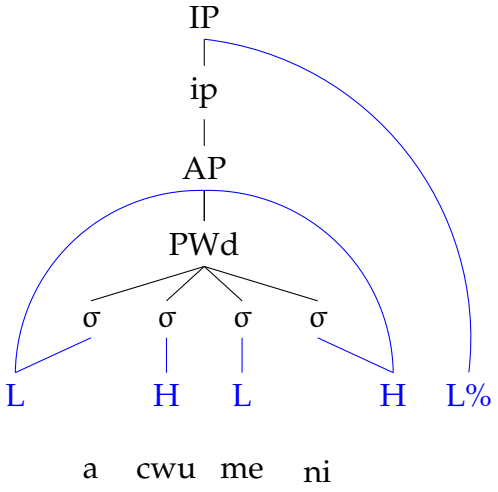
(1.30) *LHLH or HHLH in Seoul Korean*

a. a.cwu.me.ni 'aunt, middle-aged woman' (**L**HLH 아주머니)

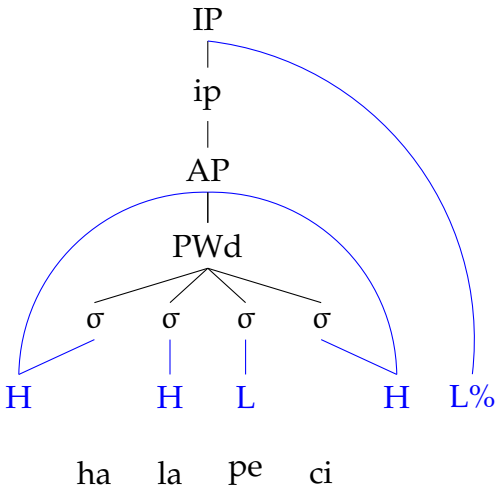
b. ha.la.pe.ci 'grandfather, elderly male' (**H**HLH 할아버지)

(1.31) *Seoul Korean*

a. *LHLH* = (1.30a)



b. *HHLH* = (1.30b)



(based on Jun 2006)

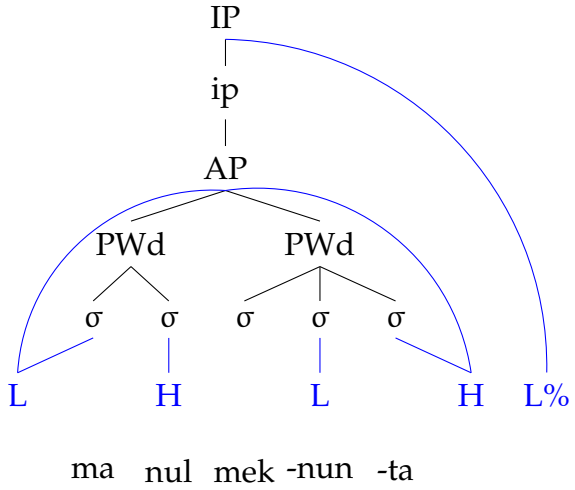
[17] An IP-final L% boundary tone overwrites the final H tone in the final AP in declarative sentences (Jun 2006).

Seoul Korean is classified as a [+multiword AP] language by Igarashi (2012) because more than one PWd can be contained in one AP as long as the number of syllables is eight or fewer (Jun 1998). The two PWds in (1.32) form an AP because there is no large syntactic boundary in an OV sentence (see Jun 1993). (1.33) shows the prosodic structure of (1.32), based on Jun (2006). The LHLH post-lexical melody is at the AP level. The first two post-lexical tones are linked with the first and the second syllables in the AP, while the last two post-lexical tones are linked with the penultimate and final syllables in the AP.

(1.32) *OV sentence in Seoul Korean*

마늘 먹는다.
pro manul mek-nun-ta.
garlic(=ACC) eat-NPST-DECL
'*pro* eats garlic.'

(1.33) *Phrasal prosody (Seoul Korean)* = (1.32)



(based on Jun 2006)

1.4.4 [−lexical tone, −multiword AP] (Kobayashi Japanese)

Kobayashi Japanese[18] is analyzed as a [−lexical tone] language by Igarashi (2012, 2014) because every PWd has the same lexical prosody in this language; examples in (1.34) show that both meanings of the lexically ambiguous word *ame* has the same lexical prosody. Sato's (2013) data in (1.35) tell us that the tone bearing unit is the syllable and that each PWd has the L...H melody in Kobayashi Japanese.

(1.34) Ame *in Kobayashi Japanese*

a. ame 'rain' (LH 雨) (cf. áme (HL) in Tokyo Japanese)

b. ame 'candy' (LH 飴) (cf. ame (LH) in Tokyo Japanese) (Sato 2013: (1.11))

(1.35) *Tone bearing unit in Kobayashi Japanese*

a. binta 'head' (LH 頭 in Standard Japanese)

b. binta=ga 'head=NOM' (LL=H 頭が in Standard Japanese)

c. kodon 'child' (LH 子供 in Standard Japanese)

d. sinbungansi 'newspaper' (LLLH 新聞紙 in Standard Japanese)

(Sato 2013: (1.12), (1.14), (1.15))

Igarashi (2012, 2014) classifies Kobayashi Japanese as a [−multiword AP] language because every PWd always has the L...H melody in phrases. (1.36) is an OV sentence and the syllables with an H tone are in bold.[19] This example shows that the two PWds do not form a large AP because if the object and the verb formed an AP, we would expect phrasal prosodies such as the one where the final syllable of the object is not H (see the possible prosodic patterns in Igarashi's 2007b (4.8)).

[18]Sound files of Kobayashi Japanese as recorded by Igarashi (2014) are available at http://fdslive.oup.com/www.oup.com/booksites/uk/booksites/content/9780199567300/start.htm.

[19]Sato (2013) argues that the sentence-final particle *do* does not form a PWd; thus, it does not have the L...H melody.

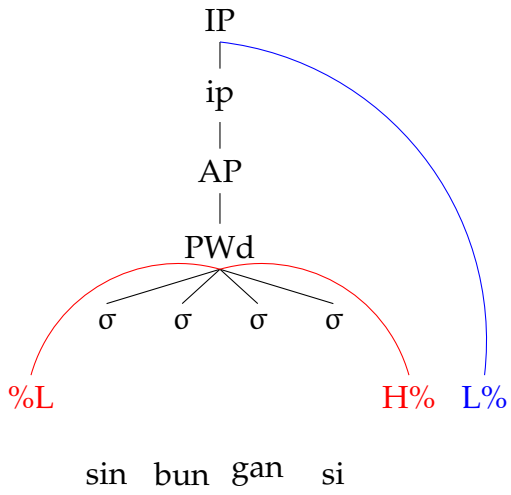
(1.36) *Large AP formation does not occur in Kobayashi Japanese.*

ビールを飲んだど。

pro biiru**=o** non**-da** do.
beer=ACC drink-PST SFP
pro drank beer. (Sato 2013: (1.47c))

(1.37) is the prosodic structure of (1.35d) based on Igarashi's (2007b) analysis. The structure is exactly the same as the prosodic structure of L-beginning unaccented PWds in Osaka Japanese (see (1.26d)). Igarashi posits a PWd-initial %L boundary tone and a PWd-final H% boundary tone for each PWd in Kobayashi Japanese. I posit an IP-final L% boundary tone to mark a declarative utterance as in the other languages.

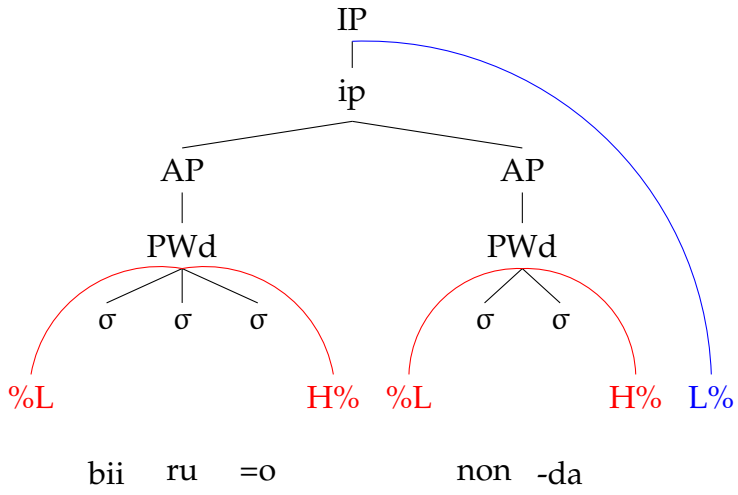
(1.37) *Kobayashi Japanese* = (1.35d)



(based on Igarashi 2007b: Figure 2.9)

(1.38) is the prosodic structure of (1.36), predicted by Igarashi's (2007b) analysis; I omitted the sentence-final particle *do* in the structure.

(1.38) *Phrasal prosody (Kobayashi Japanese)* = (1.36)



1.4.5 Summary

The summary of this section is given in Table 1.9. We have seen that varieties of Japanese and Korean can be classified into four categories using the two binary parameters ([±lexical tone] and [±multiword AP]) by Igarashi (2012, 2014). It is obvious that the existence or the absence of a lexical pitch accent system determines [±lexical tone]. Then, what determines [±multiword AP] in a specific language? Pierrehumbert and Beckman's (1988) analysis and Igarashi's (2007b) analysis suggest that [−multiword AP] languages have PWd-initial boundary tones, while [+multiword AP] languages do not. This makes sense because a PWd-initial boundary tone blocks large AP formation (see Chapter 3 for discussion).

Varieties	**[±lexical tone]**	**[±multiword AP]**
Tokyo, Fukuoka	+	+
Osaka	+	−
Seoul	−	+
Kobayashi	−	−

Table 1.9: Classification of Japanese and Korean by [±lexical tone, ±multiword AP] (adapted from Igarashi 2012, 2014)

In this section, I have investigated the two features ([±lexical tone] and [±multiword AP]) in detail, because these features turn out to be crucial in determining the realization of *wh*-prosody in specific languages.

In the next two chapters, I examine the lexical and phrasal prosody of Gyeongsang Korean (Daegu and Busan Korean). Daegu Korean and Busan Korean are both lexical pitch accent languages (Rah 1974; Kenstowicz and Sohn 1997; Jun et al. 2006; Utsugi 2007; Kim and Jun 2009, among others); thus, they are uncontroversially [+lexical tone]. I investigate whether the two varieties of Korean are [+multiword AP] or [−multiword AP]. I also clarify the basic accent classes in Gyeongsang Korean.

CHAPTER 2

ACCENT CLASSES IN GYEONGSANG KOREAN

2.1 Introduction

In this chapter, I discuss the accent classes in Gyeongsang Korean (Daegu Korean and Busan Korean). I am particularly interested in the question of whether these two varieties of Korean have an unaccented class because some researchers claim that an unaccented class is missing in Daegu and Busan Korean (Kenstowicz and Sohn 1997; Jun et al. 2006, among others for Daegu Korean; Utsugi 2007; Kim and Jun 2009, among others for Busan Korean). This claim is striking, considering the fact that other lexical pitch accent varieties of Korean such as South Hamgyeong Korean (Ramsey 1978) and Yanbian Korean (Park 2001) have an unaccented class. An unaccented class is also common in lexical pitch accent varieties of Japanese such as Tokyo Japanese and Osaka Japanese (Haraguchi 1977; Pierrehumbert and Beckman 1988, among others), as we saw in Chapter 1. The issue is important for the general argument of this dissertation, because as I briefly mentioned in Chapter 1, the contrast between accented and unaccented *wh*-words is crucial for determining the prosodic marking of *wh*-scope.

In this chapter, I show that both Daegu and Busan Korean in fact have an unaccented class by comparing the prosody of native words and the prosody of loanwords. Previous studies on the loanword phonology of Daegu and Busan Korean have reported that native words analyzed as having an accent on the final syllable and loanwords with an accent on the final syllable behave in different ways in certain contexts (Kim 1997; Kenstowicz and Sohn 2001 for Daegu Korean; Lee and Davis 2009, 2010; Do and Kenstowicz 2010 for Busan Korean). I show that this difference is due to the fact that final-accented loanwords are truly final-accented, while what have been analyzed as final-accented native words are in fact unaccented. This result is important for understanding the typology of pitch accent systems, for clarifying the methodology of identifying accent placement, and for

our subsequent discussion of the typology of prosodic *wh*-scope marking strategies in Chapter 4.

This chapter is organized as follows. Section 2.2 discusses the two types of lexical prosody, which make Daegu Korean and Busan Korean slightly different. Section 2.3 presents the previous studies of Daegu Korean and reviews the two environments where final-accented native words as analyzed by some previous studies and final-accented loanwords behave differently. Section 2.4 presents my proposal that Daegu Korean has two different sets of accent classes for native words and loanwords; native words have an unaccented class while loanwords have a final-accented class. I apply my analysis of Daegu Korean proposed in Section 2.4 to Busan Korean in Section 2.5. Section 2.6 concludes this chapter.

2.2 Two types of lexical prosody

Although Daegu Korean and Busan Korean are closely related varieties, their lexical prosody is slightly different; only one syllable must and can be realized with an H tone in Daegu Korean, while multiple syllables can get an H tone in Busan Korean (Lee and Davis 2009; Do et al. 2014; Kubozono 2018, among others).[1] Table 2.1 shows the correspondences for the surface lexical melodies of trisyllabic, quadrisyllabic, and pentasyllabic words in Daegu and Busan Korean, adapted from Kubozono's (2018) (5).[2] As mentioned in the previous studies cited above, the important point here is that two successive L tones at the beginning of a word are prohibited only in Busan Korean. In other words, if the first syllable or the second syllable of a word gets an H tone, the other syllables do not get an H tone in Busan Korean; in fact, HL, LH, HLL, and LHL in Daegu Korean correspond to HL,

[1] Only words that belong to the double-accented class (see Section 2.3.1) can receive two H tones in Daegu Korean. Double-accented words are ignored here.

[2] The table does not consider the double-accented class (see Section 2.3.1) in Daegu and Busan Korean and the rising class (see Section 2.5.1) in Busan Korean. The correspondences of these accent classes will be discussed in Section 2.5.

LH, HLL, and LHL, respectively, in Busan Korean (see Kim and Schuh 2006: Section 3.2). Note that both the accent bearing unit and the tone bearing unit in Gyeongsang Korean are considered to be the syllable in most of the previous literature (Rah 1974; Kenstowicz and Sohn 1997; Jun et al. 2006; Kim and Jun 2009, among others); I follow this analysis.

Daegu Korean	**Busan Korean**
LLH	LHH
LLLH	LHHH
LLHL	LHHL
LLLHL	LHHHL

Table 2.1: Surface lexical melodies in Daegu and Busan Korean (adapted from Kubozono's (2018) (5))

Readers might notice that the lexical prosody of Daegu Korean is similar to that of Osaka Japanese, while the lexical prosody of Busan Korean is similar to that of Tokyo Japanese, as pointed out by Kubozono (2018). Osaka Japanese words with an initial $^{\text{L}}$ register tone can have word-initial LL, while this pattern is never observed in Tokyo Japanese (see Chapter 1). Yanbian (North Hamgyeong) Korean and South Hamgyeong Korean also have the same difference; Yanbian Korean is an Osaka-type language (see Park 2001), while South Hamgyeong Korean is a Tokyo-type language (see Ramsey 1978).

Following recent studies of Gyeongsang Korean in the autosegmental-metrical framework (Jun et al. 2006 for Daegu Korean; Utsugi 2007 for Busan Korean), I assume that both Daegu and Busan Korean have the pitch accent melody H*+L. In this framework, the difference between Tokyo-type languages (LH...) and Osaka-type languages (LL...) discussed above can be attributed to the existence or the absence of a post-lexical H– (phrasal H) tone at the Accentual Phrase (AP) level. As we saw in Chapter 1, Tokyo Japanese has this tone, which can be linked with the second (or first in some cases) mora of an AP, while Osaka Japanese does not. Thus, Tokyo-type languages are [+phrasal H], while Osaka-type languages are [−phrasal H], as presented in Table 2.2. I will discuss the autosegmental-metrical intonational phonology of Daegu and Busan Korean in detail in

the next chapter.

Varieties	[±phrasal H]
Tokyo, Fukuoka	+
Osaka	−
Daegu	−
Busan	+
South Hamgyeong	+
North Hamgyeong/Yanbian	−

Table 2.2: [±phrasal H] in lexical pitch accent varieties of Japanese and Korean

Of particular interest in this chapter is the treatment of LLH and LLLH in Daegu Korean and the Busan Korean counterparts (LHH and LHHH, respectively) in Table 2.1. There are two possibilities for these tonal patterns. The first possibility is that they are final-accented and have the bitonal pitch accent melody H*+L on the final syllable, but that the +L gets deleted as in Tokyo Japanese (McCawley 1968; Haraguchi 1977; Poser 1984, among others); it is also possible that +L does not get deleted, but that researchers did not notice it. The second possibility is that they belong to an unaccented class because there is no pitch fall within the words. This chapter aims to resolve the choice between these two possibilities in Gyeongsang Korean.

2.3 Previous studies on Daegu Korean

This section reviews the previous literature on the prosody of native words and the prosody of loanwords in Daegu Korean. The reason why I chose to discuss Daegu Korean first is the wide availability of previous studies on loanwords. For instance, Kenstowicz and Sohn (2001) discuss the phrasal prosody of Daegu Korean loanwords, which is crucial to my analysis of unaccented words and final-accented words. Hwang and Davis (2019) discuss the ongoing change in Daegu Korean loanwords, which proves important to keep in mind in language consultation with native speakers. For Busan Korean loan-

words, the literature on the prosody of enclitic particles is available only in Lee and Davis (2009, 2010) and Do and Kenstowicz (2010), to my knowledge.

Section 2.3.1 shows the accent classes of Daegu Korean native words and Daegu Korean loanwords proposed by Kenstowicz and Sohn (1997) and Kenstowicz and Sohn (2001), respectively. Section 2.3.2 describes the two important differences between native words and loanwords reported in the literature, namely the prosody of enclitic particles and the prosody in phrasal contexts.

2.3.1 Accent classes

Let us first look at the accent classes of native words as analyzed by Kenstowicz and Sohn (1997). Kenstowicz and Sohn claim that Daegu Korean has three accent classes; they call the three accent classes non-final, final, and double, as in (2.1).[3] An acute accent symbol indicates the location of a pitch accent throughout this chapter. I use Kenstowicz and Sohn's labels for the moment until I introduce my proposal in Section 2.4. As mentioned in Section 2.2, Jun et al. (2006) posit the bitonal pitch accent melody H*+L, which is linked with the accented syllable, for Daegu Korean; I will follow this treatment. Under Kenstowicz and Sohn's analysis, words from the non-final class in (2.1a) and words from the final class in (2.1b) are both accented and have only one pitch peak H. Although the two accent classes have the same number of H tones, Kenstowicz and Sohn divide them into

[3]Previous studies such as Kenstowicz and Sohn (1997, 2001) show that monosyllabic native words are either from the final class or the double class. Monosyllabic words from the final class (e.g. *swúl* 'alcohol') and monosyllabic words from the double class (e.g. *mwúl* 'water') have the same melody H in isolation, but they show different melodies with an enclitic particle; the word-final syllable receives an H tone in the former, while the first two syllables receive an H tone in the latter (see the two words with the nominative enclitic particle =*i* below). I will show that the former is in fact unaccented.

(i) *Final vs. Double*

a. *Final*
swúl (H 술) → swúl=i 'alcohol=NOM' (H=L 술이)

b. *Double*
mwúl (H 물) → mwúl=í 'water=NOM' (H=H 물이) (Kenstowicz and Sohn 2001: (1))

two different accent classes because they behave differently in some environments, as will be discussed shortly in Section 2.3.2. Both Kenstowicz and Sohn and Jun et al. analyze the +L in the pitch accent melody as getting deleted in (2.1b), an analysis which will be discussed in detail in Section 2.4.1. Words from the double class in (2.1c) have an H tone on the first two syllables. In Jun et al.'s analysis, a pitch accent is linked with the first and the second syllables in double-accented words. In this chapter, I focus on only the non-final class and the final class in (2.1) because the double class is not relevant to the central argument of this chapter; note that the double class works as the same way as the non-final class (see Kenstowicz and Sohn 1997; Jun et al. 2006).

(2.1) *Accent classes of native words in Daegu Korean*

a. *Non-final*

mánul 'garlic' (HL 마늘), tangnákwi 'donkey' (LHL 당나귀)

b. *Final*

namwúl '*namul*' (LH 나물), mintulléy 'dandelion' (LLH 민들레)

c. *Double*

kúlím 'picture' (HH 그림), mwúcíkay 'rainbow' (HHL 무지개)

(Kenstowicz and Sohn 1997: (2); Kenstowicz and Sohn 2001: (1))

Loanwords seem to have the same set of accent classes, as reported by Kenstowicz and Sohn (2001) in (2.2). That is, a final-accented class exists, but an unaccented class is missing. One difference between native words and loanwords is that accent assignment of loanwords is somewhat predictable (Chung 2000; Kenstowicz and Sohn 2001, among others). According to these studies, syllable weight determines the location of a pitch accent; in general, heavy syllables receive a pitch accent. The goal of this chapter is to show that (2.2b) is final-accented, while (2.1b) is in fact unaccented.

(2.2) *Accent classes of loanwords in Daegu Korean*

a. *Non-final*

théympho 'tempo' (HL 템포), oléynci 'orange' (LHL 오렌지)

b. *Final*

chaynél 'channel' (LH 채넬), ticithél 'digital' (LLH 디지텔)

c. *Double*

sáyntúl 'sandal' (HH 샌들), ántánthey 'andante' (HHL 안단테)

(Kenstowicz and Sohn 2001: (6)–(8))

2.3.2 Two important differences between native words and loanwords

Kim (1997) and Kenstowicz and Sohn (2001) observe that native words and loanwords show different pitch patterns in combination with some postnominal enclitic particles. I introduce Hwang and Davis's (2019) analysis here, using Tables 2.3 and 2.4 adapted from their Tables 1 and 2, respectively. Table 2.3 shows the tone interaction between native words and enclitic particles, while Table 2.4 shows the tone interaction between loanwords and enclitic particles. In both tables, the nouns are either from the non-final (initial-accented) class or the final class under the analysis by Kenstowicz and Sohn (1997, 2001) and Hwang and Davis (2019). The enclitic particles are either the unaccented enclitic particle *=i* '=NOM' or the initial-accented enclitic particle *=chélem* '=like' under Hwang and Davis' analysis.

	Non-final *pátak* 'floor' (HL 바닥)	**Final** *palám* 'wind' (LH 바람)
Unaccented particle =*i* '=NOM' (이)	pátak=i (HL=L 바닥이)	palám=i (LH=L 바람이)
Accented particle =*chélem* '=like' (HL 처럼)	pátak-chelem (HL=LL 바닥처럼)	palam-chélem (LL=HL 바람처럼)

Table 2.3: Native words with enclitic particles in Daegu Korean (adapted from Hwang and Davis 2019: Table 1)

	Non-final *khíchin* 'kitchen' (HL 키친)	**Final** *kheycháp* 'ketchup' (LH 케찹)
Unaccented particle =*i* '=NOM' (이)	khíchin=i (HL=L 키친이)	kheycháp=i (LH=L 케찹이)
Accented particle =*chélem* '=like' (HL 처럼)	khíchin=chelem (HL=LL 키친처럼)	kheycháp=chelem (LH=LL 케찹처럼)

Table 2.4: Loanwords with enclitic particles in Daegu Korean (adapted from Hwang and Davis 2019: Table 2)

Let us look at Table 2.3 first and review Hwang and Davis' (2019) analysis. When the two nouns in the table are followed by the unaccented enclitic particle =*i* '=NOM', the pitch accent on the nouns remains.[4] This is because there is only one pitch accent in the combination of a noun and an enclitic particle; recall that Hwang and Davis treat both of the native words *pátak* 'floor' and *palám* 'wind' as accented words. When the nouns are followed by the initial-accented enclitic particle =*chélem* '=like', in contrast, there are two different pitch accents in the resulting forms. In the case of the non-final-accented noun *pátak* 'floor', the pitch accent on the enclitic particle gets deleted.[5] In the case of what Hwang and Davis analyze as the final-accented noun *palám* 'wind', on the other hand,

[4]Nouns from the double class behave in the same way as shown below.

(ii) *Double* + =i '=NOM'
émmá 'mother' (HH 엄마) → émmá=ka 'mother=NOM' (HH=L 엄마가)
(Kenstowicz and Sohn 1997: (12f))

[5]Words from the double class behave in the same way as words from the non-final class as shown below.

the pitch accent on the noun gets deleted. Hwang and Davis suggest that the difference comes from accent clash resolution. When two pitch accents are not adjacent to each other, the second pitch accent is removed (e.g. *pátak* 'floor' + =*chélem* '=like' → *pátak=chelem* 'like a floor'). In contrast, when two pitch accents are adjacent to each other, accent clash occurs and the first pitch accent is removed (e.g. *palám* 'wind' + =*chélem* '=like' → *palam=chélem* 'like the wind').

The tone interaction between loanwords and enclitic particles in Table 2.4 is almost the same as the tone interaction between native words and enclitic particles, but there is one difference. When a final-accented loanword is accompanied by an initial-accented enclitic particle, the pitch accent on the enclitic particle gets deleted (e.g. *khecháp* 'ketchup' + =*chélem* '=like' → *khecháp=chelem* 'like ketchup'). Hwang and Davis (2019) attribute this difference to the difference of the domain of accent clash; the domain is the syllable for native words, while the domain is the mora for loanwords. This account is motivated by proposals such as Young-Hee Chung's (e.g. Chung 2000) proposal that in loanwords, coda consonants are moraic, while in native words, they are not. Here is how Hwang and Davis' analysis works. In the final-accented loanword *khecháp* 'ketchup', a pitch accent is on the penultimate mora *chá*. Since the two pitch accents in the combination of the final-accented loanword *khecháp* 'ketchup' and the initial-accented enclitic particle =*chélem* '=like' are not next to each other in the moraic analysis, the pitch accent on the noun survives in *khecháp=chelem* 'like ketchup'.

There is one thing to note about loanword phonology in Daegu Korean. Through a production experiment, Hwang and Davis (2019) found out that recently, what they call the final-accented class for native words and the final-accented class for loanwords are being merged into the native pattern. That is, some Daegu Korean speakers pronounce

(iii) *Double* + =chélem '=*like*'
émmá 'mother' (HH 엄마) → émmá=chelem 'like a mother' (HH=LL 엄마처럼)
(see Hwang and Davis 2019: Footnote 2)

the final-accented loanword *khecháp* 'ketchup' with the initial-accented enclitic particle =*chélem* '=like' in LL=HL rather than in LH=LL.[6] I only look at the non-nativized loanword pattern in this dissertation.

The second difference between native words and loanwords is phrasal prosody. Kenstowicz and Sohn (1997) examined the phrasal prosody of Daegu Korean and found that (native) words from the non-final class and words from what they call the final class trigger different phrasal prosodies in constructions such as possessive constructions (Noun + Noun) and OV constructions, which is why they treated the two accent classes differently. I recorded a Daegu Korean male speaker reading sentences in OV constructions, changing the object. I used Praat (Boersma 2001) to make pitch tracks. The verb of the sentences is the medial-accented *mek-nún-ta* 'eat-NPST-DECL'.[7] Figure 2.1 is the pitch track of (2.3), where the object is the initial-accented native word *mánul* 'garlic'. In this figure, both the object and the verb show a pitch peak and the second peak is downstepped (see Kenstowicz and Sohn 1997 and Jun et al. 2006).[8] Figure 2.2 is the pitch track of (2.4), where the object is the final-accented native word *namwúl* '*namul*' in Kenstowicz and Sohn's (1997) analysis. In this figure, downstep is not observable on the verb. In addition, a plateau links the two words (see also the description of this prosody by Kenstowicz and Sohn 1997: p. 28).

[6] If my analysis is correct, this change means that final-accented loanwords are becoming unaccented words.

[7] The /k/ sound and the /t/ sound in *mek-nún-ta* 'eat-NPST-DECL' undergo sound changes; /k/ becomes [ŋ] due to nasal assimilation, while /t/ becomes [d] due to intersonorant voicing (see Sohn 1999; Cho and Whitman 2020, among others).

[8] The pitch peak of the initial-accented noun *mánul* 'garlic' is delayed, which is common in Daegu Korean (see Jun et al. 2006).

(2.3) *Object = Native word from the non-final class in Daegu Korean*

마늘 먹는다.

pro mánul mek-nún-ta.
garlic(=ACC) eat-NPST-DECL
'*pro* eats garlic.'

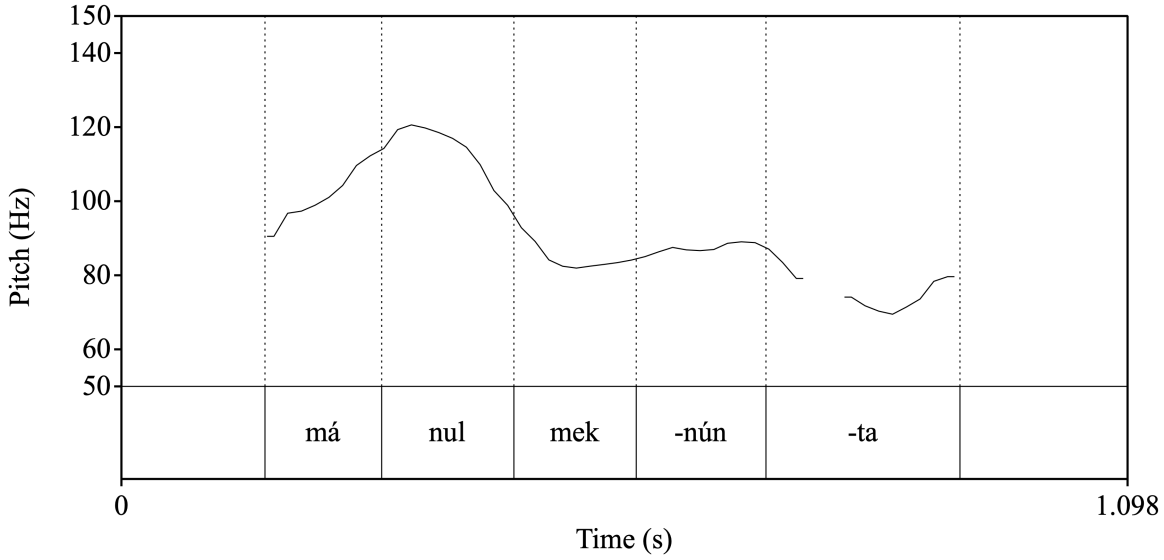


Figure 2.1: Downstep in Daegu Korean (Non-final)

(2.4) *Object = Native word from the "final" class in Daegu Korean*

나물 먹는다.

pro namwúl mek-nún-ta.
namul(=ACC) eat-NPST-DECL
'*pro* eats *namul*.'

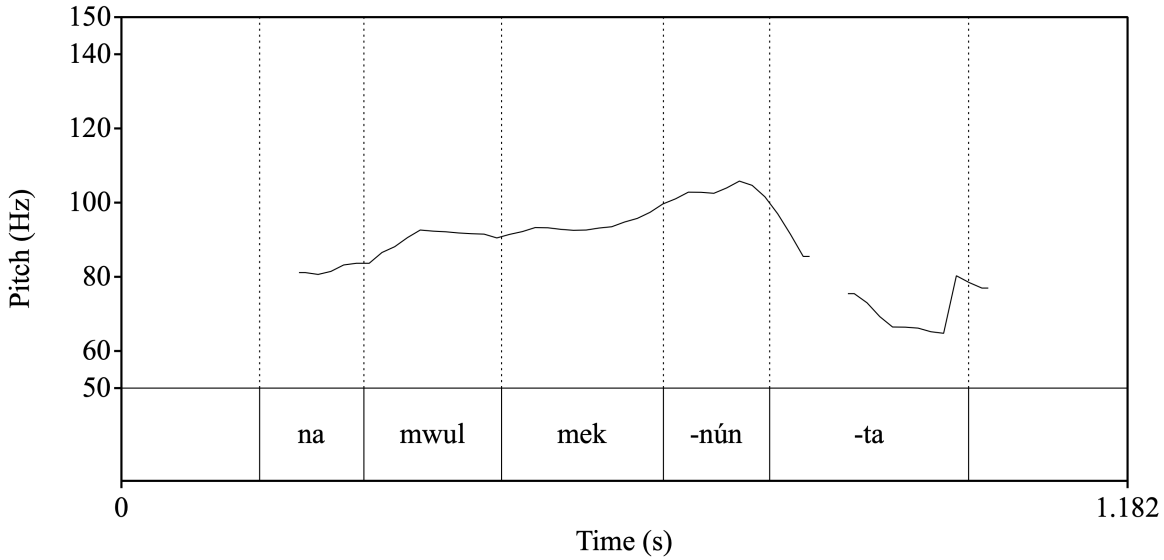


Figure 2.2: No downstep in Daegu Korean ("Final")

Kenstowicz and Sohn (2001) investigated the prosody of possessive and OV constructions, where Word1 is a native word or a loanword, and discovered that there is a difference between native words and loanwords. I recorded the same Daegu Korean speaker reading (2.5); the pitch track is presented in Figure 2.3. The object is the final-accented loanword *leymón* 'lemon' in this figure. The pitch track is similar to Figure 2.1 rather than the pitch track in Figure 2.2 because the verb is downstepped and there is no plateau between the two words.[9] If *namwúl* '*namul*' in (2.4) and *leymón* 'lemon' in (2.5) are in the same accent class, the phrasal prosody of (2.5) should be similar to that of (2.4).

[9] As mentioned earlier, final-accented loanwords allow both the native and loanword patterns (Hwang and Davis 2019). The merger seems to be in progress for the Daegu Korean speaker who recorded the three sentences in (2.3)–(2.5). He accepted both the loanword pattern LH=LL and the native pattern LL=HL for *kheychap=chelem* 'like ketchup'. He also accepted the prosody similar to Figure 2.2 in addition to the prosody in Figure 2.3.

(2.5) *Object = Loanword from the final class in Daegu Korean*

레몬 먹는다.

pro leymón mek-nún-ta.

lemon(=ACC) eat-NPST-DECL

'*pro* eats a lemon.'

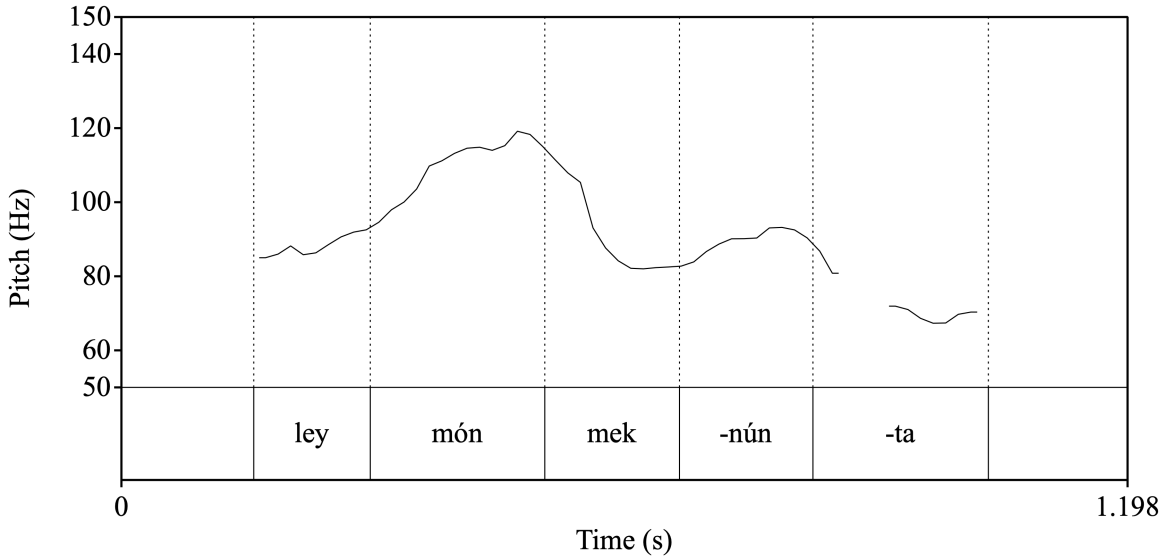


Figure 2.3: Downstep in Daegu Korean (Final)

2.4 New analysis

In Section 2.3.2, we saw that final-accented loanwords behave differently from what have been analyzed as final-accented native words when an initial-accented postnominal enclitic particle is attached to them and when they appear in phrasal contexts. I will argue that this difference is best explained as a difference in accent classes. Here, I show evidence that what have been analyzed as final-accented loanwords are final-accented, while what have been analyzed as final-accented native words are in fact unaccented. Section 2.4.1 describes the properties of unaccented words in lexical pitch accent languages and

shows that what has been analyzed as the final-accented class for native words fits the description. Section 2.4.2 shows that Ramsey's (1978) diachronic analysis of Korean supports my analysis and explains why native words and loanwords have different sets of accent classes in Daegu Korean.

2.4.1 Properties of unaccented words

Kenstowicz and Sohn (2001) actually consider the possibility that final-accented words might be unaccented because this analysis can account for the tone interaction between final-accented (native) words and initial-accented enclitic particles and the OV prosody with downstep (see Figure 2.3). Kenstowicz and Sohn mention that final-accented words are underlyingly unaccented both in native words and loanwords; they are analyzed as unaccented words in native words, while they are analyzed as final-accented words in loanwords at the surface level. In fact, if we assume that final-accented native words are indeed unaccented, while final-accented loanwords are truly final-accented, the first difference about enclitic particles can be explained straightforwardly.

As we saw in Section 2.3.2, in the combination of a final-accented word and an initial-accented enclitic particle, the pitch accent on the enclitic particle appears on the surface when the noun is a native word, but the pitch accent on the noun appears on the surface when the noun is a loanword in Hwang and Davis' (2019) analysis. Hwang and Davis claimed that this difference is due to a difference in the domain of accent clash. However, the accent clash analysis overlooks the availability of an explanation based on more general properties of Korean (and Japanese) lexical pitch accent systems. If we posit the rule that when there are two pitch accents, only the first one survives as in Tokyo and Osaka Japanese (McCawley 1968), it would make final-accented native words (e.g. *palám* 'wind') an exception in the Noun + =*chélem* '=like' combination in Tables 2.3 and 2.4. Then, we just need to explain why native words from the final-accented class behave in a different way. If we hypothesize that final-accented native words are unaccented, we do not need

to posit a special accent clash rule; we only need the rule that all but the first pitch accent are deleted in the environment where there is more than one pitch accent. I apply this analysis in (2.6), which reanalyzes Hwang and Davis's data. (2.6a) is an unaccented native word with an initial-accented enclitic particle, while (2.6b) is a final-accented loanword with an initial-accented enclitic particle. In (2.6a), the pitch accent on the enclitic particle appears on the surface because it is the only pitch accent. In (2.6b), the pitch accent on the enclitic particle gets deleted because it is not the first pitch accent.

(2.6) *Tone interaction with an initial-accented enclitic particle in Daegu Korean*

a. *Unaccented (native word)* (cf. Table 2.3)
palam 'wind' (LH 바람) + =chélem '=like' (HL 처럼) → palam=chélem 'like wind' (LL=HL 바람처럼)

b. *Final-accented (loanword)* (cf. Table 2.4)
kheycháp 'ketchup' (LH 케찹) + =chélem '=like' (HL 처럼) → khecháp=chelem 'like ketchup' (LH=LL 케찹처럼)

Although Kenstowicz and Sohn (2001) suggest the possibility of an unaccented class, they reject this analysis because it appears to unable to explain why unaccented words end in an H tone in isolation (see e.g. (2.1b)). Crosslinguistically, however, this is not an unusual pattern: unaccented words with an initial ^{L} register tone in Osaka Japanese (Kori 1987; Pierrehumbert and Beckman 1988, among others; see (1.25d) in Chapter 1 and (2.8a) below) and unaccented words in Yanbian Korean (Park 2001) show this pattern. As we saw in Chapter 1, it is also common that unaccented words and final-accented words have the same surface prosody in isolation; these two classes show a difference with an enclitic particle. (1.15) from Chapter 1, which shows the difference between unaccented and final-accented words with an unaccented enclitic particle in Tokyo Japanese, is repeated below.[10] One possible problem with my hypothesis that final-accented native

[10]South Hamgyeong Korean has a similar contrast (see Ramsey 1978).

words in Daegu Korean are in fact unaccented is that both unaccented native words and final-accented loanwords exhibit a similar accent pattern with an unaccented enclitic case particle as in (2.7). The unaccented native word *palam* 'wind' in (2.7a) might be expected to maintain its unaccentedness even with the enclitic case particle *=i* '=NOM', but there is a pitch fall in the resulting form. If the two words in (2.7) belong to different accent classes, they would be expected to show the contrast observed in Osaka Japanese in (2.8) with an unaccented enclitic particle.[11] In (2.8a), where the noun is unaccented with an ^{L} register tone, the enclitic particle gets an H tone. On the other hand, in (2.8b), where the noun is final-accented with an ^{L} register tone, the location of the H tone does not change. I will discuss the solution to the problem in (2.7) in Section 2.4.2.

(1.15) *Unaccented vs. Final-unaccented in Tokyo Japanese*

a. *Unaccented*

miyako 'capital' (LHH 都) + =ga '=NOM' (が) → miyako=ga 'capital=NOM' (LHH=H 都が)

b. *Final-accented*

atamá 'head' (LHH 頭) + =ga '=NOM' (が) → atamá=ga 'head=NOM' (LHH=L 頭が) (Haraguchi 1977: (1.1))

(2.7) *Unaccented vs. Final-unaccented in Daegu Korean* (see Tables 2.3 and 2.4)

a. *Unaccented (native word)*

palam 'wind' (LH 바람) + =i '=NOM' (이) → palám=i 'wind=NOM' (LH=L 바람이)

[11] A similar contrast is also observable in Yanbian Korean (see Park 2001).

b. *Final-accented (loanword)*

kheycháp 'ketchup' (LH 케찹) + =i '=NOM' (이) → kheycháp=i 'ketchup=NOM' (LH=L 케찹이)

(2.8) *Unaccented vs. Final-unaccented in Osaka Japanese*

a. *L-beginning unaccented*

$^{\text{L}}$sora 'sky' (LH 空) + =ga '=NOM' (が) → $^{\text{L}}$sora=ga 'sky=NOM' (LL=H 空が)

b. *L-beginning final-accented*

$^{\text{L}}$amé 'rain' (LH̃L/LH 雨) + =ga '=NOM' (が) → $^{\text{L}}$amé=ga 'rain=NOM' (LH=L 雨が) (Kori 1987: (3), (4), (6))

My assumption that native words from the final-accented class in Daegu Korean are in fact unaccented can also explain the difference in phrasal prosody. Recall that in OV constructions, the verb is downstepped when the object noun is an initial-accented native word or a final-accented loanword in Daegu Korean (see Figures 2.1 and 2.3). Also recall that there is no downstep when the object noun is a "final-accented" native word in Daegu Korean (see Figure 2.2). In Chapter 1, we saw that accented words cause downstep (see Figures 1.8 and 1.10), while unaccented words do not (see Figure 1.9) in Tokyo Japanese. The figures are repeated below; I recorded a female native speaker. This comparison suggests that final-accented loanwords are genuine final-accented words, while what have been analyzed as "final-accented" native words are unaccented words in Daegu Korean.

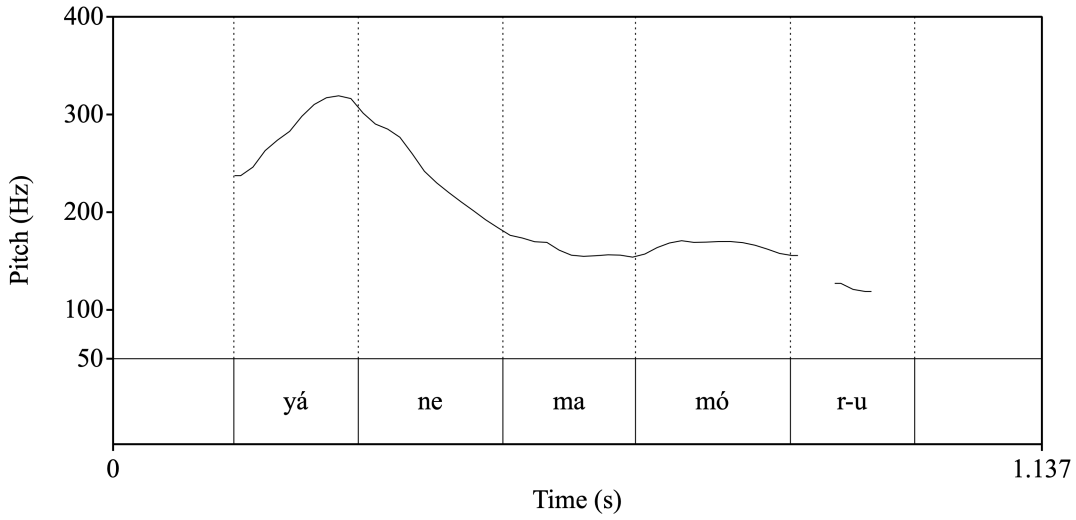


Figure 1.8: Downstep in Tokyo Japanese (Initial-accented)

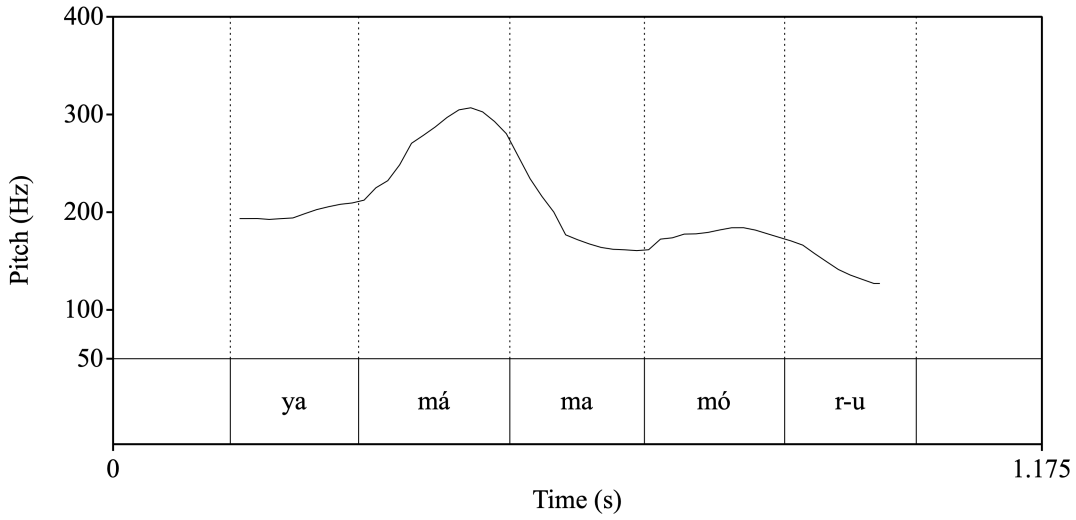


Figure 1.10: Downstep in Tokyo Japanese (Final-accented)

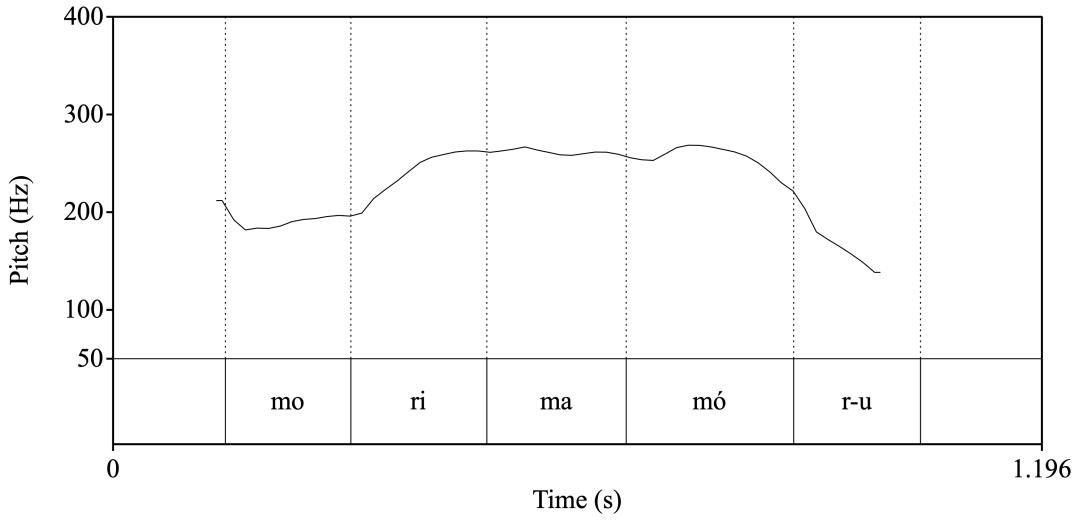


Figure 1.9: No downstep in Tokyo Japanese (Unaccented)

Kenstowicz and Sohn (1997) and Jun et al. (2006) claim that downstep is caused by the pitch accent melody H*+L in Daegu Korean as claimed by Poser (1984) and Pierrehumbert and Beckman (1988) for Tokyo Japanese. Kenstowicz and Sohn and Jun et al. also claim that what they call final-accented (native) words cannot cause downstep because there is an +L deletion rule that applies only to final-accented words; since the downstep trigger H*+L is not fully realized in this case, final-accented native words cannot cause downstep. More specifically, Jun et al. propose a rule and mention that the +L tone gets deleted when a pitch accent is on the final syllable of a word. As Jun et al. themselves notice, however, there is a counterexample: disyllabic double-accented words have a pitch accent on the final syllable, but they trigger downstep (see Kenstowicz and Sohn 1997: (9a)). The +L deletion rule is ad hoc because it cannot explain why it applies only to what they call final-accented (native) words, not to disyllabic double-accented words, and it cannot explain why the +L deletion rule does not apply to loanwords. In addition, even if the +L tone gets deleted in what they call final-accented words, they should trigger downstep because Tokyo Japanese final-accented words do not have the +L tone in the pitch accent melody H*+L in isolation (McCawley 1968; Haraguchi 1977; Poser 1984, among others),

but they still trigger downstep in phrasal context as we saw in Figure 1.10. Kenstowicz and Sohn's and Jun et al.'s treatment cannot account for the general properties of final-accented words in lexical pitch accent languages.

Kubozono's (2018) production experiment on Gyeongsang Korean (both Daegu and Busan Korean) also supports my analysis. Kubozono shows that final-accented loanwords in Daegu Korean (and Busan Korean) have a lexical, not a phrasal, pitch fall within the accented syllable and got a confirmation of this observation from Hyang-Sook Sohn, one of the co-authors of Kenstowicz and Sohn (1997, 2001) (see Kubozono's 2018 Footnote 15). For example, the surface melody of the final-accented loanword *kheycháp* 'ketchup' is in fact LH͡L. Chung (2006) also observes a similar contrast between monosyllabic native words and loanwords. In contrast, previous studies on Daegu Korean such as Kenstowicz and Sohn (1997) and Jun et al. (2006) do not report such a lexical pitch fall within the accented syllable of final-accented native words, which are analyzed as unaccented words in my treatment. This difference implies that final-accented loanwords are truly final-accented with the pitch accent melody H*+L, while what have been analyzed as final-accented native words lack a pitch accent and are in fact unaccented. A lexical pitch fall within the final tone bearing unit due to a pitch accent is observable in other languages. As we saw in (2.8b), for example, bimoraic L-beginning final-accented words can have a lexical pitch fall on the final mora in Osaka Japanese.

2.4.2 Diachronic analysis

Ramsey (1978) compared the data of Late Middle Korean (15-16th century Korean), which had a lexical pitch accent system, and the data of Modern Gyeongsang Korean. Ramsey argued that the location of a pitch accent in Middle Korean moved one syllable to the left in Modern Gyeongsang Korean. This proposal implies that a final-accented class is a gap resulting from the Gyeongsang Accent Shift in Daegu (and Busan) Korean native words. In fact, Kenstowicz and Sohn's (2001) suggestion that final-accented words could

be unaccented is based on the fact that their final-accented class in Daegu Korean corresponds to the unaccented class in Middle Korean. Loanwords can then be understood to fill this gap because as we saw in Section 2.3.1, the location of a pitch accent largely depends on syllable weight (Chung 2000; Kenstowicz and Sohn 2001, among others). English and Japanese loanwords began to enter Korean in the 20th century (Sohn 1999).[12] We do not know when exactly the accent shift was completed.[13] However, it must have been completed before the 20th century because if it were the case, we would see the shift in progress in Modern Gyeongsang Korean and loanwords would also have undergone the accent shift.

Ramsey (1978) also suggested that monosyllabic postnominal enclitic particles are now all preaccented in Modern Gyeongsang Korean because they had a pitch accent in Middle Korean. Tokyo and Osaka Japanese have preaccented enclitic particles; they assign their pitch accent to the preceding accent bearing unit (McCawley 1968). Ramsey's analysis can explain why unaccented native words and final-accented loanwords exhibit the same prosody with an enclitic case particle in (2.7). (2.7) is repeated below as (2.9) with slight modification. When the noun is an unaccented native word as in (2.9a), the final syllable of the noun receives a pitch accent due to the preaccentedness of the enclitic particle. When the noun is a final-accented loanword as in (2.9b), the preaccent on the enclitic particle gets deleted because the noun is accented. Tables 2.5 and 2.6 present my reanalysis of Table 2.3 (native words) and Table 2.4 (loanwords), respectively.

[12] Lee's (2009) data indicate that Japanese loanwords in Busan Korean have a final-accented class (e.g. *opóng* 'tray お盆') because they behave in the same way as English loanwords with a final accent. Kenstowicz and Sohn (2001) present two disyllabic Japanese loanwords with an LH melody in Daegu Korean: *wutóng* 'udon うどん' and *otéyng* '*oden* おでん'. These words seem to be final-accented.

[13] Kenstowicz et al. (2008) propose that the Gyeongsang Accent Shift is a push chain shift, triggered by H insertion to the final syllable of an unaccented word, but they do not mention when H insertion occurred.

(2.9) *Tone interaction with a preaccented enclitic particle in Daegu Korean*

a. *Unaccented (native word)*

palam 'wind' (LH 바람) + =´i '=NOM' (이) → palám=i 'wind=NOM' (LH=L 바람이)

b. *Final-accented (loanword)*

kheycháp 'ketchup' (LH͡HL 케찹) + =´i '=NOM' (이) → kheycháp=i 'ketchup=NOM' (LH=L 케찹이)

	Non-final *pátak* 'floor' (HL 바닥)	**Unaccented** *palam* 'wind' (LH 바람)
Preaccented particle =*´i* '=NOM' (이)	pátak=i (HL=L 바닥이)	palám=i (LH=L 바람이)
Accented particle =*chélem* '=like' (HL 처럼)	pátak=chelem (HL=LL 바닥처럼)	palam=chélem (LL=HL 바람처럼)

Table 2.5: Reanalysis of Table 2.3 (Native words in Daegu Korean)

	Non-final *khíchin* 'kitchen' (HL 키친)	**Final** *kheycháp* 'ketchup' (LH͡HL 케찹)
Preaccented particle =*´i* '=NOM' (이)	khíchin=i (HL=L 키친이)	kheycháp=i (LH=L 케찹이)
Accented particle =*chélem* '=like' (HL 처럼)	khíchin=chelem (HL=LL 키친처럼)	kheycháp=chelem (LH=LL 케찹처럼)

Table 2.6: Reanalysis of Table 2.4 (Loanwords in Daegu Korean)

2.5 Extension to Busan Korean

In this section, I take a look at Busan Korean. I will show that my analysis of Daegu Korean is applicable to Busan Korean: only loanwords allow a final-accented class. Section 2.5.1 presents the accent classes of Busan Korean and shows how each of the accent class in Busan Korean corresponds to Middle Korean and Daegu Korean and introduces the

two approaches (Lee and Davis 2010 and Schuh and Kim 2010) to the two LH classes in Busan Korean. Section 2.5.2 shows that Schuh and Kim's approach, which is in line with my analysis, is better, discussing the lexical prosody with enclitic particles and my novel data on phrasal prosody.

2.5.1 Accent classes

There are two differences between Daegu Korean and Busan Korean (see Do et al. 2014). The first difference is the Tokyo-type or the Osaka-type difference as we saw in Section 2.2: Daegu Korean (Osaka-type) allows word-initial LL..., while Busan Korean (Tokyo-type) does not allow word-initial LL.... Second, the number of accent classes is different. Daegu Korean has only three accent classes (see Section 2.3.1), but Busan Korean has four accent classes (see Utsugi 2007). Table 2.7 shows the accent correspondences for disyllabic words between Middle Korean, Daegu Korean, and Busan Korean with examples in Modern Korean. For Middle Korean and Daegu Korean, I also added the accent class of each pattern. As mentioned in Section 2.4.2, Daegu Korean underwent the Gyeongsang Accent Shift from Middle Korean (Ramsey 1978); since this theory is plausible, Busan Korean must also have undergone the accent shift. Kenstowicz et al. (2008) claim that the initial-accented class in Middle Korean, which became preaccented due to the accent shift, is realized as the double-accented class in Modern Gyeongsang Korean.[14] The difference in the number of accent classes in Daegu Korean and Busan Korean comes from the rising class with an initial rising tone in Middle Korean; it is the double-accented class in Daegu Korean, while it maintains the rising pattern in Busan Korean (Ramsey 1978; Kim and Schuh 2006; Kenstowicz et al. 2008, among others).[15] The double-accented words in Daegu Korean derived from the rising class in Middle Korean have a long vowel on

[14] I assume that preaccented words are realized as double-accented words only word-initially. Preaccented postnominal bound morphemes such as enclitic particles are still preaccented when they are attached to another morpheme.

[15] The rising class in Middle Korean can be either RH or RL depending on the inflection (Kenstowicz et al. 2008).

the first syllable, but the vowel length contrast is in the process of being lost (Kim 2018), which is probably the reason why the HH and H:H classes in Daegu Korean are treated as the same in Kenstowicz and Sohn (1997) and other studies such as Jun et al. (2006) (see the analysis of the historical development of the rising class in Middle Korean to Modern Gyeongsang Korean by Kenstowicz et al. 2008).[16] One might say that the two LH classes in Busan Korean in Table 2.7 might be grouped into one accent class, but they belong to different accent classes because they exhibit different melodies with an enclitic case particle as shown in (2.10). The LH(L) class in Busan Korean has a pitch fall as in (2.10a), while the LH(H) class has no pitch fall as in (2.10b).[17]

Middle Korean	**Daegu Korean**	**Busan Korean**	**Examples**
HL (Initial)	HH (Preaccented)	HH	moki 'mosquito' (모기)
LH (Final)	HL (Non-final)	HL	atul 'son' (아들)
LL (Unaccented)	LH (Unaccented)	LH(L)	poli 'barley' (보리)
RX (Rising)	H(:)H (Merged into HH)	LH(H)	salam 'person' (사람)

Table 2.7: Accent correspondences (Kenstowicz et al. 2008: (4)–(6))

[16]For example, Kenstowicz and Sohn (2001) and Jun et al. (2006) treat *kokwuma* 'sweet potato' in Daegu Korean, which belongs to the rising class in Busan Korean (see Utsugi 2007), as a double-accented word.

[17]The lexical prosody of monosyllabic words (with a monosyllabic enclitic case particle) in Busan Korean is shown below. Of course, the HL (non-final) class is missing in monosyllabic (native) words. Lee and Davis (2009, 2010) describe the lexical melody of *mal* 'language' as L, but I put R, following other previous studies such as Schuh and Kim (2010) and Hwang (2011a,b).

(iv) *Monosyllabic words in Busan Korean*

a. *LH(L) class*
mal 'horse' (H 말) → mal=i 'horse=NOM' (H=L 말이)

b. *LH(H) class*
mal 'language' (R 말) → mal=i 'language=NOM' (L=H 말이)

c. *HH (preaccented) class*
mal 'a measuring unit' (H 말) → mal=i 'a measuring unit=NOM' (H=H 말이)

(Lee and Davis 2009: (3))

(2.10) *LH classes in Busan Korean*

a. *LH(L) class*

palam 'wind' (LH 바람) + =i '=NOM' (이) → palam=i 'wind=NOM' (LH=L 바람이)

b. *LH(H) class*

salam 'person' (LH 사람) + =i '=NOM' (이) → salam=i 'person=NOM' (LH=H 사람이) (Kenstowicz et al. 2008: (7))

I have argued that Daegu Korean has an unaccented class, which suggests, given the closeness of the two varieties, that Busan Korean has an unaccented class, too. In this section, I introduce two studies that claim that Busan Korean has an unaccented class: Lee and Davis (2010) and Schuh and Kim (2010).[18] Although the two studies claim that an unaccented class exists in Busan Korean, they give different analyses. Lee and Davis claim that the LH(L) class is final-accented, while the LH(H) class is unaccented because the behavior of the two accent classes with an enclitic case particle in (2.10) is parallel with the contrast between final-accented words and unaccented words in Tokyo Japanese as we saw in (1.15) in Chapter 1.[19] Schuh and Kim claim that the LH(L) class belongs to the unaccented class, while the LH(H) class belongs to the rising class from a diachronic standpoint. As in my analysis of Daegu Korean, Schuh and Kim analyze the pitch fall in an LH(L) word with a monosyllabic enclitic particle such as (2.10a) as the preaccentedness of the enclitic particle, following Ramsey (1978). Schuh and Kim also argue that the two H tones in the LH(H) class are lexical tones from the historical rising class, which can overwrite the pitch accent of a preaccented enclitic particle; this is why there is no pitch

[18] Lee and Davis (2009) and Lee and Davis (2010) are based on Lee (2009). I adopt Lee and Davis (2010) rather than Lee and Davis (2009) because Lee and Davis (2010) discuss loanword phonology in detail. Kim and Schuh (2006) revised their analysis in Schuh and Kim (2010).

[19] Lee and Davis (2010) also claim that Busan Korean has word-initial (more accurately, PWd-initial) register tones (^{H} or ^{L}) as in Osaka Japanese (Kori 1987; Pierrehumbert and Beckman 1988). This analysis is not tenable because PWd-initial register tones block large AP formation. As will be discussed in Chapter 3, Busan Korean is a [+multiword AP] language.

fall in (2.10b).[20] I will show that Schuh and Kim's analysis is better than Lee and Davis's analysis by looking at the lexical prosody with enclitic particles and the phrasal prosody of Busan Korean.

2.5.2 Data and analysis

As in Daegu Korean, heavy syllables are usually accented in loanwords in Busan Korean (Lee 2009). Lee and Davis (2010) found a difference in prosody between LH(L) native words with an initial-accented enclitic particle and LH(L) loanwords with an initial-accented enclitic particle in Busan Korean.[21] Let us take a look at Lee and Davis' analysis of the tone interaction between LH words with some enclitic particles in Table 2.8. Recall that Lee and Davis argue that the LH(L) class is final-accented, while the LH(H) class is unaccented. They analyze most of the enclitic particles as unaccented, except for some enclitic particles such as =*chélem* '=like', which is initial-accented.

	LH(L) (Native word) *kelúm* 'fertilizer' (거름)	**LH(L) (Loanword)** *tulím* 'dream' (드림)	**LH(H)** *salam* 'person' (사람)
Unaccented particle =*i* '=NOM' (이)	kelúm=i LH=L (거름이)	tulím=i LH=L (드림이)	salam=i LH=H (사람이)
Accented particle =*chélem* '=like' (HL 처럼)	kelum=chélem LH=HL (거름처럼)	tulím=chelem LH=LL (드림처럼)	salam=chélem LH=HL (사람처럼)

Table 2.8: LH words with enclitic particles in Busan Korean (Lee and Davis 2010: (2), (3))

With the enclitic case particle =*i* '=NOM', the LH(L) and LH(H) classes show different tone patterns as we saw in (2.10). Lee and Davis (2010) claim that this is because the LH(L) class is final-accented, while the LH(H) class is unaccented. Native words and loanwords in the LH(L) class exhibit the same tone pattern with the enclitic case particle =*i* '=NOM'.

With an initial-accented enclitic particle such as =*chélem* '=like', native words in the

[20] Kim and Jun (2009) propose a similar analysis and argue that the pitch accent melody H+H is linked with the second and the third syllables in the LH(H) class; I will discuss their analysis in Chapter 3.

[21] The difference is also pointed out by Do and Kenstowicz (2010).

LH(L) class have the same tone pattern as words in the LH(H) class. In Lee and Davis' (2010) treatment, the case of the LH(H) word *salam* 'person' is straightforward because there is only one pitch accent from the enclitic particle; the second syllable of *salam=chélem* 'like a person' receives an H tone because two successive L tones are ill-formed at the beginning of a word in Busan Korean (see Section 2.2). In the case of the LH(L) native word *kelúm* 'fertilizer', there are two pitch accents from both the noun and the enclitic particle under Lee and Davis' analysis. Lee and Davis argue that the pitch accent on the noun gets deleted in this case because of accent clash, as Hwang and Davis (2019) analyze a similar case in Daegu Korean (see Section 2.3.2). Since the two pitch accents are next to each other, the pitch accent on the noun gets deleted. The second syllable of *kelum=chélem* 'like fertilizer' receives an H tone for the same reason as *salam=chélem* 'like a person'.

The LH(L) loanword *tulím* 'dream' with the initial-accented enclitic particle *=chélem* '=like' is expected to be LH=HL as in *kelum=chélem* 'like fertilizer' because both *tulím* 'dream' and *kelém* 'fertilizer' are in the same accent class in Lee and Davis (2010), but the actual tone pattern is LH=LL. Lee and Davis argue that this is because native words and loanwords have different phonological systems, following Lee (2009); the tone bearing unit is the syllable in native words, while it is the mora in loanwords. The melody of the LH(L) loanword *tulím* 'dream' is in fact LH͡L; the pitch accent melody is H*+L, with the H* on the penultimate mora and the +L on the final mora. The difference between native words and loanwords can be accounted for in the same way as the difference between native words and loanwords in Daegu Korean as analyzed by Hwang and Davis (2019). Accent clash does not occur in *tulím=chelem* 'like a dream' because the pitch accent on the noun and the pitch accent on the enclitic particle are not adjacent to each other. As a result, the pitch accent on the enclitic particle is deleted and we get the LH=LL melody. Lee and Davis' analysis has exactly the same problem as with Hwang and Davis' analysis: proposals like the accent clash analysis are ad hoc (if not implausible). It would be preferable, if possible, to come up with an account based on the general properties of the

lexical pitch accent systems of Korean (and Japanese). Another problem is that Lee and Davis' analysis cannot explain the diachronic relationship between Middle Korean and Busan Korean as Schuh and Kim (2010) do.

Lee and Davis (2009) (and also Lee and Davis 2010) claim that LH(H) words are unaccented, but that they are deaccenting at the same time; they can delete the pitch accent on the following enclitic particle. (2.11) shows an example. The word *mal* 'language' belongs to the LH(H) class and is unaccented under Lee and Davis' analysis. When it is followed by the initial-accented enclitic particle *=chélem* '=like', the surface melody of *mal=chelem* 'like a language' is supposed to be L=HL, but the actual melody is L=HH because the pitch accent on the enclitic particle gets deleted. This claim has two problems. First, it is strange that the surface melody of *salam=chelem* 'like a person' in Table 2.8 is not LH=HH if LH(H) words are deaccenting.[22] Second, unaccented words in other lexical pitch accent languages do not have such a property. (2.12) shows some examples from Japanese.[23] In (2.12a), the unaccented word *miyako* 'capital' is accompanied by the initial-accented enclitic particle *=máde* '=until/to' in Tokyo Japanese. In (2.12b), the L-beginning unaccented word ^{L}*kama* 'kettle' is followed by the initial-accented enclitic particle *=démo* '=even' in Osaka Japanese. In both cases, the accented enclitic particles still have a pitch accent in the resulting forms.[24]

(2.11) *Deaccenting in Busan Korean*[25]

mal 'language' (R 말) + =chélem '=like' (HL 처럼) → mal=chelem 'like a language' (L=HH 말처럼) (Lee and Davis 2009: (3c))

[22] Lee and Davis (2009) explain that this is because Busan Korean prohibits word-final three consecutive H tones. We will see that this is wrong in Chapter 4; long *wh*-words allow more than two consecutive H tones word-finally.

[23] Unaccented words in South Hamgyeong Korean also work in the same way (see Ramsey 1978).

[24] Unaccented words with an initial ^{H} register tone (H-beginning) are not deaccenting, either, in Osaka Japanese (see McCawley 1968: p. 198).

[25] Lee and Davis (2009) describe the lexical prosody of *mal* 'language' as L, but I follow other people's description such as Hwang's (2011a; 2011b) because it is more accurate; these people describe the lexical prosody of *mal* 'language' as R (see Footnote 17).

(2.12) *Tokyo and Osaka Japanese unaccented words are not deaccenting.*

a. *Tokyo Japanese*

miyako 'capital' (LHH 都) + =máde '=until/to' (HL まで) → miyako=máde 'to a capital' (LHH=HL 都まで) (McCawley 1968: p. 139)

b. *Osaka Japanese*

^{L}kama 'kettle' (LH 釜) + =démo '=even' (HL でも) → ^{L}kama=démo 'even a kettle' (LL=HL 釜でも) (McCawley 1968: p. 198)

I extend my analysis of Daegu Korean to Busan Korean and argue that while a final-accented class is missing in native words, loanwords provide a source for a final-accented class. Hence, the LH(L) class is unaccented in native words, while it is final-accented in loanwords. I hypothesize that the Busan system is interpreted as a combination of a pitch accent and a tone system, with the LH(H) class interpreted as tone, following Utsugi (2007); see the review of this approach in Lee and Davis (2009). What this means concretely is that the LH(H) class has the fixed melody LHHL word-initially.[26] If we adopt Hyman's (2009) argument that pitch accent languages are subsumed under tone languages, the rising class can be interpreted as having a tone system, while the other classes can be interpreted as falling between a stress system and a tone system.

There are some reasons for my hypothesis. First, we have accented (preaccented, non-final, and final) and unaccented classes; there is no more new accent class available. Second, there are no Busan Korean loanwords that belong to the LH(H) class; loanwords are always accented and heavy syllables attract a pitch accent (Lee 2009). Since we established an unaccented class in Busan Korean, this fact suggests that the LH(H) class is neither accented nor unaccented. I will call the LH(H) class a rising class and put a superscript ^{R} for words from the rising class. For the accented class, I assume that the pitch accent melody H*+L is assigned to the accented syllable in Busan Korean, as proposed by

[26] Utsugi (2007) also interprets the HH class as tone, but I reject this analysis; see my analysis in Chapter 3.

Jun et al. (2006) for Daegu Korean.

(2.13) and (2.14) below present my analysis of the data in Table 2.8. (2.13) shows the nouns from the three classes (unaccented, final-accented, and rising) with the enclitic case particle =*ʹi* '=NOM'.[27] As in Daegu Korean, I analyze monosyllabic enclitic particles as preaccented, following Ramsey (1978). I apply the rule that leftmost accent always wins when the resulting forms have more than one pitch accent; this rule was applied to Daegu Korean in Section 2.4. In (2.13a), the noun itself is unaccented, but its final syllable gets accented due to the preaccented enclitic particle. The final-accented noun deletes the pitch accent on the particle in (2.13b). In (2.13c), the pitch accent on the enclitic particle is overwritten by the LHHL melody of the rising class noun.[28] (2.14) shows the same three nouns with the initial-accented enclitic particle =*chélem* '=like'. Since the noun does not have a pitch accent in (2.14a), the pitch accent on the enclitic particle appears on the surface. The surface melody is LH=HL in Busan Korean, not LL=HL as in Daegu Korean (see (2.6a)), because Busan Korean does not allow word-initial LL, while Daegu Korean allows word-initial LL (see Section 2.2). The pitch accent on the enclitic particle is removed in (2.14b) because there is another pitch accent on the noun. In (2.14c), the lexical melody LHHL of the rising class noun appears on the surface.

(2.13) *Tone interaction with a preaccented enclitic particle in Busan Korean*

a. *Unaccented (native word)*

kelum 'fertilizer' (LH 거름) + =ʹi '=NOM' (이) → kelúm=i 'fertilizer=NOM' (LH=L 거름이)

[27] Nouns from the preaccented (HH) class behave in exactly the same way as the Daegu Korean counterparts (see examples in Lee and Davis 2009, 2010); this also applies to initial-accented enclitic particles.

[28] The final L in the lexical melody gets deleted because there are only three syllables (see Chapter 3).

b. *Final-accented (loanword)*

tulím 'dream' (LH 드림) + =́i '=NOM' (이) → tulím=i 'dream=NOM' (LH=L 드림이)

c. *Rising*

^{R}salam 'person' (LH 사람) + =́i '=NOM' (이) → ^{R}salam=i 'person=NOM' (LH=H 사람이)

(2.14) *Tone interaction with an initial-accented enclitic particle in Busan Korean*

a. *Unaccented (native word)*

kelum 'fertilizer' (LH 거름) + =chélem '=like' (HL 처럼) → kelum=chélem 'like fertilizer' (LH=HL 거름처럼)

b. *Final-accented (loanword)*

tulím 'dream' (LH 드림) + =chélem '=like' (HL 처럼) → tulím=chelem 'like a dream' (LH=LL 드림처럼)

c. *Rising*

^{R}salam 'person' (LH 사람) + =chélem '=like' (HL 처럼) → ^{R}salam=chelem 'like a person' (LH=HL 사람처럼)

As the phrasal prosody of Daegu Korean is similar to that of Tokyo Japanese (see Section 2.4.1), the phrasal prosody of Busan Korean is also parallel with that of Tokyo Japanese. This comparison shows that Lee and Davis' (2010) proposal that LH(L) native words are final-accented cannot be correct. I asked a female native speaker of Busan Korean to record sentences in OV constructions with the same three object nouns that I used for Daegu Korean in (2.3)–(2.5), and made pitch tracks with Praat (Boersma 2001). (2.15) has an initial-accented native word as the object of the sentence. In Figure 2.4, which corresponds to (2.15), the verb is downstepped because the object noun is accented, which is the same as the Daegu Korean and Tokyo Japanese counterparts in Figure 2.1 and

Figure 1.8, respectively.

(2.15) *Object = Initial-accented native word in Busan Korean*

마늘 먹는다.
pro mánul mek-nún-ta.
garlic(=ACC) eat-NPST-DECL
'*pro* eats garlic.'

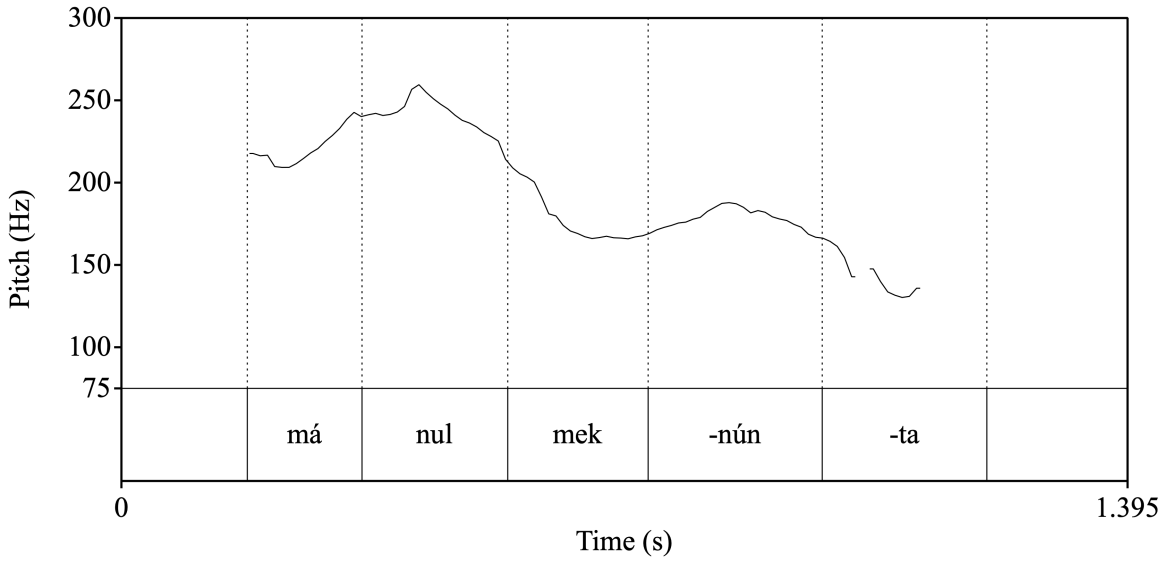


Figure 2.4: Downstep in Busan Korean (Initial-accented)

(2.16) has an unaccented native word as the object of the sentence under my analysis. If the object noun were final-accented as Lee and Davis (2010) analyzed, the verb of the sentence would be downstepped. This prediction is not borne out, however. In Figure 2.5, which corresponds to (2.16), the pitch peak of the verb is not reduced and there is a plateau between the two words, which is parallel with Figure 2.2 in Daegu Korean and Figure 1.9 in Tokyo Japanese.[29]

[29]See also Utsugi's (2007) Figure 2 and Kim and Jun's (2009) (28b) for similar pitch tracks. Utsugi analyzes this accent class as a final-accented class because there is a pitch fall when words from this accent class are followed by a monosyllabic enclitic particle (see (2.10a)). Following Kenstowicz and Sohn's (1997) and Jun

(2.16) *Object = Unaccented native word in Busan Korean*

나물 먹는다.

pro namwul mek-nún-ta.

namul(=ACC) eat-NPST-DECL

'*pro* eats *namul*.'

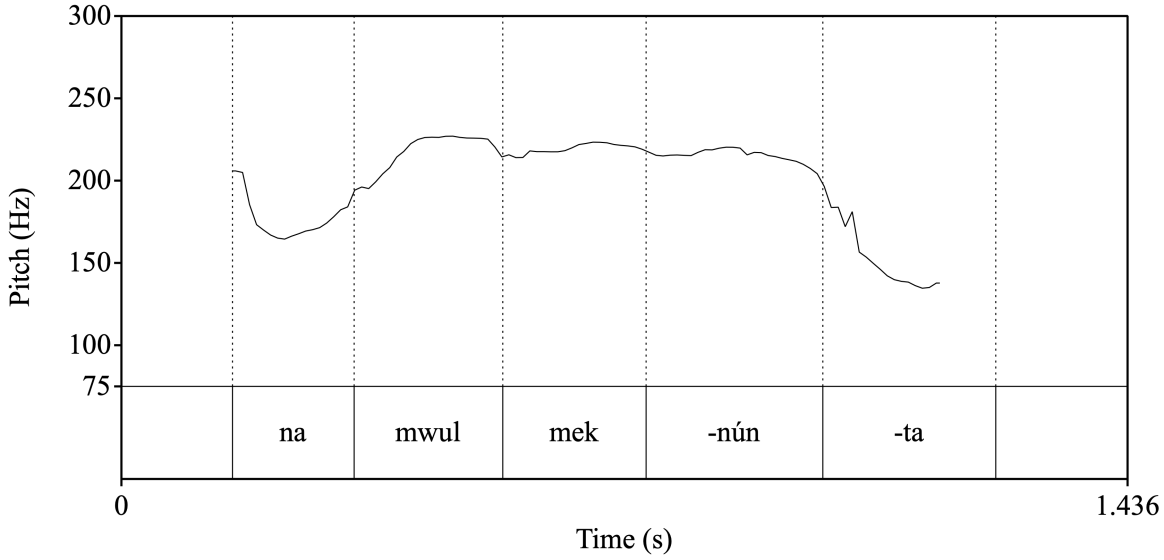


Figure 2.5: No downstep in Busan Korean (Unaccented)

Finally, a final-accented loanword is used as the object of the sentence in (2.17). The corresponding pitch track in Figure 2.6 shows downstep on the verb due to the accented object noun.[30] This is parallel with the Daegu Korean counterpart in Figure 2.3 and the Tokyo Japanese counterpart in Figure 1.10. The three examples here indicate that native

et al.'s (2006) analyses of Daegu Korean, Utsugi posits an +L deletion rule for this accent class. As I have shown, my approach is economical and diachronically-supported.

[30]The nativization process of final-accented Busan Korean loanwords seems to be in progress as Hwang and Davis (2019) report for final-accented Daegu Korean loanwords. That is, unaccented native words and final-accented loanwords are merged into the unaccented class. In fact, the nativization process has been completed for some of my Busan Korean consultants. These speakers pronounce the final-accented loanword *leymón* 'lemon' followed by the initial-accented enclitic particle *=chélem* '=like' in the native pattern LH=HL, not in LH=LL. They also use the prosody in Figure 2.5, not the prosody in Figure 2.6, for the sentence in (2.17). The speaker who recorded (2.17) makes a clear distinction between unaccented native words and final-accented loanwords.

words from the LH(L) are unaccented, but that loanwords from the LH(L) class are final-accented.

(2.17) *Object = Final-accented loanword in Busan Korean*

레몬 먹는다.
pro leymón mek-nún-ta.
lemon(=ACC) eat-NPST-DECL
'*pro* eats a lemon.'

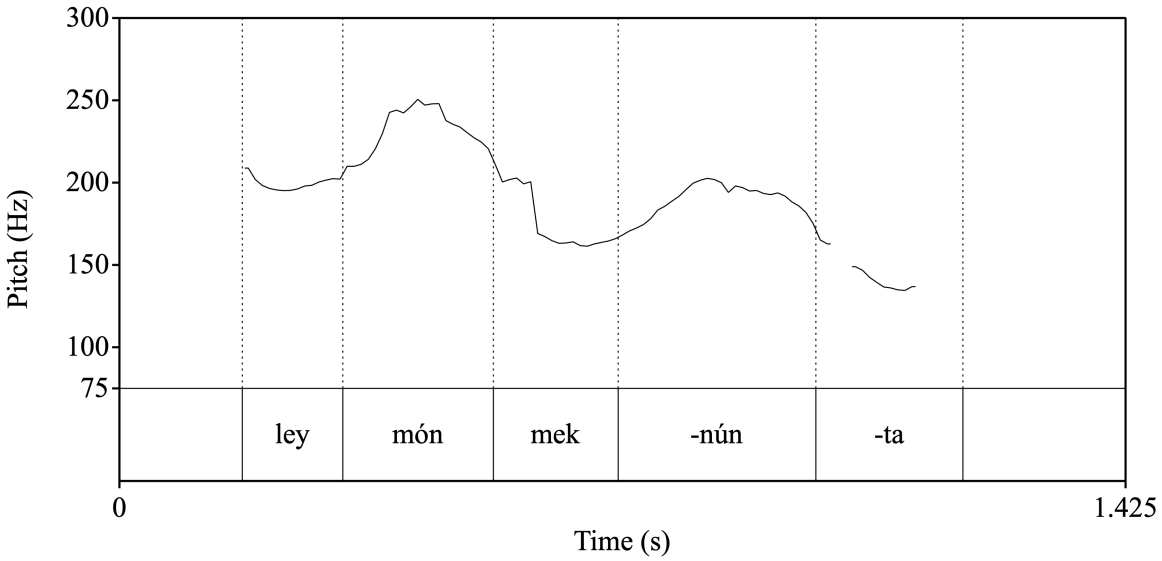


Figure 2.6: Downstep in Busan Korean (Final-accented)

As mentioned in Section 2.4.1, Kubozono (2018) conducted a production experiment on loanwords in Busan (and Daegu) Korean and found that there is a lexical pitch fall on the final syllable of final-accented loanwords. For Busan Korean, this observation is confirmed by Dongmyung Lee, one of the co-authors of Lee and Davis (2009, 2010), according to Kubozono's (2018) Footnote 15, and also by the speaker who recorded (2.17). A similar report on monosyllabic loanwords is also made by Do and Kenstowicz (2010). For native words, Kim and Jun (2009) report that there is a pitch fall at the right edge of

what Lee and Davis (2009, 2010) and Utsugi (2007) analyzed as final-accented words, but Kim and Jun mention that this pitch fall is post-lexical. The reports made by the previous studies above confirm that final-accented loanwords and what look like final-accented native words belong to different accent classes and that only final-accented loanwords have the pitch accent melody H*+L on their final syllables. Table 2.9 is the reanalysis of Table 2.8. In the table, the final-accented loanword *tulím* 'dream' has a contour of H͡L on its final syllable, following the observations by Kubozono (2018) and others.

	Unaccented (LH) *kelum* 'fertilizer' (거름)	**Final (LH͡L)** *tulím* 'dream' (드림)	**Rising (LH)** ^{R}*salam* 'person' (사람)
Preaccented particle =*ʹi* '=NOM' (이)	kelúm=i LH=L (거름이)	tulím=i LH=L (드림이)	^{R}salam=i LH=H (사람이)
Accented particle =*chélem* '=like' (HL 처럼)	kelum=chélem LH=HL (거름처럼)	tulím=chelem LH=LL (드림처럼)	^{R}salam=chelem LH=HL (사람처럼)

Table 2.9: Reanalysis of Table 2.8 (Busan Korean)

2.6 Conclusion

Table 2.10, which is repeated from Table 2.7 with slight modification, shows the summary of my analysis. Daegu Korean native words have three accent classes, while Busan Korean native words have three accent classes with one tone pattern. In addition to these accent classes, both Daegu Korean and Busan Korean have another accent class, namely the final class, exclusively for loanwords.

Middle Korean	**Daegu Korean**	**Busan Korean**	**Examples**
HL (Initial)	HH (Preaccented)	HH (Preaccented)	moki 'mosquito' (모기)
LH (Final)	HL (Non-final)	HL (Non-final)	atul 'son' (아들)
	LH͡L (Final)	LH͡L (Final)	leymon 'lemon' (레몬)
LL (Unaccented)	LH (Unaccented)	LH(L) (Unaccented)	poli 'barley' (보리)
RX (Rising)	H(:)H (Merged into HH)	LH(H) (Rising)	salam 'person' (사람)

Table 2.10: Summary of my analysis in Chapter 2 (cf. Table 2.7)

This study has revealed two things, one for Gyeongsang Korean and one for lexical pitch accent languages generally. First, native words and loanwords have different phonologies in Gyeongsang Korean, but this is the matter of accent classes, not of the syllable or the mora as claimed by Chung (2000) and Lee (2009). Second, it is not enough just to look at how words interact with different enclitic particles to examine which accent class they belong to because there are cases where common enclitic particles such as enclitic case particles are preaccented as in Gyeongsang Korean. Examination of phrasal prosody is also required because it shows the contrast between accented and unaccented words clearly. (Final-)accented words cause downstep, while unaccented words do not.

CHAPTER 3

THE PROSODIC STRUCTURE OF GYEONGSANG KOREAN

3.1 Introduction

I proposed the accent classes of Gyeongsang Korean (Daegu Korean and Busan Korean) in Table 2.10 in Chapter 2. Both Daegu and Busan Korean have four accent classes (preaccented, non-final, final, and unaccented) and only Busan Korean has the rising class with a tone system, which comes from the historical rising class in Middle Korean. The accent class that corresponds to the historical rising class in Middle Korean is now merged with the preaccented class in Daegu Korean. Words from the preaccented class are realized as double-accented words synchronically (see Kenstowicz et al. 2008). The goal of this chapter is to propose the prosodic structure for each accent class in Gyeongsang Korean in the autosegmental-metrical framework (see Ladd 1996/2008).

Middle Korean	**Daegu Korean**	**Busan Korean**	**Examples**
HL (Initial)	HH (Preaccented)	HH (Preaccented)	moki 'mosquito' (모기)
LH (Final)	HL (Non-final)	HL (Non-final)	atul 'son' (아들)
	L$\widehat{\text{HL}}$ (Final)	L$\widehat{\text{HL}}$ (Final)	leymon 'lemon' (레몬)
LL (Unaccented)	LH (Unaccented)	LH(L) (Unaccented)	poli 'barley' (보리)
RX (Rising)	H(:)H (Merged into HH)	LH(H) (Rising)	salam 'person' (사람)

Table 2.10: Accent classes of Gyeongsang Korean

The prosodic hierarchy formulated by Pierrehumbert and Beckman (1988) and Jun (2006) in Figure 1.7, which is repeated from Chapter 1, is assumed in this chapter. The definition of each prosodic domain is given in Table 3.1 (see Chapter 1 for more details).

Intonation Phrase (IP)
|
Intermediate Phrase (ip)
|
Accentual Phrase (AP)
|
Prosodic Word (PWd)

Figure 1.7: Prosodic hierarchy of Japanese and Korean (based on Pierrehumbert and Beckman 1988 and Jun 2006)

Prosodic domain	**Definition**
Intonation Phrase (IP)	Utterance level; Final boundary tones mark sentence type.
Intermediate Phrase (ip)	Domain for downstep and focus
Accentual Phrase (AP)	At most one pitch accent
Prosodic Word (PWd)	Word level; e.g. Noun + Enclitic particle(s)

Table 3.1: Definition of each prosodic domain

The three parameters that we have seen so far ([±lexical tone] and [±multiword AP] proposed by Igarashi 2012, 2014 in Chapter 1 and [±phrasal H] in Chapter 2) need to be reviewed for discussion in this chapter. Daegu Korean and Busan Korean are both [+lexical tone] languages because they have lexical tones as evidenced by their lexical pitch accent systems. The data in Chapter 2 indicate that both Daegu Korean and Busan Korean are [+multiword AP] because unaccented PWds trigger large prosodic phrase (= AP) formation (see Figure 2.2 for Daegu Korean and Figure 2.5 for Busan Korean in Chapter 2; these figures will be repeated in Section 3.2) as unaccented PWds in Tokyo Japanese ([+multiword AP]) do (see Kubozono 1993); an AP in these languages can bear more than one PWd. The classification of Japanese and Korean using these two parameters in Table 1.9 (Chapter 1) is updated in Table 3.2 below.[1] [±phrasal H] in [+lexical tone] languages is based on the existence or the absence of an AP-level H– (phrasal H) tone, which can be secondarily associated with the second (or first in some cases) tone bearing unit of an

[1]Hamgyeong Korean is not included in the table because there are not enough data as to [±multiword AP].

AP if possible (see Chapter 1). [+phrasal H] languages do not allow word-initial (more accurately, AP-initial) consecutive L tones, while [−phrasal H] languages do. Busan Korean is [+phrasal H], while Daegu Korean is [−phrasal H], as Table 2.2 from Chapter 2 shows. Trisyllabic words in Table 3.3 show this contrast between Daegu Korean and Busan Korean.[2] The classification of lexical pitch accent varieties of Japanese and Korean using [±phrasal H] is given in Table 3.4.

Varieties	**[±lexical tone]**	**[±multiword AP]**
Tokyo, Fukuoka	+	+
Osaka	+	−
Seoul	−	+
Kobayashi	−	−
Gyeongsang (Daegu, Busan)	+	+

Table 3.2: Classification of Japanese and Korean by [±lexical tone] and [±multiword AP] (cf. Table 1.9)

Varieties	**[±phrasal H]**
Tokyo, Fukuoka	+
Osaka	−
Daegu	−
Busan	+
South Hamgyeong	+
North Hamgyeong/Yanbian	−

Table 2.2: [±phrasal H] in [+lexical tone] languages

Accent classes	**Daegu**	**Busan**	**Examples**
Preaccented	HHL	HHL	mwucikay 'rainbow' (무지개)
Non-final (Initial)	HLL	HLL	myenuli 'daughter-in-law' (며느리)
Non-final (Penult)	LHL	LHL	apeci 'father' (아버지)
Final	LLĤL	LHĤL	pulacil 'Brazil' (브라질)
Unaccented	LLH	LHH	mintulley 'dandelion' (민들레)

Table 3.3: Trisyllabic words in Daegu and Busan Korean (based on Do et al. 2014; Kubozono 2018)

[2]The rising class in Busan Korean is omitted in this table.

Varieties	[±multiword AP]	[±phrasal H]
Tokyo, Fukuoka	+	+
Osaka	−	−
Daegu	+	−
Busan	+	+

Table 3.4: Classification of Japanese and Korean by [±multiword AP] and [±phrasal H]

In Chapter 1, I suggested that what makes [+multiword AP] and [−multiword AP] different is the existence or the absence of PWd-initial boundary tones. [−multiword AP] languages have them, while [+multiword AP] languages lack them. The contrast is schematized in Figure 3.1 ([+multiword AP] languages) and Figure 3.2 ([−multiword AP] languages); dashed lines indicate PWd boundaries. These figures contain two unaccented PWds; the two unaccented words in Figure 3.2 have a PWd-initial %L boundary tone. Figure 3.1 has an H flat pitch contour from a non-lexical pitch accent melody (e.g. H−), which constitutes an AP with two PWds. In contrast, an H flat pitch contour is blocked by the PWd-initial %L boundary tone in PWd2 in Figure 3.2. Since both Daegu and Busan Korean are [+multiword AP] languages, they are expected to lack PWd-initial boundary tones.

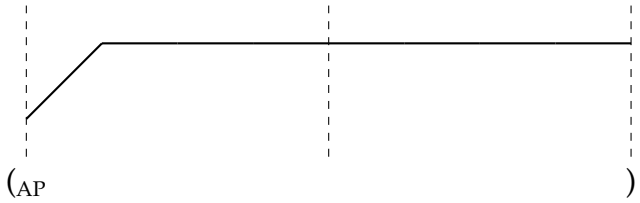


Figure 3.1: An AP can contain two PWds in [+multiword AP] languages.

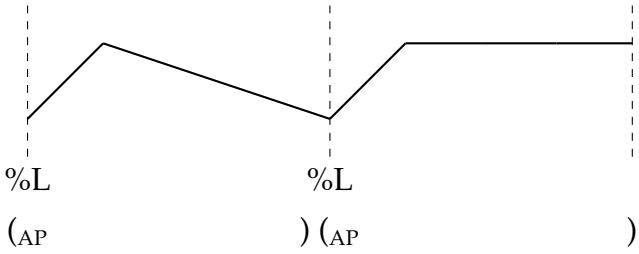


Figure 3.2: An AP can contain only one PWd in [−multiword AP] languages.

The rest of this chapter is organized as follows. Section 3.2 looks at the autosegmental-metrical analyses of Daegu and Busan Korean by Jun et al. (2006) and Kim and Jun (2009), respectively. I present my analysis of the two varieties of Gyeongsang Korean in Section 3.3. Section 3.4 discusses the rising class, which is unique to Busan Korean, and shows that only the rising class instantiates a tone system. Section 3.5 is the conclusion of this chapter.

3.2 Previous studies by Jun et al. (2006) and Kim and Jun (2009)

This section reviews the analysis of Daegu Korean by Jun et al. (2006) and the analysis of Busan Korean by Kim and Jun (2009) because these two studies are the pre-existing analyses of Gyeongsang Korean in the autosegmental-metrical framework. These studies assume underspecification of tones and a linear interpolation algorithm between tones, following Pierrehumbert and Beckman (1988) for Tokyo (and Osaka) Japanese. Section 3.2.1 reviews Daegu Korean as analyzed by Jun et al. (2006) and Section 3.2.2 reviews Busan Korean as analyzed by Kim and Jun (2009). In the two subsections, we will see that the two studies propose completely different analyses for Daegu and Busan Korean despite the fact that the two studies share the same co-author. Since Daegu Korean and Busan Korean are essentially the same as to [+lexical tone, +multiword AP] and the only difference is [±phrasal H], at least of the face of it, the preferred analyses would be similar

to each other.

3.2.1 Daegu Korean (Jun et al. 2006)

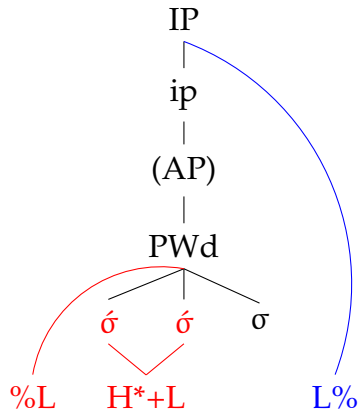
I show that the analysis of Daegu Korean by Jun et al. (2006) has at least two problems. First, it does not cover the true final-accented class provided by loanwords (see Chapter 2). Second and more importantly, their analysis cannot properly handle cases of [+multiword AP] in Daegu Korean.

As mentioned in Chapter 2, Jun et al. (2006) claim that Daegu Korean does not have an unaccented class, but has a final-accented class instead (in the native lexicon). Jun et al. analyze Daegu Korean as a language that does not require AP; under their analysis, an AP with more than one PWd is impossible in this language because an unaccented class is missing. That is, Daegu Korean is analyzed as a [−multiword AP] language by Jun et al. (2006), contra my analysis.

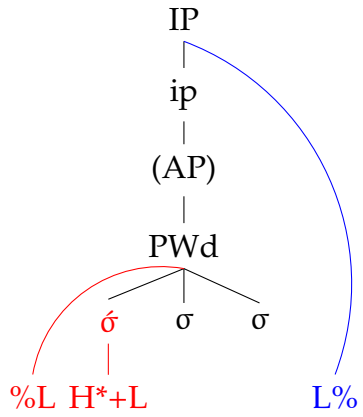
(3.1) shows the prosodic structure of each accent class in Daegu Korean as analyzed by Jun et al. (2006). The words are the trisyllabic words in Table 3.3. For Jun et al., the accent class that is analyzed as an unaccented class in my analysis (i.e. (3.1d)) is a final-accented class. In addition, Jun et al. do not take into consideration loanwords and thus do not analyze the true final-accented class such as *pulacíl* 'Brazil'. The location of a pitch accent is indicated by an acute accent symbol and lexical tones (= PWd-level) are in red, while post-lexical tones are in blue in the prosodic trees in this chapter.

(3.1) *Daegu Korean by Jun et al. (2006)*

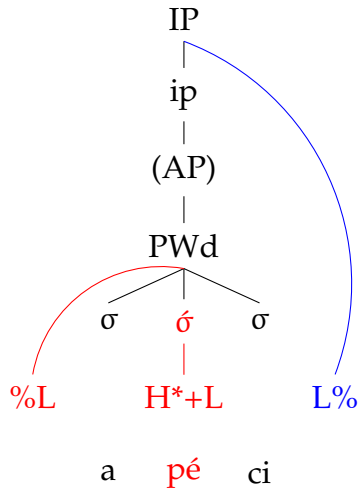
a. *Preaccented (= Realized as Double)*



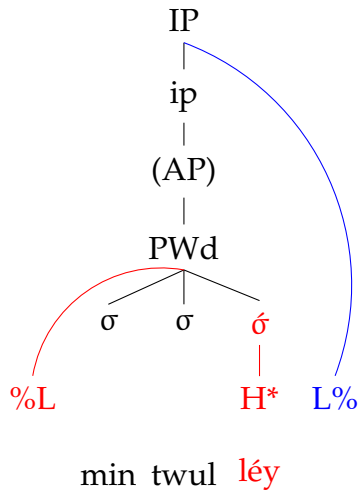
b. *Non-final (Initial)*



c. *Non-final (Penult)*



d. *"Final" = Unaccented under my analysis*



(based on Jun et al. 2006: (6))

Jun et al. (2006) posit three types of tones in Daegu Korean. The first one is the pitch accent melody H*+L, which is linked to the accented syllable. In the preaccented class (3.1a), which is analyzed as a double-accented class on the surface, a pitch accent is linked to the first two syllables. In the final-accented class (3.1d), which is analyzed as an unaccented class under my analysis, the +L in the pitch accent melody gets deleted in isolation. The second tone is a PWd-initial %L boundary tone. Jun et al. posit this tone because they observe that each PWd starts with low F0; however, it is not fully realized when the PWd-initial syllable has a pitch accent (i.e. (3.1a) and (3.1b)). This boundary tone is at the PWd level, not at the AP or ip level, because AP does not exist in Jun et al.'s analysis and

downstep can occur after word-initial low F0. The third tone is an IP-final boundary tone, which marks sentence type (e.g. L% for declaratives).

As we saw in Chapter 2, object nouns from the "final-accented" (unaccented in my analysis) class trigger a different melody from object nouns from the other accent classes in OV constructions in Daegu Korean. Two examples from Chapter 2 are repeated below; I recorded a male speaker for the pitch tracks. (2.3) contains an initial-accented object noun, which causes downstep on the verb (see Figure 2.1). (2.4) contains a "final-accented" (unaccented in my analysis) object noun, which triggers a flat pitch contour (see Figure 2.2).

(2.3) *Object = Non-final in Daegu Korean*

마늘 먹는다.
pro mánul mek-nún-ta.
garlic(=ACC) eat-NPST-DECL
'*pro* eats garlic.'

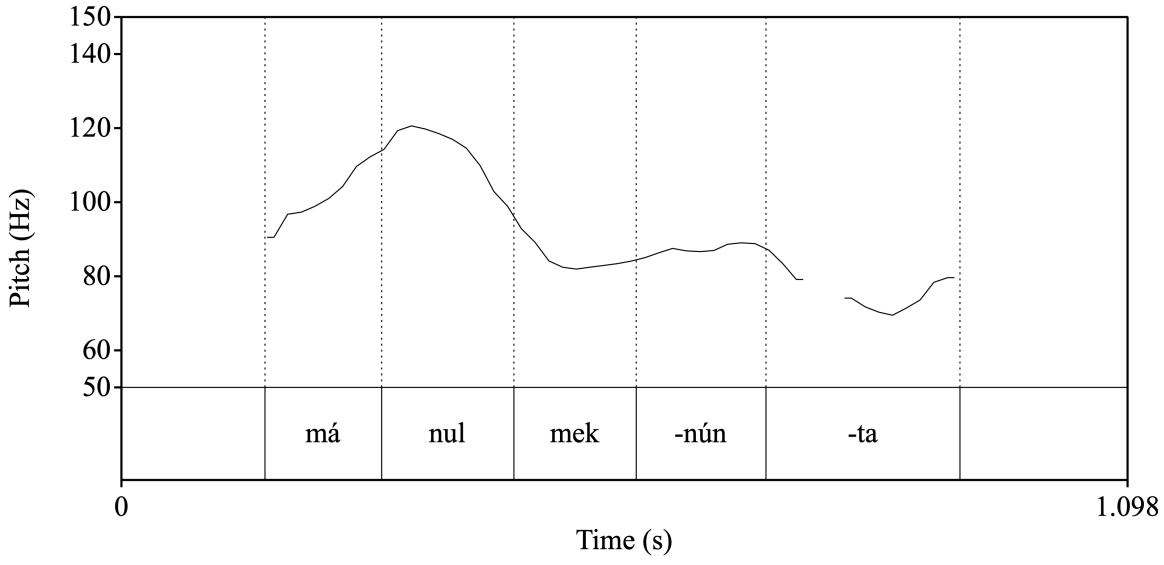


Figure 2.1: Downstep in Daegu Korean

(2.4) *Object = "Final" in Daegu Korean*

나물 먹는다.

pro namwúl mek-nún-ta.

namul(=ACC) eat-NPST-DECL

'*pro* eats *namul*.'

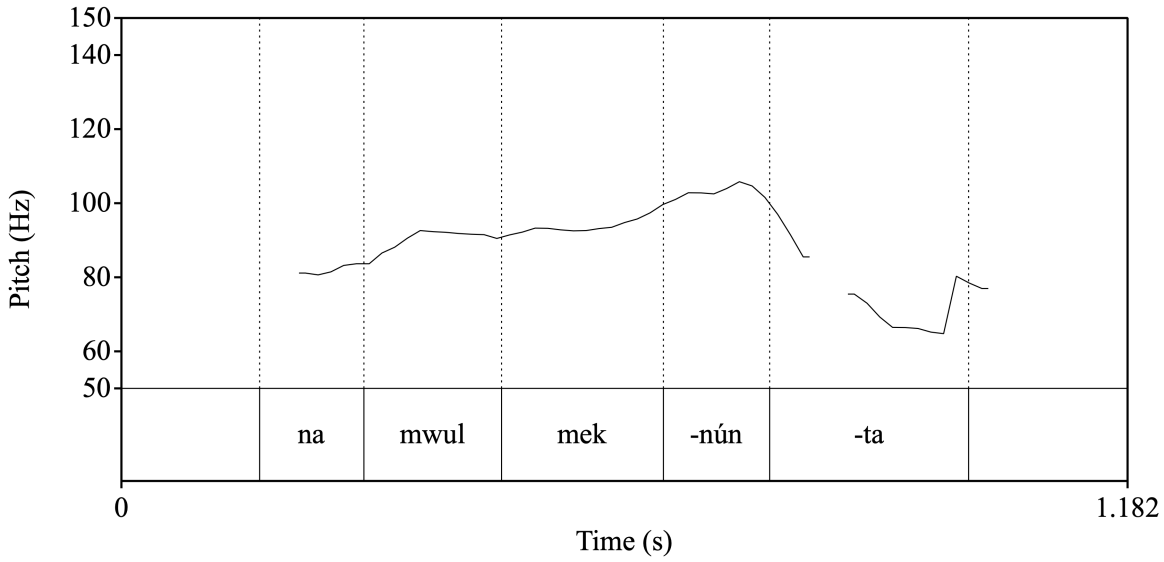
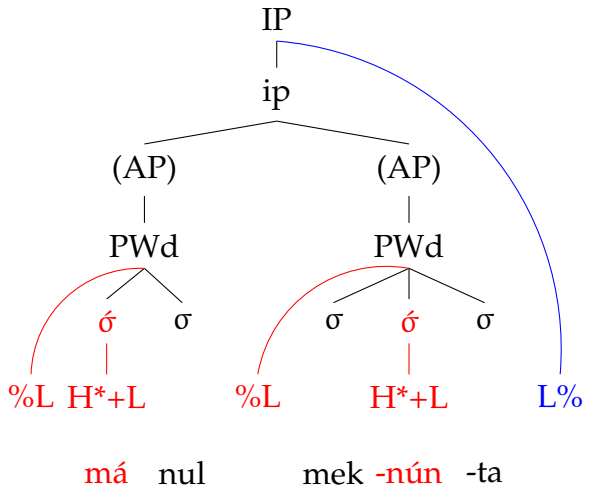


Figure 2.2: No downstep in Daegu Korean

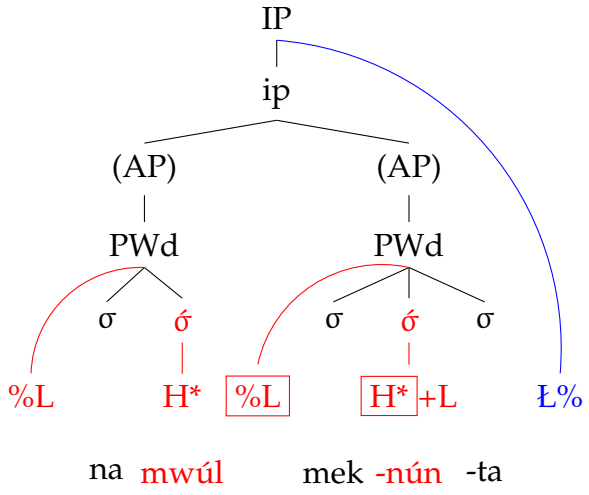
The prosodic structures of (2.3) (= Figure 2.1) and of (2.4) (= Figure 2.2) under Jun et al.'s (2006) analysis are given in (3.2) and (3.3), respectively. There is nothing particular to mention regarding (3.2); the second AP undergoes downstep in an ip due to the accented first AP. In contrast, Jun et al. posit an upstep rule for (3.3). Notice that both the object noun and the verb have an H* tone, but that the one in the verb has a higher pitch than the one in the object noun. There is also an %L boundary tone between the two PWds despite the H flat pitch contour. In order to explain the pitch difference and the H flat pitch contour between the object noun and the verb, Jun et al. propose that the two tones in boxes in (3.3) (the PWd-initial %L boundary tone and the H* tone in the verb) are

upstepped, triggered by the non-fully realized pitch accent melody H* in PWd1.[3] In Jun et al.'s definition, the domain for upstep is ip.

(3.2) *Downstep in Daegu Korean by Jun et al. (2006)* = Figure 2.1



(3.3) *Upstep in Daegu Korean by Jun et al. (2006)* = Figure 2.2



Let us review the two problems listed at the beginning of this subsection. The first problem with Jun et al.'s (2006) analysis of Daegu Korean is that it is not clear how their analysis covers a true final-accented class, which is unique to loanwords. One can assume that the +L in the pitch accent melody H*+L, which gets deleted in the "final-accented"

[3] Kenstowicz and Sohn (1997) make a similar proposal, but there is no L tone between "final-accented" (= unaccented) Word1 and Word2 in their analysis.

(= unaccented in my analysis) class in (3.1d), does not get deleted only in loanwords, but this treatment is ad hoc.

The second and more fundamental problem is the analysis of upstep in (3.3); lack of an unaccented class, which makes the language [−multiword AP], leads to an incorrect prediction about upstep. Daegu Korean under Jun et al.'s (2006) analysis has the same prosodic properties as Osaka Japanese ([−multiword AP] with PWd-initial boundary tones; see Chapter 1). Recall Pierrehumbert and Beckman's (1988) claim that a lexical HL sequence, including the pitch accent melody H*+L, becomes a downstep trigger (see (1.29) below from Chapter 1). (3.4) and its corresponding pitch track in Figure 3.3 show a case of downstep, not triggered by a pitch accent, in Osaka Japanese.[4] (3.4) consists of an unaccented noun with a PWd-initial %L boundary tone (indicated by a superscript ^{L}) and an accented noun with a PWd-initial %L boundary tone, as shown in (3.5). The PWd-final H% boundary tone in PWd1[5] and the PWd-initial %L boundary tone in PWd2 constitute a downstep trigger and lower the pitch peak of PWd2 in Figure 3.3. Notice that (3.5) in Osaka Japanese is roughly equivalent to Jun et al.'s analysis of Daegu Korean in (3.3). Since the H* in the object noun and the PWd-initial %L boundary tone in (3.3) are both at the PWd level, Jun et al.'s analysis expects the verb to undergo downstep, which is not the case. This incorrect prediction suggests that the initial %L boundary tone must be posited at a different prosodic phrase level between PWd and ip.

(1.29) *Downstep trigger*

An HL sequence at the PWd level triggers downstep in an ip.

(based on Pierrehumbert and Beckman 1988: Chapter 8.1.4)

[4]Figure 3.3 is from Figure 1.11 in Chapter 1. I recorded myself for the pitch track.

[5]Unaccented PWds in Osaka Japanese end in a PWd-final H% boundary tone (Pierrehumbert and Beckman 1988; see Chapter 1).

(3.4) *L-beginning unaccented + L-beginning accented in Osaka Japanese*

今井の夜回り

^{L}Imái=no ^{L}yomáwari

Imai=GEN night watch

'Imai's night watch'

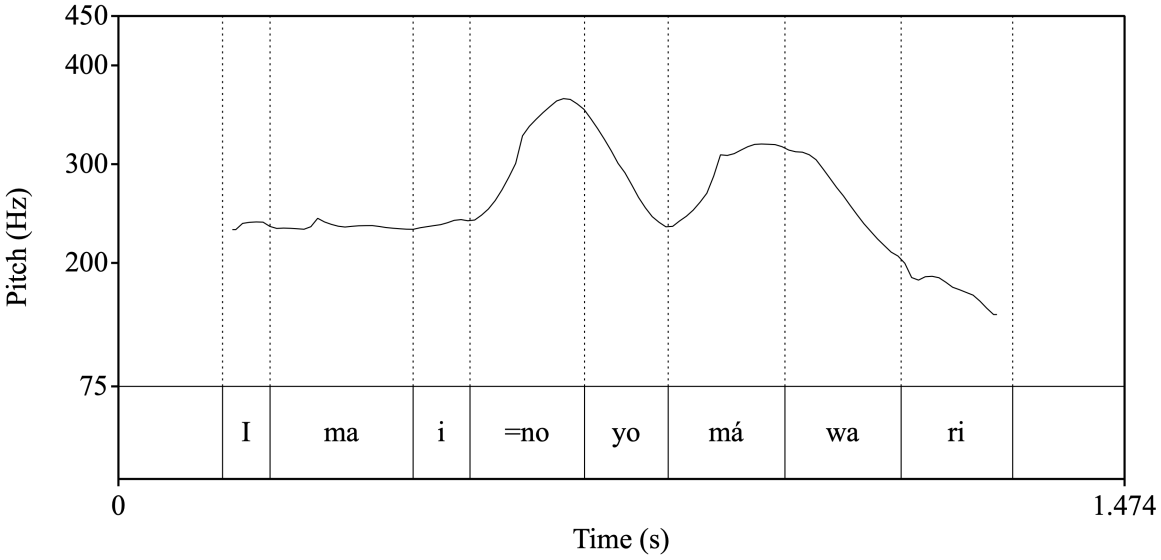
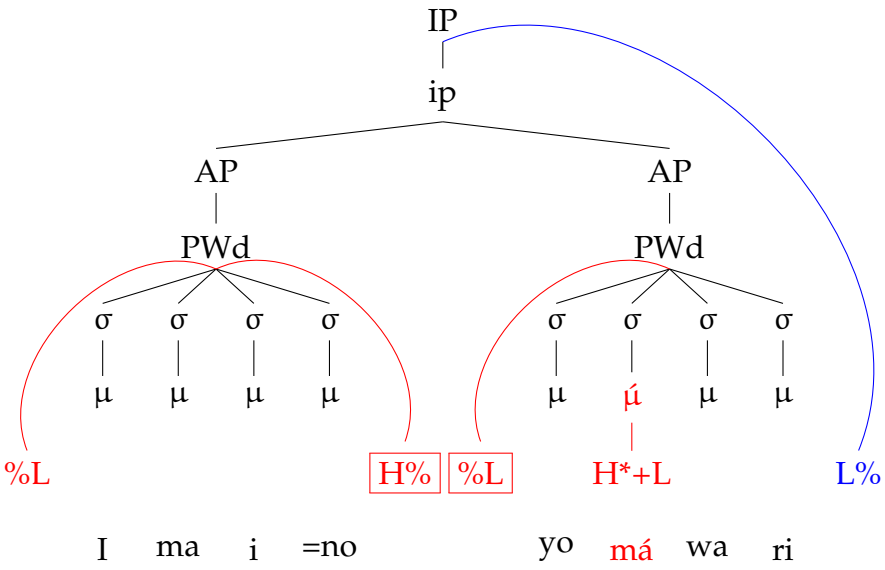


Figure 3.3: An HL sequence at the PWd level becomes a downstep trigger in Osaka Japanese.

(3.5) *Downstep in Osaka Japanese* = (3.4)



I will show that an analysis of Daegu Korean with an unaccented class and [+multiword AP] can describe both the lexical prosody and the phrasal prosody of Daegu Korean more economically in Section 3.3.1.

3.2.2 Busan Korean (Kim and Jun 2009)

Busan Korean must be analyzed in a similar way to Daegu Korean because of the closeness of the two varieties (which are generally grouped together as "Gyeongsang Korean" in Korean dialectology), but Kim and Jun (2009) give a totally different analysis of Busan Korean. There are two differences between Jun et al. (2006) for Daegu Korean and Kim and Jun (2009) for Busan Korean. The first difference is pitch accent assignment. The second difference is [±multiword AP]; Daegu Korean is treated as [−multiword AP], while Busan Korean is treated as [+multiword AP]. Let us review other problems that arise from Kim and Jun's analysis of Busan Korean.

Kim and Jun (2009) claim that every Busan Korean word has one of the two types of pitch accent melodies: H+L and H+H; thus, Kim and Jun claim that there is no unaccented class in Busan Korean. The first H tone in each pitch accent melody is linked to one of the

syllables in a PWd and the +L or +H tone is linked to the following syllable; if the first H tone is linked to the PWd-final syllable, the +L or +H gets deleted. (3.6) and (3.7) show pitch accent assignment in Busan Korean disyllabic and trisyllabic nouns, respectively. The number in each subscript indicates the location of a pitch accent; for example, H_1+H indicates that the first H tone is linked to the first syllable of a PWd and that the +H is linked to the second syllable of a PWd. Notice that (3.6) and (3.7) do not cover all the pitch patterns in Table 2.10 and Table 3.3, respectively.

(3.6) *Disyllabic words in Busan Korean* (cf. my analysis in Table 2.10)

a. *H_1+H (Preaccented = Double in my analysis)*
émí 'mom' (HH 어미) → émí=ka 'mom=NOM' (HH=L 어미가)

b. *H_1+L (Non-final; Initial in my analysis)*
átúl 'son' (HL 아들) → átúl=i 'son=NOM' (HL=L 아들이)

c. *H_2+L (Unaccented in my analysis)*
namwú 'tree' (LH 나무) → namwú=ká 'tree=NOM' (LH=L 나무가)

d. *H_2+H (Rising in my analysis)*
imkúm 'king' (LH 임금) → imkúm=í 'king=NOM' (LH=H 임금이)

(Kim and Jun 2009: (8), (9))

(3.7) *Trisyllabic words in Busan Korean* (cf. my analysis in Table 3.3)

a. *H_1+H (Preaccented = Double in my analysis)*
mwúcíkay 'rainbow' (HHL 무지개)

b. *H_1+L (Non-final; Initial in my analysis)*
myénúli 'daughter-in-law' (HLL 며느리)

c. *H_2+L (Non-final; Penult in my analysis)*
minálí 'parsley' (LHL 미나리)

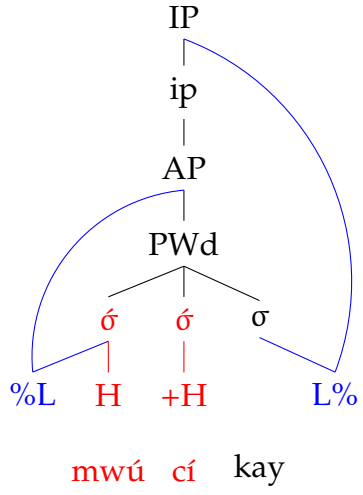
d. *H_2+H (Unaccented in my analysis)*

pokswúngá 'peach' (LHH 복숭아) (Kim and Jun 2009: (4))

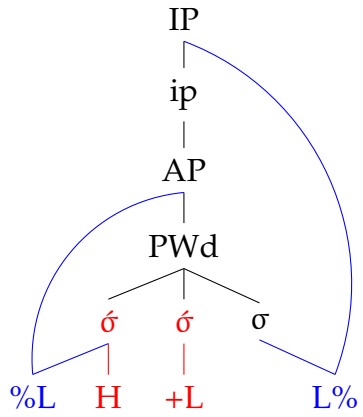
The prosodic structure of each trisyllabic word in (3.7) by Kim and Jun (2009) is presented in (3.8); the prosodic structure of each disyllabic word in (3.6) is omitted because the same analysis applies. Kim and Jun posit AP in the prosodic hierarchy because Busan Korean allows large AP formation as will be seen shortly. Aside from the two pitch accent melodies H+H and H+L, two post-lexical tones are posited: an AP-initial %L boundary tone, which is secondarily linked to the AP-initial syllable, and an IP-final boundary tone. An AP-initial %L boundary tone is required because Kim and Jun observe an AP-initial pitch rise, which is not fully realized when the first syllable has a pitch accent (i.e. (3.8a) and (3.8b)); this is exactly the same as Initial Lowering in Tokyo Japanese as observed by Poser (1984) and Pierrehumbert and Beckman (1988) (see Chapter 1) and essentially the same as the word-initial low F0 in Daegu Korean as observed by Jun et al. (2006) (see Section 3.2.1). An IP-final boundary tone, which is secondarily linked to the IP-finally syllable, marks sentence type; for example, an IP-final L% boundary tone marks declaratives.

(3.8) *Busan Korean by Kim and Jun (2009)*

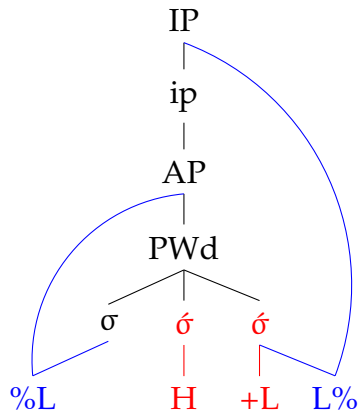
a. *Preaccented (Double) in my analysis* = (3.7a)



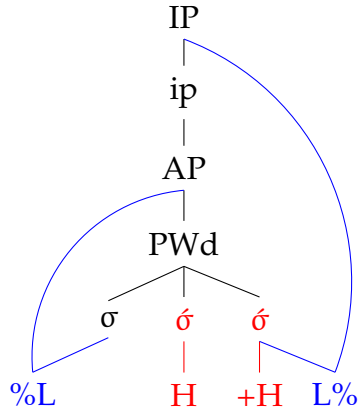
b. *Non-final (Initial) in my analysis* = (3.7b)



c. *Non-final (Penult) in my analysis* = (3.7c)



d. *Unaccented in my analysis* = (3.7d)



Let us move on to the phrasal prosody of Busan Korean as analyzed by Kim and Jun (2009). In Chapter 2, we saw two types of melodies in OV constructions; (2.15) (and Figure 2.4) and (2.16) (and Figure 2.5) are repeated below from Chapter 2; I asked a female native speaker to record the sentences. The verb is downstepped in Figure 2.4 because the object noun in (2.15) is accented, while the verb is not downstepped in Figure 2.5 because the object noun in (2.16) is unaccented under my analysis.

(2.15) *Object = Accented in Busan Korean*

마늘 먹는다.

pro mánul mek-nún-ta.

garlic(=ACC) eat-NPST-DECL

'*pro* eats garlic.'

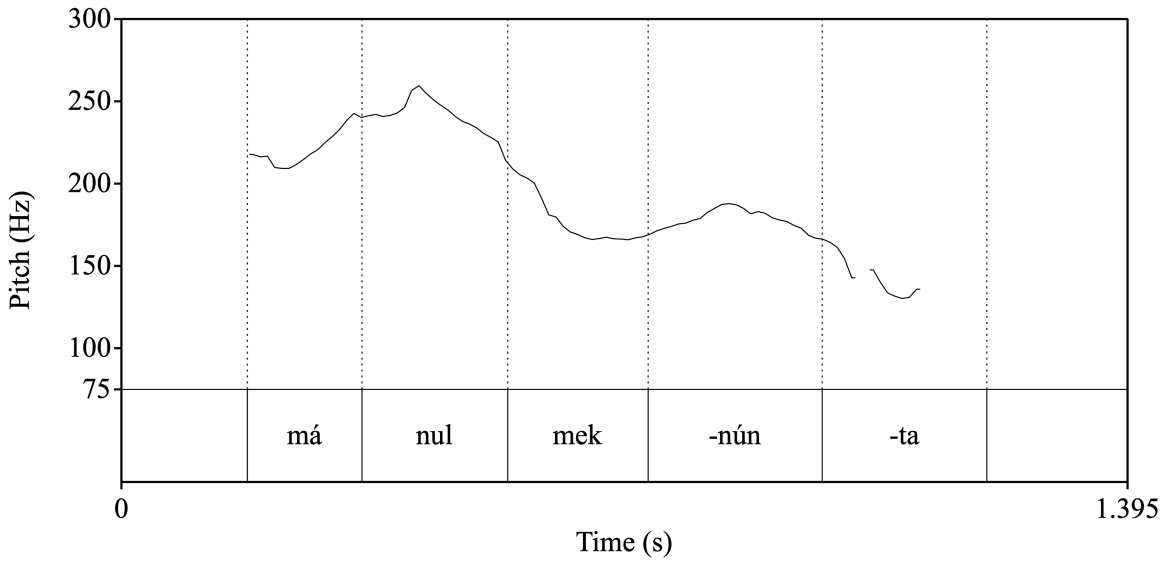


Figure 2.4: Downstep in Busan Korean

(2.16) *Object = Unaccented in Busan Korean*

나물 먹는다.

pro namwul mek-nún-ta.

namul(-ACC) eat-NPST-DECL

'*pro* eats *namul*.'

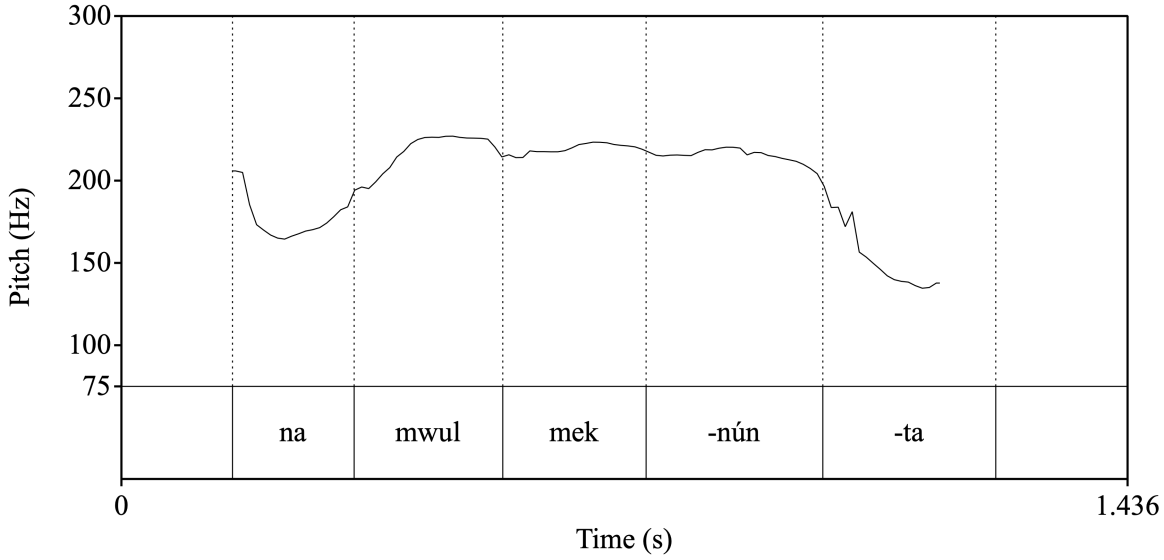


Figure 2.5: No downstep in Busan Korean

Kim and Jun (2009) argue that when two PWds form one AP (e.g. noun compounds[6] and OV constructions), either one of the PWds' pitch accent is removed, which results in an AP with only one pitch accent. For example, due to the accent deletion rule proposed by Kim and Jun (2009), the verb, which is H_2+L, becomes unaccented in (2.15) and the object noun, which is H_2+L, becomes unaccented in (2.16), as shown in (3.9) and (3.10), respectively. The prosodic structures of (3.9) and of (3.10) are (3.11) and (3.12), respectively.

[6] Kim and Jun (2009) treat noun compounds as APs, but they must be treated as PWds. This is another problem with Kim and Jun's analysis.

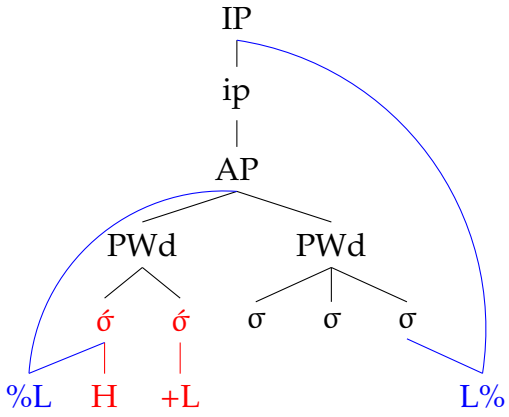
(3.9) *Object = H_1+L, Verb = H_2+L in Busan Korean* (cf. (2.15))

mánúl 'garlic' (HL 마늘) + mek-nún-tá 'eat-NPST-DECL' (L-H-L 먹는다) → ($_{AP}$ mánúl mek-nun-ta) (Accented + Unaccented) (see Kim and Jun 2009: (13a))

(3.10) *Object = H_2+L, Verb = H_2+L in Busan Korean* (cf. (2.16))

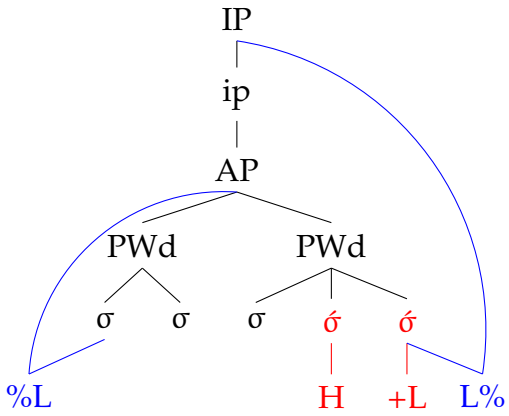
namwúl '*namul*' (LH 나물) + mek-nún-tá 'eat-NPST-DECL' (L-H-L 먹는다) → ($_{AP}$ namwul mek-nún-tá) (Unaccented + Accented) (see Kim and Jun 2009: (13b))

(3.11) *Phrasal prosody in Busan Korean by Kim and Jun (2009)* = (3.9)



(see Kim and Jun 2009: (29))

(3.12) *Phrasal prosody in Busan Korean by Kim and Jun (2009)* = (3.10)



(see Kim and Jun 2009: (28))

The tree diagrams in (3.11) and (3.12) by Kim and Jun (2009) do not represent the actual pitch contours in Figure 2.4 and Figure 2.5 above and tell us that the accent deletion analysis in (3.9) and (3.10) is incorrect. In Figure 2.4, the pitch accent on the verb is not deleted; thus, the object noun and the verb form two separate APs. (3.12) does not show the plateau prosody starting from the second syllable of the object noun in Figure 2.5.

In Section 3.3.2, I show that the prosodic structure of Busan Korean is in fact similar to the prosodic structure of Daegu Korean with the feature [±phrasal H] the only difference.

3.3 My analysis

In this section, I propose my analysis of the prosodic structure of Gyeongsang Korean, fixing the defects in Jun et al. (2006) for Daegu Korean and in Kim and Jun (2009) for Busan Korean. Section 3.3.1 proposes my analysis of Daegu Korean, while Section 3.3.2 proposes my analysis of Busan Korean. I will treat the rising class in Busan Korean in Section 3.4.

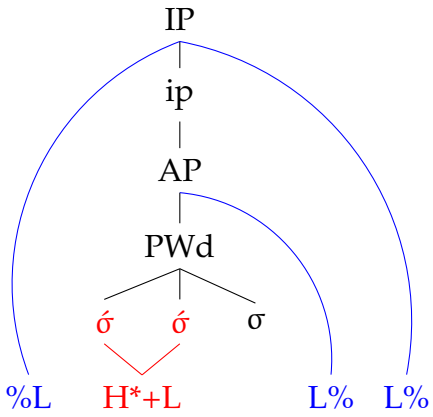
3.3.1 Daegu Korean

Recall that Jun et al. (2006) analyze Daegu Korean as a language without AP ([−multiword AP]) because an unaccented class is missing. Recall also that Jun et al. propose an up-step rule to explain the plateau-type phrasal prosody and the pitch difference between the pitch peak of PWd1 and the pitch peak of PWd2, triggered by "final-accented" (= unaccented in my analysis) PWd1.

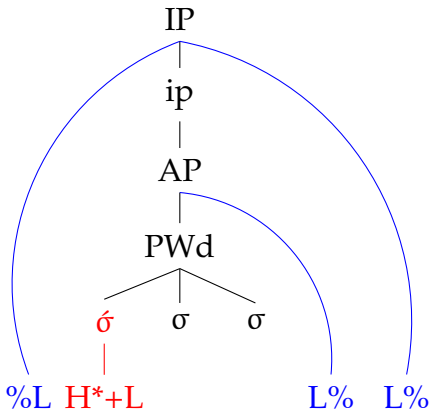
My hypothesis that Daegu Korean is a [+multiword AP] language with AP and an unaccented class can solve the problems with Jun et al.'s (2006) analysis. (3.13) presents my analysis of the Daegu trisyllabic nouns in Table 3.3.

(3.13) *Daegu Korean (my analysis)* (cf. (3.1))

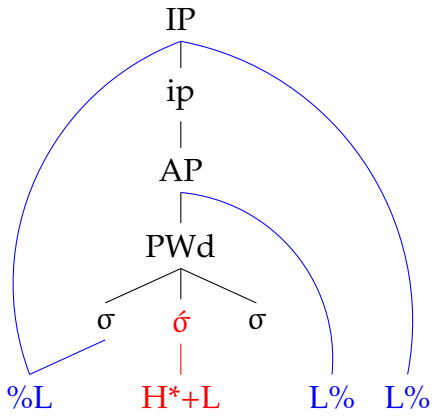
a. *Preaccented (Double)*



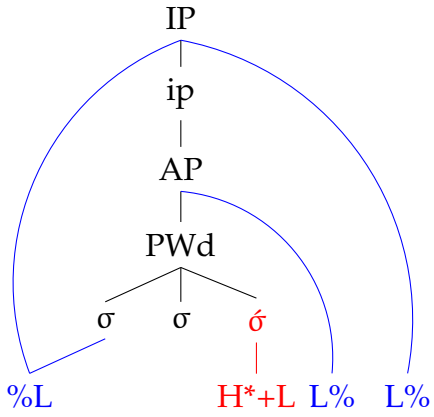
b. *Non-final (Initial)*



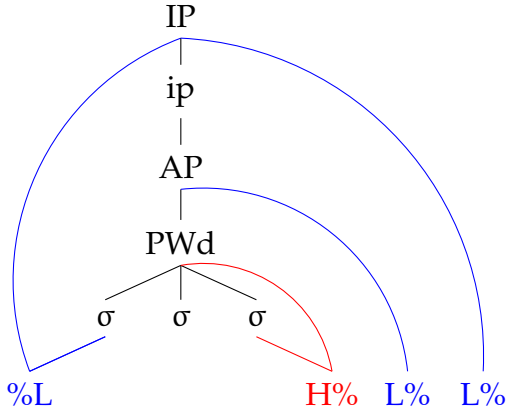
c. *Non-final (Penult)*



d. *Final*



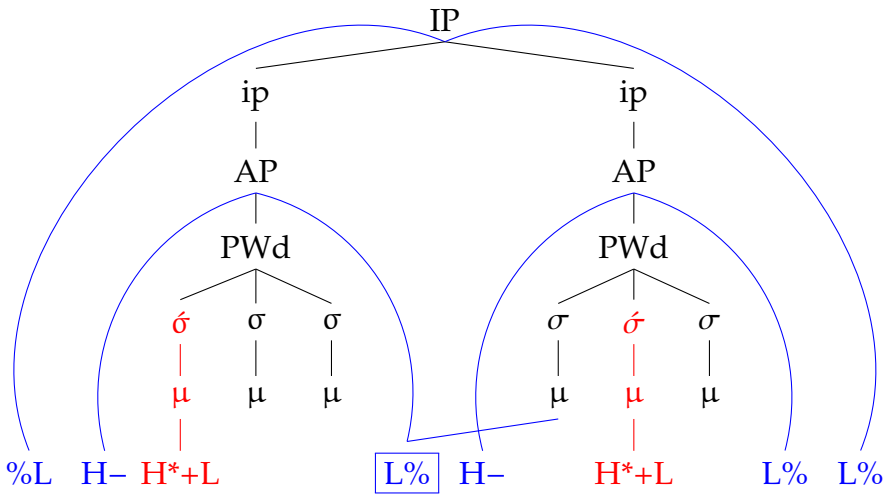
e. *Unaccented*



Roughly speaking, two things are different between my analysis and Jun et al.'s (2006) analysis. First, in order to describe Initial Lowering, Jun et al. posit a PWd-initial %L boundary tone, whereas I posit an L boundary tone at the AP level because the boundary tone must be posited at the level between PWd and ip levels. Following Pierrehumbert and Beckman's (1988) treatment of Initial Lowering in Tokyo Japanese, I posit an AP-*final* L% boundary tone and an IP-initial %L boundary tone, both of which can be secondarily linked to the initial toneless syllable of the following AP. The motivation behind positing two types of L boundary tones by Pierrehumbert and Beckman (1988) is that the boundary L tone between two ips undergoes downstep, as illustrated in (1.24) from Chapter 1. The data in Kenstowicz and Sohn (1997) (e.g. (16b)) suggest that this also applies to Daegu Korean. Second, I posit a PWd-final H% boundary tone in the unaccented class in (3.13e), following Pierrehumbert and Beckman's treatment of unaccented PWds in Osaka Japanese (see Chapter 1). I secondarily link the tone to the PWd-final syllable because the PWd-final syllable in unaccented words always has an H tone in Daegu Korean, unlike in unaccented words in Osaka Japanese (see Chapter 1).[7] My analysis makes a clear distinction between the unaccented class and the true final-accented class.

[7]The PWd-final H% boundary tone of a PWd does not undergo secondary linking in Kobayashi Japanese under Igarashi's (2007b) analysis although the PWd-final syllable always receives an H tone (see (1.37)). Igarashi does not give a clear reason for this treatment.

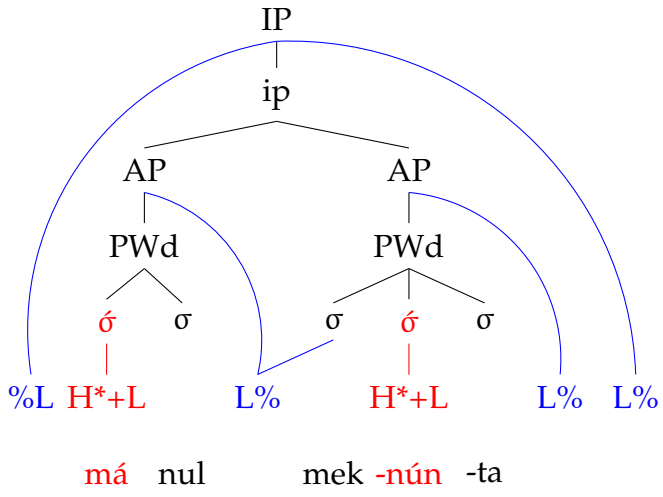
(1.24) *Two types of L boundary tones in Tokyo Japanese*



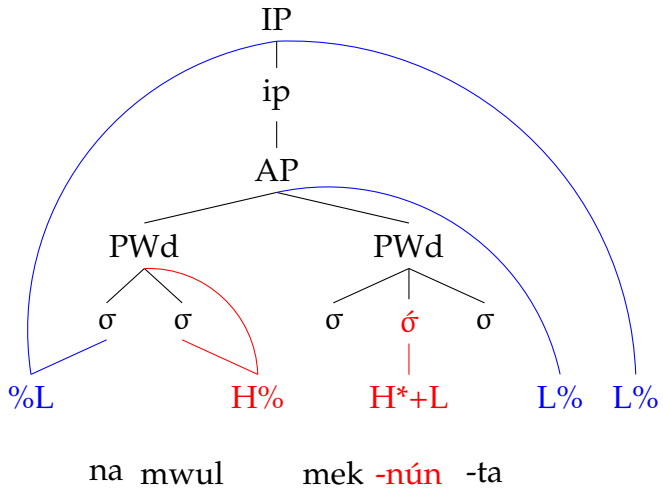
The phrasal prosody of Daegu Korean shows the necessity of AP in the prosodic hierarchy. (3.2) and (3.3) by Jun et al. (2006) are reanalyzed as (3.14) and (3.15), respectively. In (3.14), the second AP undergoes downstep in the ip (see Figure 2.1) because the first AP is accented. In (3.15), the two PWds form one AP because the first PWd is unaccented. An upstep rule is applied to the PWd-initial %L boundary tone and the H* in the second PWd in Jun et al.'s analysis in (3.3) because there is a pitch plateau between the two PWds and the H* in the second PWd is higher than the H* in the first PWd in Figure 2.2. Upstep applies only to the H* tone in the second PWd in (3.15).[8] In my analysis, the domain for upstep seems to be AP because it occurs in environments with unaccented PWds. My analysis in (3.15) does not predict a downstep on the verb because there is no lexical HL sequence between the two PWds.

[8]There is a possibility that an upstep rule is not required because in my analysis, the pitch difference between the two H tones can be accounted for by the different target values of H% and H*. However, I posit the rule because the recordings by one of my Daegu consultants reveal that when the two PWds are both unaccented in possessive constructions, the PWd-final H% tone in the second PWd seems to undergo upstep. I leave this issue for future research.

(3.14) *Accented + Accented → Two APs in Daegu Korean* (cf. (3.2))



(3.15) *Unaccented + Accented → One AP in Daegu Korean* (cf. (3.3))



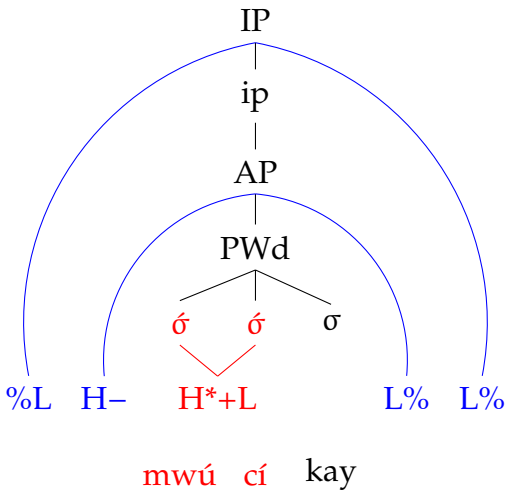
3.3.2 Busan Korean

My analysis of the Busan trisyllabic nouns in Table 3.3 is given in (3.16). I apply Pierrehumbert and Beckman's (1988) analysis of Tokyo Japanese (see Chapter 1) to Busan Korean because Busan Korean shares the same prosodic properties as Tokyo Japanese ([+multiword AP, +phrasal H]; see Table 3.4). The pitch accent melody H*+L is linked to the accented syllable. Following Jun et al.'s (2006) treatment of Daegu Korean in Section 3.2.1, a pitch accent is associated with the first two syllables of a PWd in the preaccented

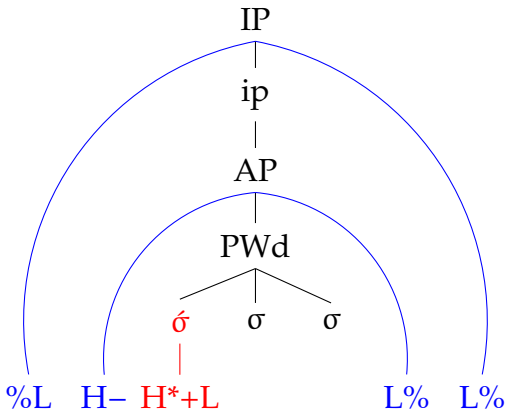
(= double-accented synchronically) class in (3.16a). In (3.16), the IP-initial %L boundary tone and the AP-final L% boundary tone work the same way and mark Initial Lowering of an AP; they can be linked to the first syllable of the following AP when it is toneless (e.g. (3.16c)–(3.16e)). The existence or the absence of the secondary association explains the existence or the absence of the full realization of AP-initial low F0 (Initial Lowering), observed by Kim and Jun (2009). As in Tokyo Japanese and Daegu Korean, two types of L boundary tones (an IP-initial %L boundary tone and an AP-final L% boundary tone) are required to describe Initial Lowering in Busan Korean because Kim and Jun's data (e.g. (28)) show that an L boundary tone between two ips seems to undergo downstep (see the illustration in (1.24) above). The H– in (3.16) is primarily associated with the left edge of each AP and can be secondarily associated with the second syllable of an AP if the AP does not have a pitch accent on the first and second syllables (e.g. (3.16d) and (3.16e)). Finally, an IP-final boundary tone is required to mark sentence type (e.g. L% for declaratives). My analysis has an advantage over Kim and Jun's analysis of Busan Korean because it can describe all the possible pitch accent patterns and has a relation to the intonational phonology of Daegu Korean, proposed in Section 3.3.1.

(3.16) *Busan Korean (my analysis)* (cf. (3.8))

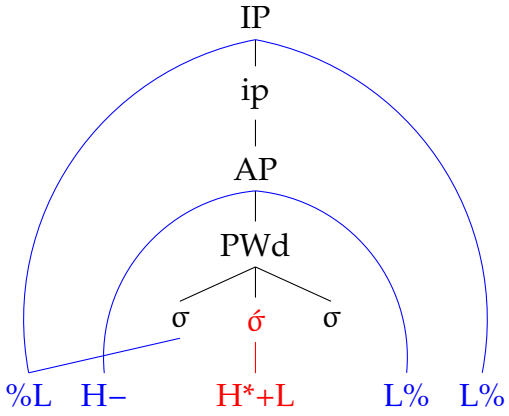
a. *Preaccented (Double)*



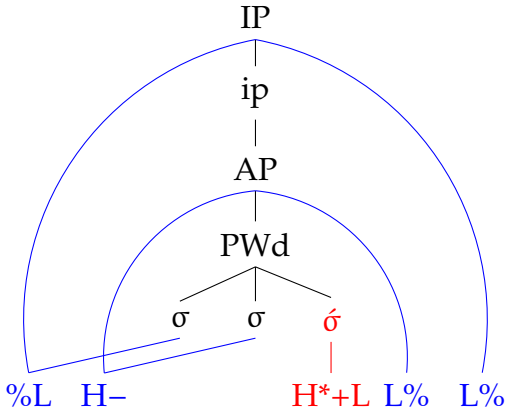
b. *Non-final (Initial)*



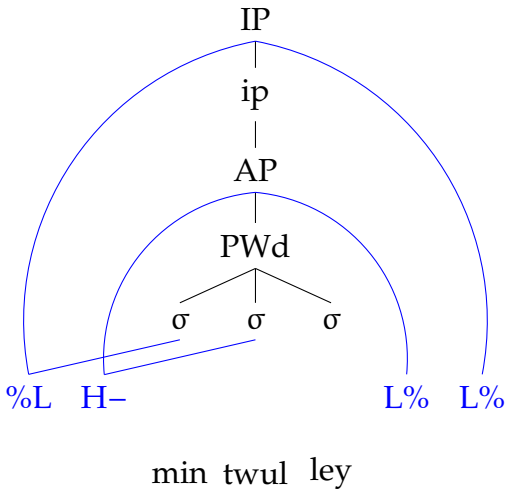
c. *Non-final (Penult)*



d. *Final*

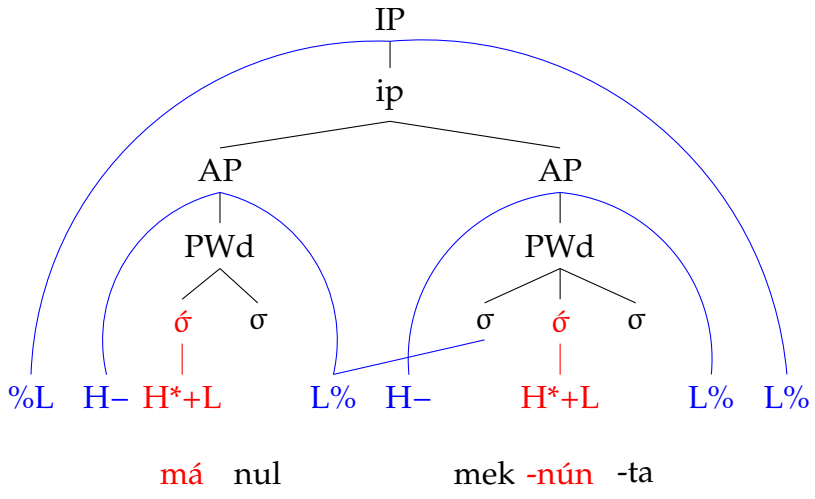


e. *Unaccented*

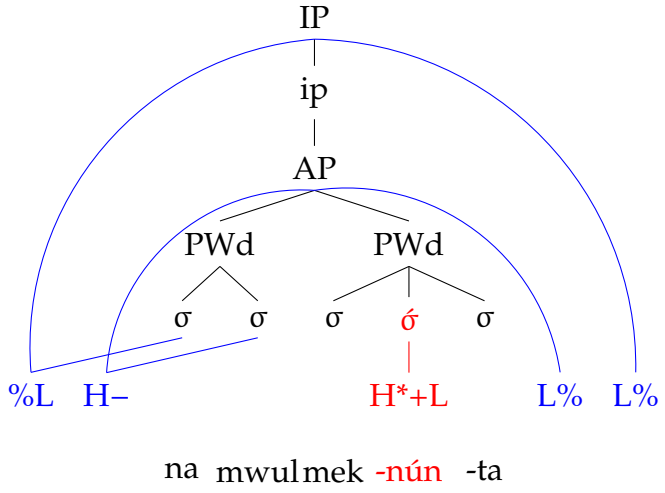


My analysis also correctly describe the phrasal prosody of Busan Korean. The reanalysis of (3.9) and (3.10) by Kim and Jun (2009) is given in (3.17) and (3.18), respectively (see also Figures 2.4 and 2.5, respectively). I pointed out two problems with Kim and Jun's analysis in Section 3.2.2. First, the two PWds should not form one AP in (3.9) because each PWd maintains its pitch peak due to a pitch accent in Figure 2.4. Second, (3.10) does not explain the plateau prosody in Figure 2.5. In (3.17), the two PWds form two separate APs and the first AP causes downstep to the second AP in the ip. In (3.18), the two PWds form one large AP and the H– accounts for the plateau prosody.

(3.17) *Accented + Accented → Two APs in Busan Korean* (cf. (3.9))



(3.18) *Unaccented + Accented → One AP in Busan Korean* (cf. (3.10))

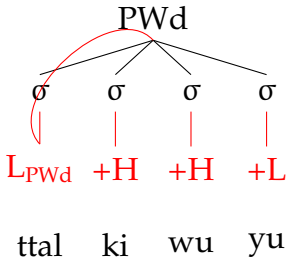


3.4 The rising class in Busan Korean

This section discusses the rising class, which exists only in Busan Korean. In Chapter 2, I claimed that the rising class resides outside the lexical pitch accent system; rather, it has a lexical tone pattern, following Utsugi (2007). The rising class is in a tone system, while the other accent classes are in a system between stress and tone systems if Hyman's (2009) approach to stress and tone languages is adopted (see Chapter 2). Utsugi claims that instead of a lexical pitch accent, the rising class (M(edial)-Double class in his terminology) has the lexical (= PWd-level) edge tone melody L_{PWd}+H+H+L, which is associated with the left edge of a PWd. (3.19) is the prosodic structure of the quadrisyllabic word *ttalkiwuyu* 'strawberry milk', which belongs to the rising class, as analyzed by Utsugi (2007), at the PWd level.[9] Each tone in the lexical edge tone melody is secondarily linked to each of the first four syllables in (3.19). If a PWd does not have four or more syllables, the tones in the melody without a docking site seem to get deleted. Perhaps an L tone and an H tone are associated with the only one syllable in monosyllabic words because they have an R melody (see Kim and Schuh 2006, Hwang 2011a,b, among others),

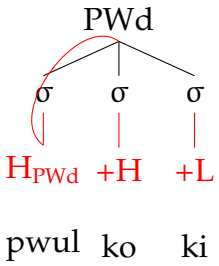
[9] Utsugi (2007) posits L and H tones at the post-lexical level, which correspond to our AP-final/IP-initial L boundary tones and phrasal H– tone.

(3.19) *M-Double class by Utsugi (2007) (= Rising in my analysis)*



In my analysis, the rising class is the only tone-like exception to overall pitch accent system, but Utsugi (2007) claims that the preaccented/double-accented class (I(nitial)-Double class in his terminology) also has a lexical tone pattern with the lexical edge tone H_{PWd}+H+L. (3.20) is Utsugi's analysis of the trisyllabic word *pwulkoki* 'grilled beef' that belongs to the preaccented/double-accented class at the PWd level. As in (3.19), each tone in the lexical edge tone melody is secondarily linked to each of the first third syllables in (3.20). Again, if a PWd does not have three or more syllables, the lexical edge tones without a docking site seem to get deleted.

(3.20) *I-Double class by Utsugi (2007) (= Preaccented/Double-accented in my analysis)*



Recall that PWd-initial boundary tones, which are associated with the left edge of a PWd, are the feature of [−multiword AP] languages because they block a large AP with more than one PWd (see Figure 3.2). PWd-initial edge tones by Utsugi (2007) should function the same way as PWd-initial boundary tones because they are also primarily associated with the left edge of a PWd. I need to show that the rising class blocks large AP formation, while the preaccented/double-accented class does not. (3.21) and (3.22) are OV sentences in Busan Korean. The object is the unaccented PWd *swul* 'alcohol' in both

sentences, but the verb is the rising PWd ^{R}*et-nun-ta*[10] 'get-NPST-DECL' in (3.21) and is the preaccented/double-accented PWd *kúlí-n-ta* 'draw-NPST-DECL' in (3.22). I also present (3.23), where the verb is the accented (non-final) PWd *mek-nún-ta* 'drink-NPST-DECL' for reference. Since the object noun *swul* 'alcohol' is unaccented, it has an ability to form a large AP with the following PWd in OV constructions.

(3.21) *Unaccented + Rising in Busan Korean*

술 얻는다.
pro swul ^{R}et-nun-ta.
alcohol(=ACC) get-NPST-DECL
'*pro* gets alcohol.'

(3.22) *Unaccented + Preaccented/Double-accented in Busan Korean*

술 그린다.
pro swul kúlí-n-ta.
alcohol(=ACC) draw-NPST-DECL
'*pro* draws alcohol.'

(3.23) *Unaccented + Accented in Busan Korean*

술 먹는다.
pro swul mek-nún-ta.
alcohol(=ACC) drink-NPST-DECL
'*pro* drinks alcohol.'

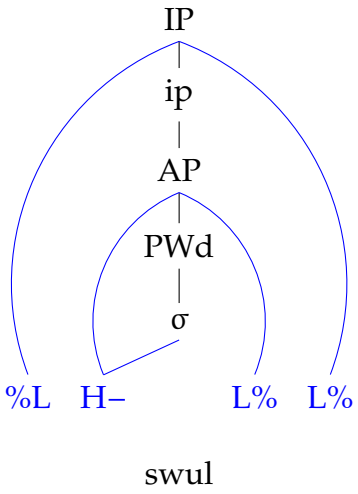
An unaccented monosyllabic PWd such as *swul* 'alcohol' shows different surface melodies depending on how it forms an AP. When it forms an AP by itself, it receives an H tone (see Footnote 3 in Chapter 2), as shown in (3.24).[11] In contrast, when it forms a large AP with the following PWd, it receives an L tone, as the prosodic structure of (3.23)

[10] A superscript ^{R} indicates that the word is from the rising class.

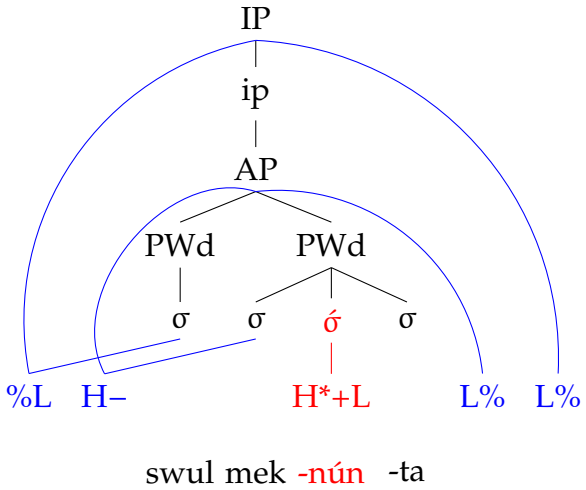
[11] This also applies to unaccented monomoraic PWds in Tokyo Japanese as we saw in Footnote 12 in Chapter 1. I assume that an AP-level H– tone, which is secondarily associated with the second tone bearing unit of the AP in general, is secondarily associated with the first tone bearing unit of the AP in this case.

shows in (3.25). Thus, if my claim that only the rising class is in a lexical tone system is correct, we expect that the object noun *swul* 'alcohol' receives an H tone in (3.21), where the verb belongs to the rising class, while it receives an L tone in (3.22), where the verb belongs to the preaccented/double-accented class.

(3.24) *Unaccented (Monosyllabic)*



(3.25) *Unaccented (Monosyllabic) + Accented* = (3.23)



This prediction is borne out. I recorded a female native speaker of Busan Korean and made pitch tracks using Praat (Boersma 2001). Figure 3.4 is the pitch track of (3.21), while Figure 3.5 is the pitch track of (3.22). The object noun *swul* 'alcohol' receives an H tone in Figure 3.4, while it receives an L tone in Figure 3.5.[12] Of course, I need more data to confirm my analysis, but I will leave it for future research.

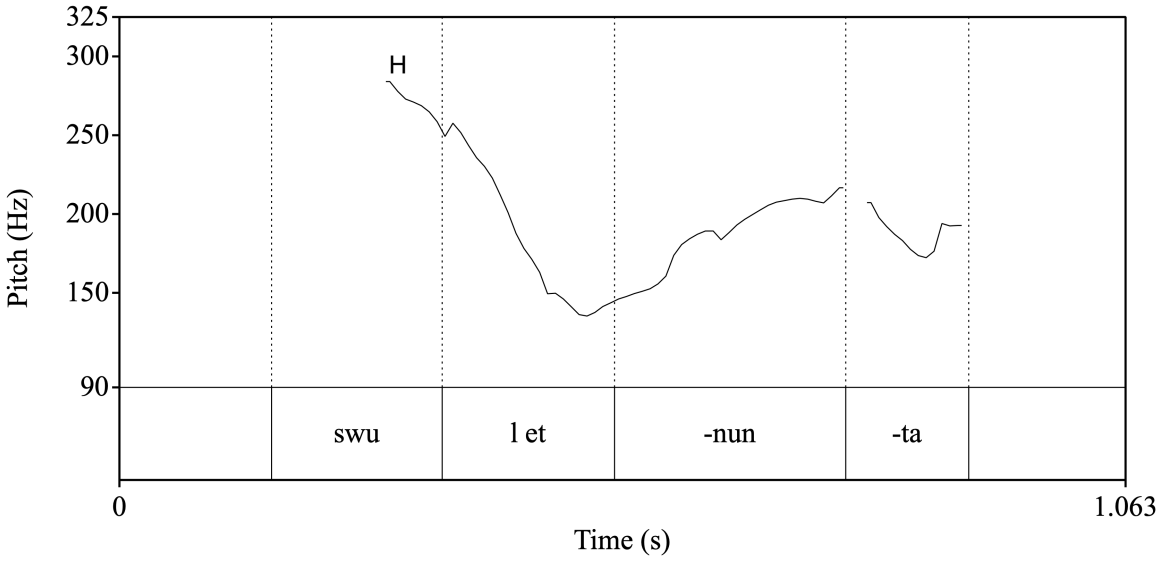


Figure 3.4: A rising class verb blocks large AP formation.

[12]The speaker read the sentences with the subject *Yéngmi=nun* 'Youngmi=TOP', but it is omitted in both figures. In Figure 3.4, *swul* 'alcohol' and *et*^{R}- 'get' are re-syllabified and *t* in *et*^{R}- becomes nasal due to nasal assimilation (see Sohn 1999; Cho and Whitman 2020, among others). In addition, voiceless stops between sonorants become voiced in Korean (see Sohn 1999; Cho and Whitman 2020, among others).

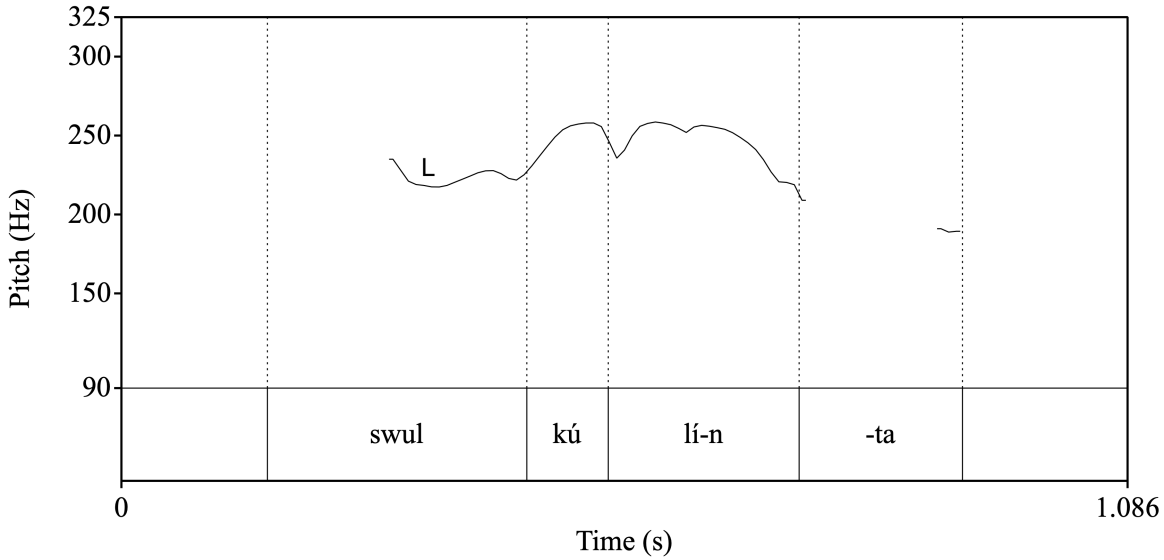


Figure 3.5: A preaccented class verb does not block large AP formation.

3.5 Conclusion

This chapter discusses the intonational phonology of Daegu and Busan Korean, comparing my analysis with the analysis of Daegu Korean by Jun et al. (2006) and the analysis of Busan Korean by Kim and Jun (2009). Jun et al. and Kim and Jun propose different sets of accent classes for Gyeongsang Korean from mine, which made their analyses of Gyeongsang intonational phonology inadequate. I showed that my analysis of the Gyeongsang accent classes in Chapter 2 can correctly account for the intonational phonology of Gyeongsang Korean. In Chapter 4, I discuss the typology of prosodic *wh*-scope marking strategies in Japanese and Korean based on my analysis of the lexical pitch accent systems.

CHAPTER 4

THE TYPOLOGY OF *WH*-SCOPE MARKING STRATEGIES

4.1 Introduction

In the last two chapters, I clarified the accent classes and the prosodic structure of Gyeongsang Korean (Daegu and Busan Korean). Now that we are familiar with the accent classes and the prosodic structure of the languages of my interest in this dissertation (Tokyo Japanese, Osaka Japanese, Fukuoka Japanese, Kobayashi Japanese, Seoul Korean, Daegu Korean, and Busan Korean), let us turn to the central question of how *wh*-prosody is realized in Japanese and Korean and the relationship between *wh*-prosody and prosodic structure. In the literature, a number of possible *wh*-scope marking strategies have been discussed, but the actual mechanisms underlying the relevant prosodic patterns have not been clarified yet. In this chapter, I show that the crucial question is which prosodic level a *wh*-in-situ language uses to mark *wh*-scope.

This chapter is organized as follows. Section 4.2 introduces previous studies on prosodic *wh*-scope marking strategies in Japanese and Korean and points out their problems. In Section 4.3, I make my own proposal that *wh*-prosody is realized at the lowest possible level in the prosodic hierarchy. Section 4.4 reintroduces the two parameters [±lexical tone] and [±multiword AP] (Igarashi 2012, 2014) from Chapter 1 and examines how these parameters relate to which prosodic phrase level is chosen for *wh*-scope marking. Section 4.5 discusses some counterexamples to my proposal and gives some possible explanations for the counterexamples. Section 4.6 is a conclusion.

Before moving on to Section 4.2, I briefly touch on indeterminates (Kuroda 1965) in Japanese and Korean. Japanese and Korean use *wh*-phrases to express *wh*-question words such as *what* in English (*nani* in Japanese and *mwues* in Korean; called ***wh*-interrogatives** in Yun 2019) and indefinite pronouns such as *something* in English (*nanika* in Japanese and *mwues* in Korean; called ***wh*-indefinites** in Yun 2019). How these *wh*-phrases are inter-

preted depends on factors such as associated particles and the context they occur in; thus, Kuroda call them **indeterminates**, including cases in both Japanese and English. Yun (2019) coined the term ***wh*-indeterminates** to discuss cases in Japanese and Korean. Both *wh*-interrogatives and *wh*-indefinites use special prosody within *wh*-domains in Japanese and Korean (see Kuroda 2005/2013; Hwang 2011a,b), but my focus in this chapter is *wh*-interrogatives.

4.2 Previous studies

It has been observed that *wh*-in-situ languages use special prosody to mark *wh*-scope. Two *wh*-scope marking strategies used in lexical pitch accent varieties of Japanese and Korean (e.g. Tokyo Japanese, Fukuoka Japanese, and Busan Korean) have been widely discussed in the literature: pitch compression prosody and H plateau prosody.

Tokyo Japanese uses pitch compression prosody, which is equivalent to focus prosody (Deguchi and Kitagawa 2002; Ishihara 2003, among others). (4.1) and the corresponding pitch track in Figure 4.1 show the pitch compression prosody in Tokyo Japanese; compare the declarative counterpart in (4.2) and the corresponding pitch track in Figure 4.2.[1] In Figure 4.1, the F0 peak of the *wh*-interrogative *náni* 'what' gets boosted due to its semantic importance and this pitch boost compresses the F0 peaks of the words in the *wh*-domain; note that the *wh*-domain of each *wh*-question is highlighted in gray in this chapter. The location of a pitch accent, which gives a pitch fall HL, is indicated by the acute accent symbol ´ in all the examples.

(4.1) Wh-*prosody in Tokyo Japanese*

なおやが何を飲み屋で飲んだの？

Náoya=ga	náni=o	nomíya=de	nón-da-no?
Naoya=NOM	what=ACC	bar=LOC	drink-PST-Q

'What did Naoya drink at the bar?' (Ishihara 2003: (28b))

[1] I got permission to cite the two images from Shinichiro Ishihara.

(4.2) *Non-*wh*-prosody in Tokyo Japanese*

なおやが何かを飲み屋で飲んだ。

Náoya=ga	nánika=o	nomíya=de	nón-da.
Naoya=NOM	something=ACC	bar=LOC	drink-PST

'Naoya drank something at the bar.' (Ishihara 2003: (28a))

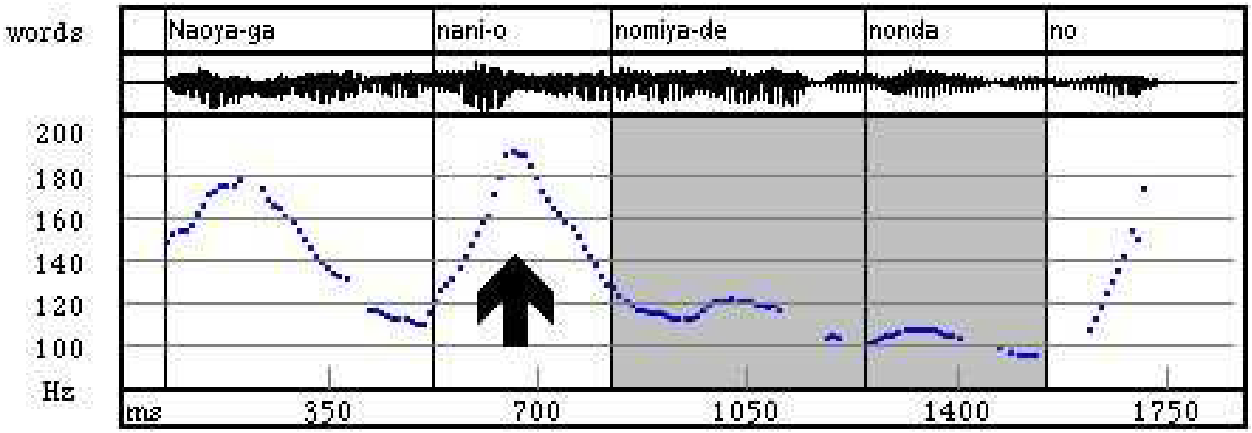


Figure 4.1: *Wh*-prosody in Tokyo Japanese (Ishihara 2003: (28b))

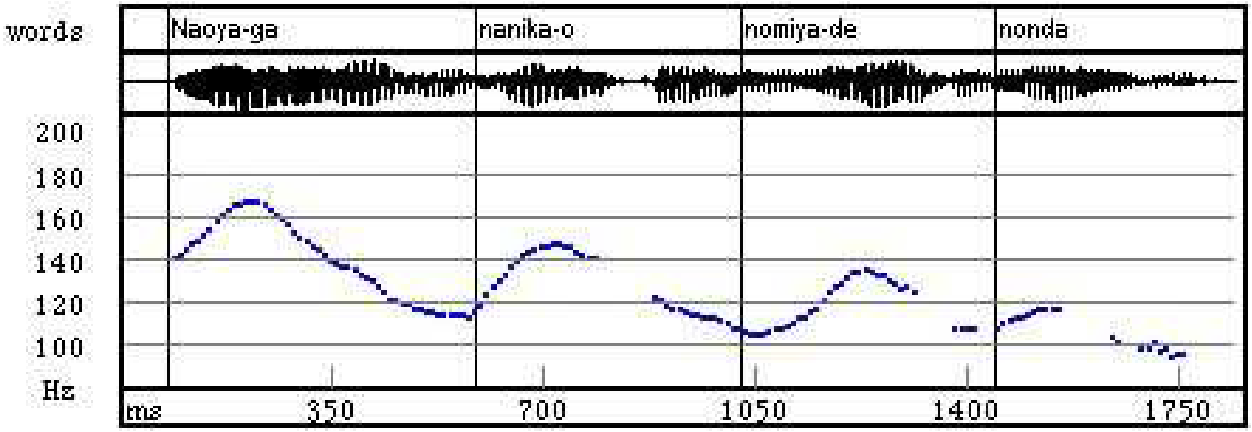


Figure 4.2: Non-*wh*-prosody in Tokyo Japanese (Ishihara 2003: (28a))

In contrast, Fukuoka Japanese uses H plateau prosody (Hayata 1985; Kubo 1989, among others). (4.3) and its corresponding pitch track in Figure 4.3 show an example.[2]

[2]The three figures from Smith (2013) in this chapter (Figures 4.3, 4.4, 4.21) are cited under the permission

(4.4) is the declarative version; see also the corresponding pitch track in Figure 4.4. Kubo (2001) claims that pitch accents that exist in declarative sentences (e.g. (4.4)) are removed in *wh*-domains in Fukuoka Japanese, which is experimentally supported by Smith (2013), and that a flat H contour appears in *wh*-domains.[3] Busan Korean uses H plateau prosody, too (Gim 1970; Kubo 2001; Hwang 2011a,b, among others). Hwang shows that the same accent deletion occurs to *wh*-prosody in Busan Korean with an experiment. There is no correlation between *wh*-prosody and focus prosody in the case of H plateau prosody because focus prosody in Fukuoka Japanese and Busan Korean is Tokyo-like pitch compression prosody and is not accompanied by pitch accent deletion (see Igarashi 2007a for Fukuoka Japanese and Kim and Jun 2009 for Busan Korean; see also Section 4.5.1).

(4.3) Wh-*prosody in Fukuoka Japanese*

誰が土曜日青虫にやられたと？

Dare=ga doyoobi aomusi=ni yar-are-ta-to?

who=NOM Saturday caterpillar=by affect-PASS-PST-SFP(-Q)

'Who was affected by caterpillars on Saturday?' (Smith 2013: (2))

(4.4) *Non*-wh-*prosody in Fukuoka Japanese*

今西が土曜日青虫にやられたと。

Imanísi=ga doyóobi aomúsi=ni yar-are-ta-to.

Imanishi-NOM Saturday caterpillar-by affect-PASS-PST-SFP

'Imanishi was affected by caterpillars on Saturday.' (Smith 2013: (1))

of Elsevier (https://www.elsevier.com/).

[3]The pitch plateau in Figure 4.3 might not be high enough to be H plateau prosody, but Hayata (1985) and Kubo (1989, 2001) consider it H flat prosody. Hayata observes that the F0 difference between H and L tones is smaller in Fukuoka Japanese than in Tokyo Japanese.

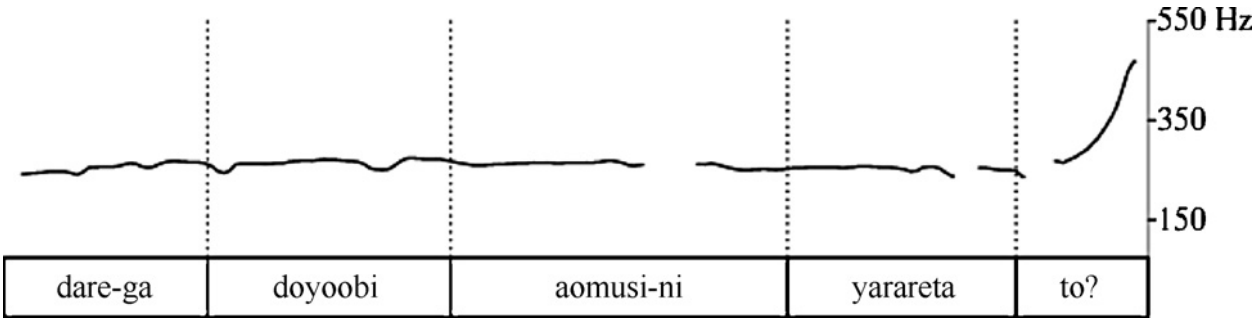


Figure 4.3: *Wh*-prosody in Fukuoka Japanese (Smith 2013: (2))

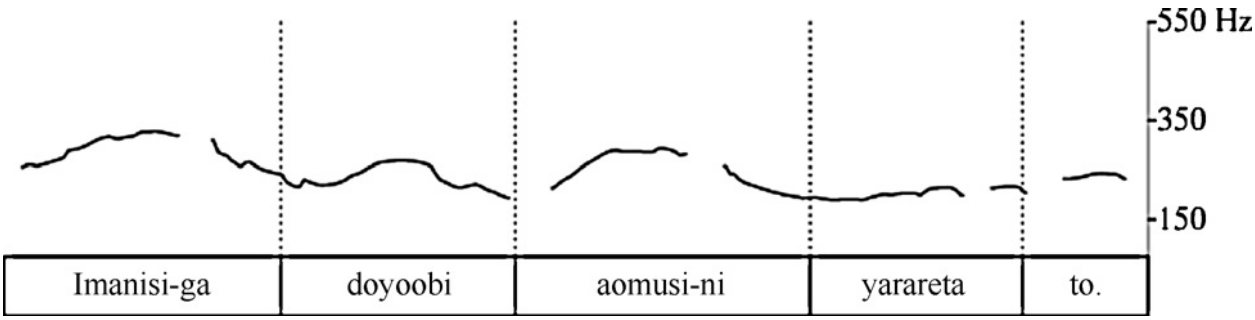


Figure 4.4: Non-*wh*-prosody in Fukuoka Japanese (Smith 2013: (1))

It may first appear that which *wh*-scope marking strategy is used is language-specific, but more careful examination shows that this is not correct. Kuroda (2005/2013) and Hwang (2011a,b) take into consideration the prosodic properties of *wh*-indeterminates and argue that accented *wh*-indeterminates with a lexical pitch fall (HL) trigger pitch compression prosody, while unaccented *wh*-indeterminates without a lexical pitch fall trigger H plateau prosody. And indeed, *wh*-interrogatives in Tokyo Japanese are accented as in (4.5), while *wh*-interrogatives in Fukuoka Japanese are unaccented as in (4.6).[4]

(4.5) Wh-*interrogatives in Tokyo Japanese*

dáre 'who' (誰 HL), náni 'what' (何 HL)

ítu 'when' (いつ HL), dóko 'where' (どこ HL) (Kuroda 2005/2013: Table 1)

[4]Hayata (1985) and Kubo (1989) observe that *wh*-interrogatives in Fukuoka Japanese are accented in isolation (e.g. *dáre* 'who'), but that they become unaccented in sentences.

(4.6) Wh-*interrogatives in Fukuoka Japanese*

dare 'who' (誰 LH), nani 'what' (何 LH)

itu 'when' (いつ LH), doko 'where' (どこ LH) (Kubo 1989: (14))

The hypothesis by Kuroda (2005/2013) and Hwang (2011a,b) is an important first step, but it cannot explain all of the facts, beginning with *wh*-prosody in Osaka Japanese, which will be discussed in Section 4.4.3. Besides, Kuroda and Hwang do not consider varieties of Japanese and Korean without a lexical pitch accent system such as Seoul Korean (see Section 4.4.4) and Kobayashi Japanese (see Section 4.4.5).

Richards (2010, 2016) attempts to explain *wh*-question formation cross-linguistically in terms of prosody. His proposal in Richards (2016) is that languages place a *wh*-phrase and its associated complementizer in the same prosodic phrase (= Phonological Phrase, following Match Theory as formulated by Selkirk 2011).[5] Languages that can manipulate their prosodic structure to accomplish this such as Japanese (and Korean) allow *wh*-in-situ, while languages that cannot do this such as English must resort to *wh*-movement so that the *wh*-phrase and the complementizer are in the same Phonological Phrase.[6] This approach covers all *wh*-in-situ languages such as accentless varieties of Japanese and Korean, but does not explain the phonetic effects within *wh*-domains in *wh*-in-situ languages.[7]

In this section, I have pointed out two problems in the previous literature. First, the proposal that refers to the accentedness or the unaccentedness of *wh*-indeterminates (Kuroda 2005/2013; Hwang 2011a,b) is not enough to describe the whole picture. Second, Richards (2010, 2016) refers to the prosodic structure of a *wh*-question, but does not discuss choice of specific *wh*-prosody. The goal of this chapter is to make a proposal to ex-

[5]Match Theory by Selkirk (2011) allows recursion. The lower Phonological Phrase corresponds to AP, while the upper Phonological Phrase corresponds to ip in our model (see Ito and Mester 2013).

[6]See Richards (2010, 2016) for why Japanese allows *wh*-in-situ, while English does not allow *wh*-in-situ.

[7]In fact, Richards (2010) mentions that "what kind of effect these *wh*-domains have on pitch is not part of the theory: *wh*-domains might involve pitch compression, a high tone, or (in principle) no prosodic effects at all" (p. 148).

plain how *wh*-prosody is realized in Japanese and Korean in detail, including both lexical pitch accent and accentless varieties.

4.3 Proposal

In this chapter, I argue that *wh*-in-situ languages realize *wh*-prosody at the lowest possible prosodic phrase level in the prosodic hierarchy as in (4.7). I assume the prosodic hierarchy in Figure 1.7 from Chapter 1, repeated below. The basic choice for marking the domain of *wh*-scope is between Accentual Phrase (AP) or Intermediate Phrase (ip) in this hierarchy, because they exist between the word level (Prosodic Word; PWd) and the utterance level (Intonation Phrase; IP). The PWd level is presumably too small to mark a domain which must extends over propositions, while IP is presumably too large. Roughly speaking, one AP has at most one pitch accent (Pierrehumbert and Beckman 1988), while focus is realized in an ip in Japanese and Korean (Pierrehumbert and Beckman 1988 for Tokyo and Osaka Japanese; Jun 2006 for Seoul Korean; Jun et al. 2006 for Daegu Korean; Kim and Jun 2009 for Busan Korean). See Chapter 1 for more details about this prosodic hierarchy. In the next section, I show that in general, the AP level is chosen for *wh*-scope marking, but that if prosodic phrase formation cannot be achieved at the AP level, the second lowest level (= ip) is used.

(4.7) *The typology of prosodic* wh*-scope marking strategies (to be revised)*

Wh-prosody in *wh*-in-situ languages (e.g. Japanese and Korean) is realized at the lowest possible prosodic phrase level in the prosodic hierarchy.

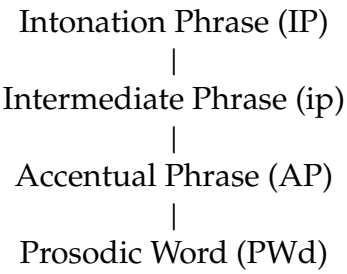


Figure 1.7: Prosodic hierarchy of Japanese Korean (based on Pierrehumbert and Beckman 1988 and Jun 2006)

My hypothesis gives us an approach to solve the two shortcomings in the previous studies reviewed in the previous section. First, this approach can cover both lexical pitch accent and accentless varieties of Japanese and Korean. Second, this hypothesis can explain different phonetic effects used by different *wh*-in-situ languages; the differences are just due to different post-lexical melodies at the AP level or different focus melodies at the ip level.

4.4 Case studies

The two parameters [±lexical tone] and [±multiword AP] (Igarashi 2012, 2014) come into play when considering which prosodic phrase level is used for *wh*-scope marking. In Igarashi (2012, 2014), the two parameters are defined as follows. [+lexical tone] languages are languages with lexical tones (e.g. lexical pitch accent languages), while [−lexical tone] languages are languages without lexical tones (e.g. accentless languages). [+multiword AP] languages are languages that allow an AP to have more than one PWd, while [−multiword AP] languages are languages that do not allow large AP formation. The seven varieties of Japanese and Korean are classified as in Table 3.2, as I claimed in Chapter 3.

Varieties	[±lexical tone]	[±multiword AP]
Tokyo, Fukuoka	+	+
Osaka	+	−
Seoul	−	+
Kobayashi	−	−
Gyeongsang (Daegu, Busan)	+	+

Table 3.2: Classification of Japanese and Korean by [±lexical tone] and [±multiword AP]

This section examines each combination of the two parameters. I start with Tokyo and Fukuoka Japanese ([+lexical tone, +multiword AP]) in Section 4.4.1 because these languages are the most studied languages with respect to this topic. Then, I show that Gyeongsang Korean (Daegu and Busan Korean) is identical to Tokyo and Fukuoka Japanese in terms of *wh*-prosody in Section 4.4.2 because both Daegu and Busan Korean are [+lexical tone, +multiword AP]. Next, I compare [+lexical tone, +multiword AP] languages with [+lexical tone, −multiword AP] languages, looking at Osaka Japanese in Section 4.4.3. I show that the hypothesis by Kuroda (2005/2013) and Hwang (2011a,b) does not work for Osaka Japanese. Sections 4.4.4 and 4.4.5 cover [−lexical tone] languages: Seoul Korean ([+multiword AP]) in Section 4.4.4 and Kobayashi Japanese ([−multiword AP]) in Section 4.4.5. I show that my hypothesis also works for accentless languages. Finally, I examine one language from outside Japanese and Korean in Section 4.4.6. Dhaka Bengali, which seems to be [−lexical tone, +multiword AP] (see Khan 2014), behaves the same way as Seoul Korean ([−lexical tone, +multiword AP]).

We will see that the parameter [±multiword AP] is another crucial factor regarding whether AP or ip is chosen to mark *wh*-scope as in (4.8). [+multiword AP] languages can use both AP and ip and AP is preferred. In contrast, [−multiword AP] languages use only ip because it means that ip is the smallest prosodic unit for marking *wh*-scope domains.

(4.8) *Which prosodic phrase level is used?*

a. [+multiword AP] languages → AP (or ip)

b. [−multiword AP] languages → ip

4.4.1 Tokyo and Fukuoka Japanese ([+lexical tone, +multiword AP])

Tokyo Japanese and Fukuoka Japanese have the same prosodic properties ([+lexical tone, +multiword AP]); both of them are lexical pitch accent languages and allow large AP formation (Igarashi 2012, 2014). Let us review what we saw in Section 4.2. Tokyo Japanese uses pitch compression prosody (see Figure 4.1), whereas Fukuoka Japanese uses H plateau prosody (see Figure 4.3) for *wh*-scope marking. Kuroda (2005/2013) and Hwang (2011a,b) hypothesize that accentedness or unaccentedness of a *wh*-indeterminate determines which *wh*-scope marking strategy is chosen: accented *wh*-indeterminates are responsible for pitch compression prosody, while unaccented *wh*-indeterminates are responsible for H plateau prosody. *Wh*-interrogatives in Tokyo Japanese are accented (see (4.5)), while *wh*-interrogatives in Fukuoka Japanese are unaccented (see (4.6)).

Then, which prosodic phrase level do pitch compression prosody and H plateau prosody select? I claim that pitch compression prosody in Tokyo Japanese uses ip; this prosody is the same as focus prosody in Tokyo Japanese (Deguchi and Kitagawa 2002; Ishihara 2003) and the prosodic domain for focus in Tokyo Japanese is claimed to be ip by Pierrehumbert and Beckman (1988).[8] The domain cannot be AP because *wh*-domains in Tokyo Japanese, as we saw in example (4.1), may contain more than one pitch accent; recall that one AP cannot have more than one pitch accent (Pierrehumbert and Beckman 1988). I follow Smith (2011), in holding that H plateau prosody in Fukuoka Japanese as in example (4.3) is an extended AP resulting from accent deletion.[9] More precisely, this

[8] Ishihara (2003) claims that focus does not insert a prosodic boundary, but I follow Pierrehumbert and Beckman's (1988) claim.

[9] Smith (2011) uses the term *Minor Phrase*, which corresponds to our AP.

is an unaccented AP, containing no pitch accent following lexical accent deletion.[10] The prosodic structure of (4.1) in Tokyo Japanese and that of (4.3) in Fukuoka Japanese are schematized with brackets in (4.9) and (4.10), respectively. I will discuss the prosodic structures of these two *wh*-prosodies in detail in the next subsection on Gyeongsang Korean.

(4.9) *Pitch compression prosody in Tokyo Japanese* = (4.1)

{$_{\text{ip}}$ ($_{\text{AP}}$ Náoya=ga)} {$_{\text{ip}}$ ($_{\text{AP}}$ náni=o) ($_{\text{AP}}$ nomíya=de) ($_{\text{AP}}$ nón-da-no)}?

'What did Naoya drink at the bar?'

(4.10) *H plateau prosody in Fukuoka Japanese* = (4.3)

($_{\text{AP}}$ Dare=ga doyoobi aomusi=ni yar-are-ta-to-∅)?

'Who was affected by caterpillars on Saturday?'

In [+multiword AP] languages, an accented PWd cannot form an AP with the following PWd (see (4.11a)), but an unaccented PWd can form an AP with the following PWd (see (4.11b)), as proven by Kubozono's (1993) experiment. This difference accounts for why ip is the lowest possible prosodic phrase level for accented *wh*-indeterminates, while AP is the lowest possible prosodic phrase level for unaccented *wh*-indeterminates.

(4.11) *AP formation in [+multiword AP] languages* (see also Ito and Mester 2013: (13))

a. *PWd1 = Accented*

($_{\text{AP}}$ Accented) ($_{\text{AP}}$ Accented) or ($_{\text{AP}}$ Accented) ($_{\text{AP}}$ Unaccented)

b. *PWd1 = Unaccented*

($_{\text{AP}}$ Unaccented Accented) or ($_{\text{AP}}$ Unaccented Unaccented)

One might wonder why H plateau prosody is accompanied by pitch accent deletion because it never occurs in large AP formation in OV sentences in [+lexical tone,

[10] A *wh*-domain in Fukuoka Japanese can have only one pitch accent depending on the situation; for instance, the Q-particle *-ka* assigns a pitch accent on the previous syllable (see Kubo 1989).

+multiword AP] languages (see Chapter 1 for Tokyo Japanese and Chapters 2 and 3 for Gyeongsang Korean). There is a plausible learning or diachronic scenario for the emergence of H plateau prosody with pitch accent deletion.[11] In a [+multiword AP] language with unaccented *wh*-indeterminates, speakers happen to form APs with multiple PWds in short *wh*-questions for the reason that I mentioned above; subsequently, as this prosodic pattern becomes associated with *wh*-scope marking, speakers develop an operation for using it in unbounded *wh*-domains, namely pitch accent deletion.

4.4.2 Gyeongsang Korean ([+lexical tone, +multiword AP])

I argued that Gyeongsang Korean (Daegu and Busan Korean) are [+lexical tone, +multiword AP] in Chapter 3, which means that Daegu Korean and Busan Korean have the same prosodic properties as Tokyo Japanese and Fukuoka Japanese. Thus, if the same thing as Tokyo and Fukuoka Japanese applies to Gyeongsang Korean, we predict that accented *wh*-indeterminates should trigger pitch compression prosody at the ip level, while unaccented *wh*-indeterminates should trigger H plateau prosody at the AP level because [+multiword AP] languages allow an unaccented PWd to form a large AP with the following PWd.

I start with Busan Korean because of the wide availability of previous studies. As briefly touched on in Section 4.2, Busan Korean uses H plateau prosody (Gim 1970; Kubo 2001; Hwang 2011a,b, among others), which deletes all the pitch accents within *wh*-domains (Hwang 2011a,b). The *wh*-question in (4.12) and the corresponding pitch track in Figure 4.5 show that the pitch accents in the non-*wh*-question in (4.13) and the corresponding pitch track in Figure 4.6 all disappear in the H plateau prosody.[12] In the figures, lexical tones are in red, while post-lexical tones are in blue based on my proposal in Chapter 3; an IP-final boundary tone does not exist in interrogative sentences in Busan

[11] I would like to thank John Whitman for the discussion here.

[12] I asked a female speaker of Busan Korean to record (4.12), (4.13), and (4.17). I used Praat (Boersma 2001) to make pitch tracks.

Korean (Hwang 2011a,b). It seems that in the H plateau prosody in (4.12), the original pitch accent on the first syllable of the verb *mánna-* 'meet' gets deleted (cf. (4.13)), but that the verb receives a new pitch accent on the second syllable (i.e. *manná-*) probably due to the preaccented (see Chapter 2) Q-particle *-´no*. H plateau prosody in Busan Korean should be realized at the AP level because the prosody contains at most one pitch accent after pitch accent deletion.[13]

(4.12) *H plateau prosody in Busan Korean*

여름에 누가 언니를 만났노?
Yélum=ey nwu=ka enni=lul manná-ss-no?
summer=in who=NOM sister=ACC meet-PST-$Q_{[+wh]}$
'Who met (her) sister in summer?'

(4.13) *Non-*wh*-prosody in Busan Korean*

여름에 영미가 언니를 만났나?
Yélum=ey Yéngmi=ka énni=lul mánna-ss-na?
summer=in Youngmi=NOM sister=ACC meet-PST-$Q_{[-wh]}$
'Did Youngmi meet (her) sister in summer?'

[13] Kubo (2001) and Hwang (2011a,b) claim that H plateau prosody in Busan Korean is realized in a phonological phrase. Hwang's phonological phrase seems to involve our AP and ip.

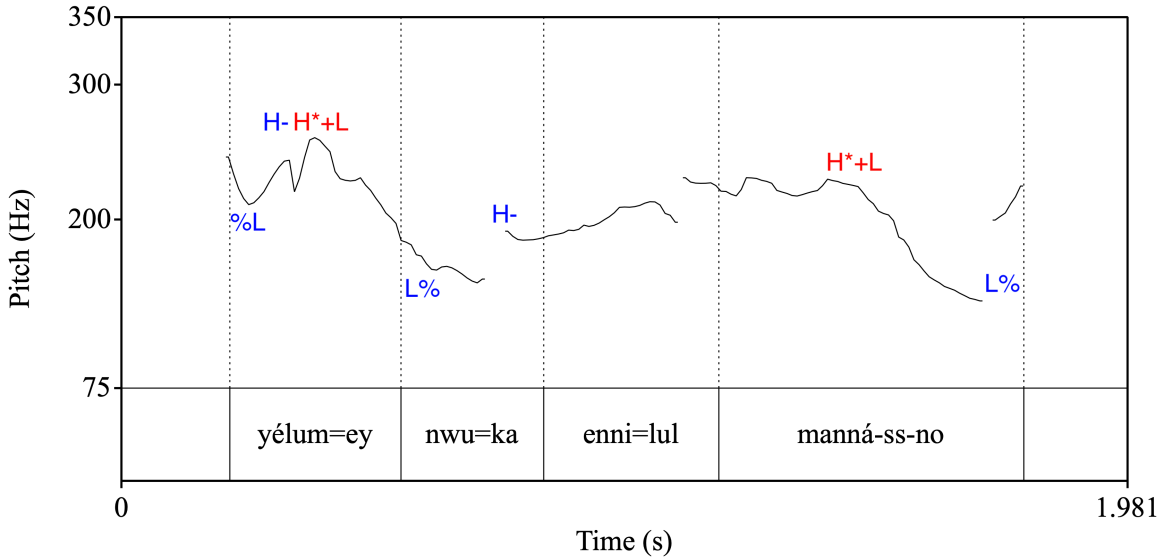


Figure 4.5: H plateau prosody in Busan Korean

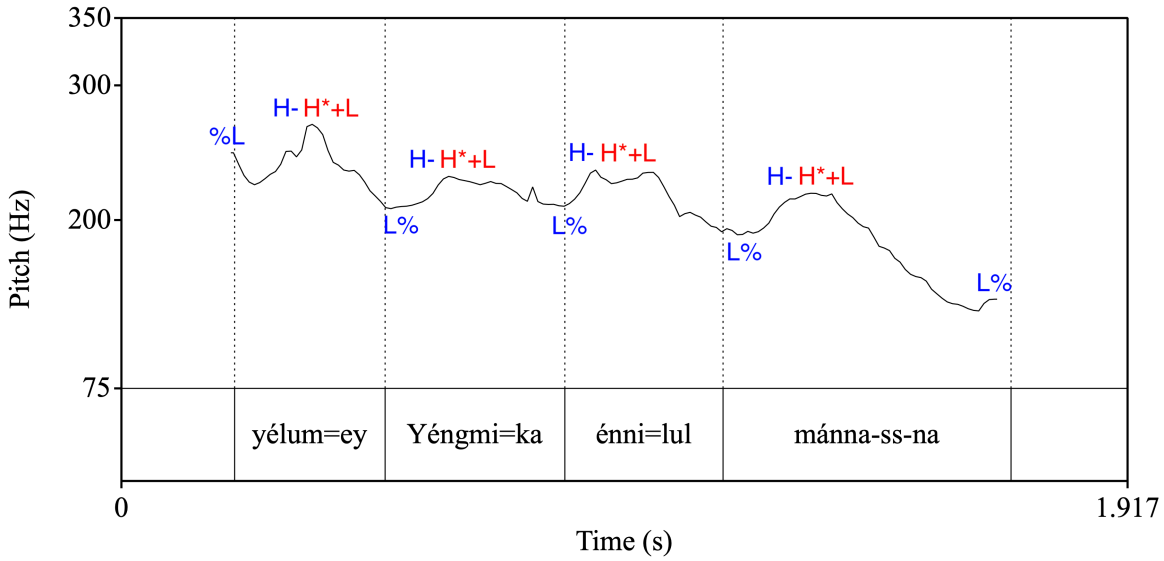


Figure 4.6: Non-*wh*-prosody in Busan Korean

Wh-interrogatives in Busan Korean are in (4.14); they all have an LH melody. There

are two possibilities as to which accent class these *wh*-interrogatives belong to; as we saw in Chapter 2, disyllabic words with an LH melody in isolation in Busan Korean belong either to an unaccented class without a pitch accent (LHHH...) or to a rising class, which has the fixed melody LHHL. These two classes show different melodies when words have four or more syllables. Consultation with a native speaker reveals that *wh*-interrogatives with an enclitic particle all show an LHHH... melody as in (4.15), which means that they belong to an unaccented class.[14] This explains why H plateau prosody is used in Busan Korean.

(4.14) Wh-*interrogatives in Busan Korean*

nwukwu 'who' (누구 LH), mwues 'what' (무엇 LH)

encey 'when' (언제 LH), eti 'where' (어디 LH) (Hwang 2011a: (1.14))

(4.15) Wh-*interrogatives with an enclitic particle in Busan Korean*

nwukwu=hantheyse 'who=from' (누구한테서 LH=HHH)

mwues=pwuthe 'what=from' (무엇부터 LH=HH)

encey=pwuthe 'when=from' (언제부터LH=HH)

eti=eyse 'where=at' (어디에서 LH=HH)

The prosodic structure of (4.12) with brackets is given in (4.16). In Chapters 2 and 3, I proposed that Busan Korean is identical to Tokyo and Fukuoka Japanese in that they all have a phrasal H− tone at the AP level ([+phrasal H]). This H− tone appears on the surface when the first and second tone bearing units in an AP are empty (e.g. unaccented APs). Hence, I claim that H-plateau prosody in Fukuoka Japanese and Busan Korean has

[14]Monosyllabic *wh*-interrogatives seem to have an R melody in Busan Korean (Hwang 2011a: (1.14); Hwang 2011b: (3)). As we saw in Chapter 2, monosyllabic words from the unaccented class have an H melody, while monosyllabic words from the rising class have an R melody. If *wh*-interrogatives are all unaccented, it is not clear why monosyllabic *wh*-interrogatives have an R melody. *Mwues* 'what' has the contracted form *mwe* with an R melody, according to my consultant; one possible hypothesis is that the R tone is the result of lexicalization of the pre-contraction LH contour (John Whitman p.c.).

the tones represented in Figure 4.5 and that a phrasal H– tone is responsible for the pitch plateau.[15]

(4.16) *H plateau prosody in Busan Korean* = (4.12)

(AP Yélum=ey) (AP nwu=ka enni=lul manná-ss-no)?

'Who met (her) sister in summer?'

Hwang (2011a,b) observes that some of the *wh*-interrogatives such as *nwukwu* 'who' allow an alternative melody HHL... in the same situation in Busan Korean. Hwang reports that *wh*-interrogatives with this melody trigger pitch compression prosody, which is shown in (4.17) and its corresponding pitch track in Figure 4.7; again, lexical tones are in red, while post-lexical tones are in blue. Under my analysis in Chapter 2, words with an HHL... melody belong to the preaccented/double-accented class, which accounts for why pitch compression prosody appears in this case. I claim that pitch compression prosody in Busan Korean is realized at the ip level because the pitch accents in the domain are all retained in (4.17), which is supported by Hwang's (2011a; 2011b) experiment, and pitch compression prosody is focus prosody, whose domain is ip (Kim and Jun 2009).[16] The prosodic structure of (4.17) with brackets is shown in (4.18).

(4.17) *Pitch compression prosody in Busan Korean*

영미가 언제 언니를 만났노?

Yélum=ey nwú=ká énni=lul mánna-ss-no?

summer=in who=NOM sister=ACC meet-PST-$Q_{[+wh]}$

'Who met (her) sister in summer?'

[15] See also Smith (2011) for the same analysis of Fukuoka H plateau prosody.

[16] Hwang (2011a,b) claims that pitch compression prosody in Busan Korean is also realized in a phonological phrase.

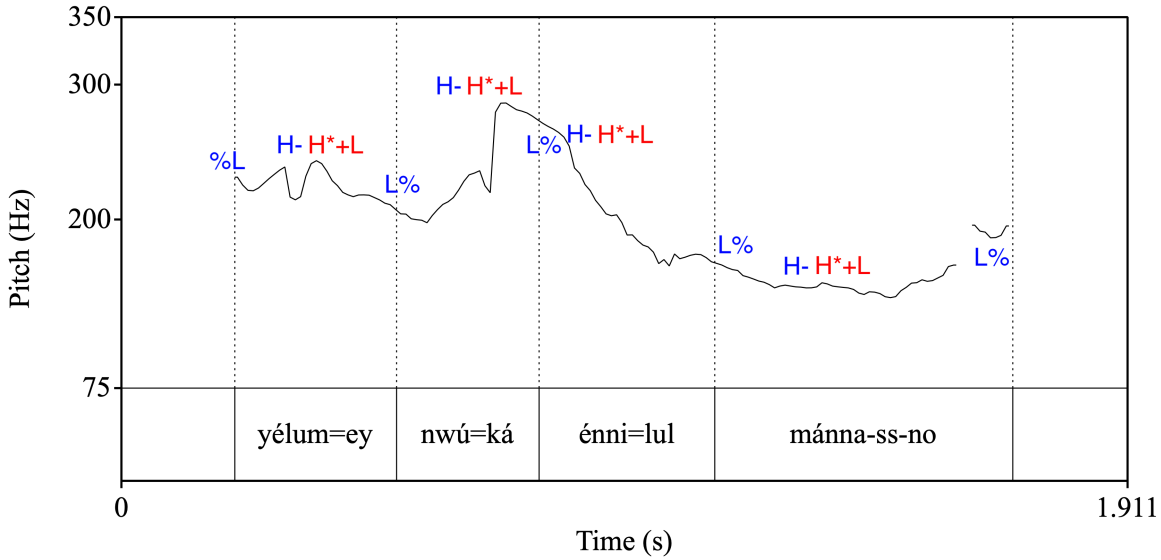


Figure 4.7: Pitch compression prosody in Busan Korean

(4.18) *Pitch compression prosody in Busan Korean* = (4.17)

{ip (AP Yélum=ey)} {ip (AP nwú=ká) (AP énni=lul) (AP mánna-ss-no)}?

'Who met (her) sister in summer?'

Let us move on to Daegu Korean. Sohn's (2004) data in (4.19) indicate that *wh*-interrogatives in Daegu Korean belong either to the preaccented/double-accented class (HHL...) or the unaccented class (L...H) in Chapter 2.[17]

(4.19) Wh-*interrogatives in Daegu Korean*

a. *Preaccented/Double-accented*

nwúkwú 'who' (누구 HH), éncéy 'when' (언제 HH)

nwúkwú=lul 'who=ACC' (누구를 HH=L)

[17]Monosyllabic enclitic particles in Gyeongsang Korean are all preaccented (Ramsey 1978), but unaccented *wh*-interrogatives with a monosyllabic enclitic particle are still unaccented (e.g. *mwues=ul* 'what=ACC'). I assume that this is because these expressions are lexicalized due to their high frequency; this also applies to Busan Korean.

b. *Unaccented*

mwues 'what' (무엇 LH), eti 'where' (어디 LH)

mwues=ul 'what=ACC' (무 엇 을 LL=H), eti=eyse 'where=at' (어 디 에 서 LL=LH) (Sohn 2004: (11); the accent classes are reanalyzed by the author)

As predicted, preaccented/double-accented *wh*-interrogatives cause pitch compression prosody, while unaccented *wh*-interrogatives cause H plateau prosody in Daegu Korean, as is shown in the pitch tracks below: a *wh*-question with a preaccented *wh*-interrogative ((4.20) and Figure 4.8), a *wh*-question with an unaccented *wh*-interrogative ((4.21) and Figure 4.9), and a non-*wh*-question for reference ((4.22) and Figure 4.10).[18] As in the Busan figures, lexical tones are in red, while post-lexical tones are in blue under my analysis in Chapter 3; I assume that Hwang's (2011a; 2011b) observation that there is no IP-final boundary tone for interrogative sentences in Busan Korean also applies to Daegu Korean. In Figure 4.8, the pitch track of (4.20), the preaccented/double-accented *wh*-interrogative *éncéy* 'when' triggers pitch compression on the words in the *wh* domain. In Figure 4.9, the pitch track of (4.21), the unaccented *wh*-interrogative *eti=se* 'where=at' deletes all the pitch accents in the domain, presumably assigning the preaccent of the Q-marker *-´no* to the preceding syllable.[19] I claim that as in the other three languages with [+lexical tone, +multiword AP], the domain for pitch compression prosody is ip, while the domain for H plateau prosody is AP in Daegu Korean due to the number of pitch accents; the pitch accent on each PWd is retained in the pitch compression prosody in Figure 4.8, while there is only one pitch accent in the H plateau prosody in Figure 4.9. The domain for focus is claimed to be ip in Daegu Korean by Jun et al. (2006).

[18] I recorded a male native speaker of Daegu Korean and used Praat (Boersma 2001) to make the three pitch tracks. The two *wh*-prosodies are confirmed by another Daegu Korean speaker.

[19] The pitch accent on *mánna-* 'meet' is very high in F0. One possibility is that it undergoes upstep, triggered by the unaccented *wh*-interrogative (see Chapter 3).

(4.20) *Pitch compression prosody in Daegu Korean*

영미가 언제 언니를 만났노?
Yéngmi=ka éncéy énni=lul mánna-ss-no?
Youngmi=NOM when sister=ACC meet-PST-$Q_{[+wh]}$
'When did Youngmi meet (her) sister?'

(4.21) *H plateau prosody in Daegu Korean*

영미가 어디서 언니를 만났노?
Yéngmi=ka eti=se enni=lul manná-ss-no?
Youngmi=NOM where=at sister=ACC meet-PST-$Q_{[+wh]}$
'Where did Youngmi meet (her) sister?'

(4.22) *Non-*wh*-prosody in Daegu Korean*

영미가 어제 언니를 만났나?
Yéngmi=ka écey énni=lul mánna-ss-na?
Youngmi=NOM yesterday sister=ACC meet-PST-$Q_{[-wh]}$
'Did Youngmi meet (her) sister yesterday?'

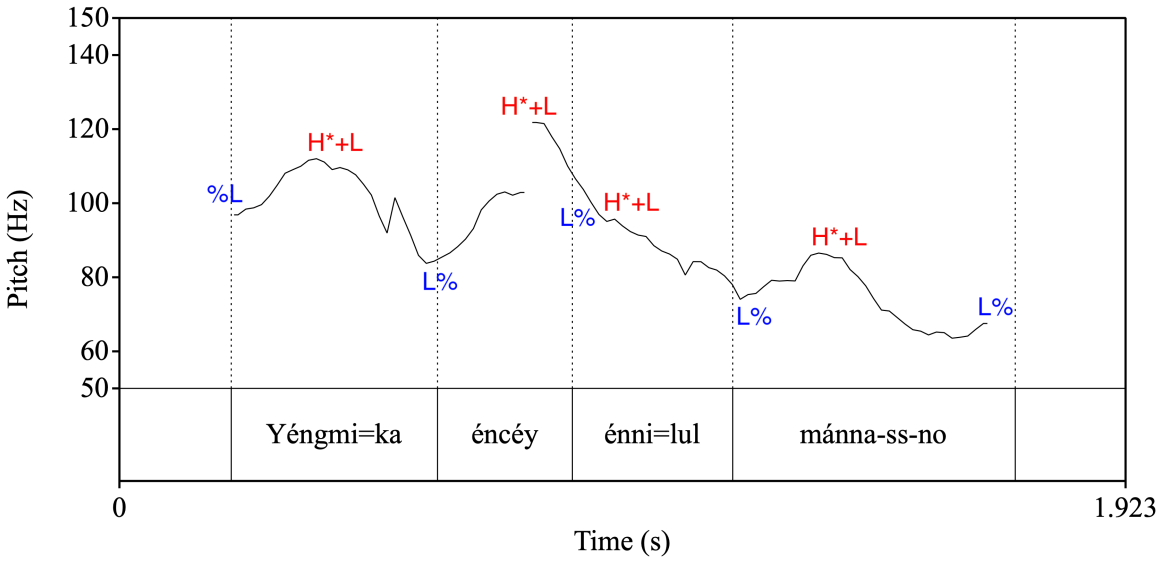


Figure 4.8: Pitch compression prosody in Daegu Korean

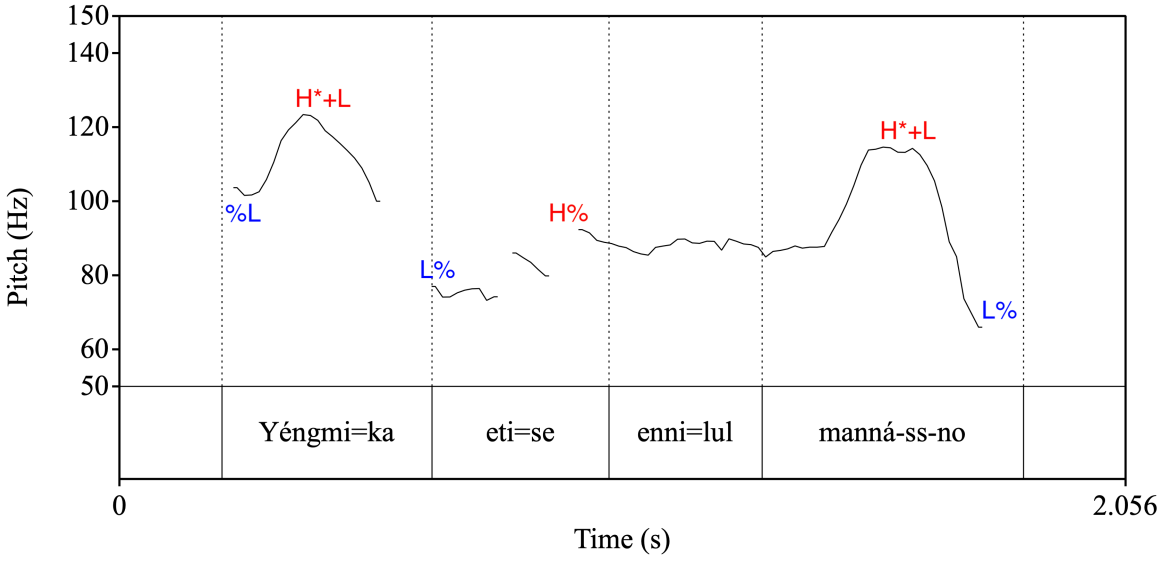


Figure 4.9: H plateau prosody in Daegu Korean

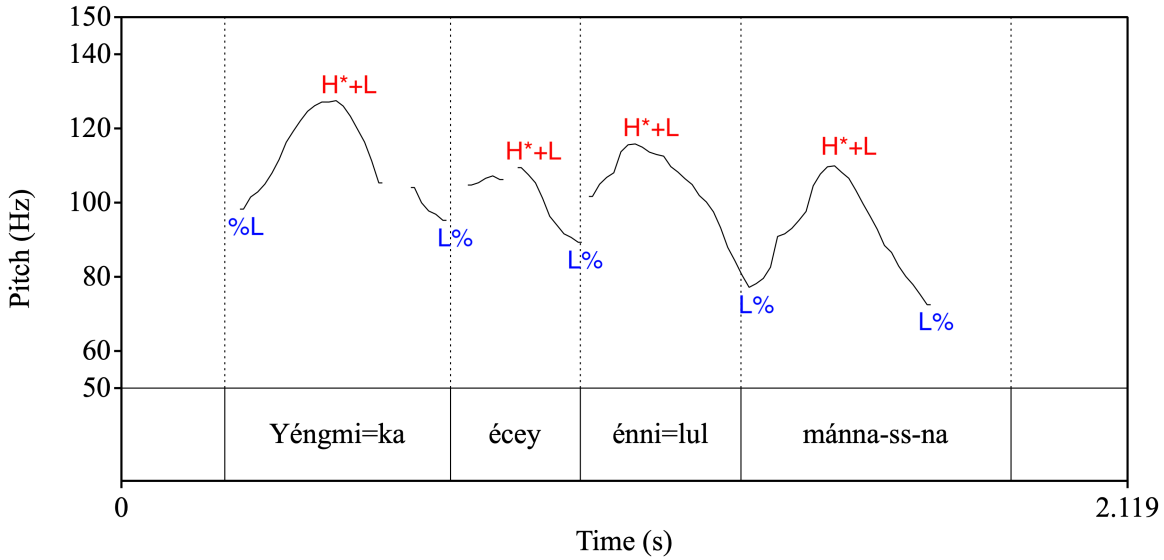


Figure 4.10: Non-*wh*-prosody in Daegu Korean

The prosodic structure of (4.20) and that of (4.21) are schematized in (4.23) and (4.24), respectively. Of particular interest is how the H plateau prosody is created in an AP in (4.24) because the H flat pitch contour in Daegu H plateau prosody in Figure 4.9 is slightly different from the one in Fukuoka (Figure 4.3) and Busan (Figure 4.5) H plateau prosody. In Chapters 2 and 3, I proposed that Daegu Korean is different from Tokyo Japanese, Fukuoka Japanese, and Busan Korean in that it does not have a phrasal H– tone ([–phrasal H]) although the four varieties are all [+lexical tone, +multiword AP]. I also proposed that unaccented PWds in Daegu Korean end in a PWd-final H% boundary tone in Chapter 3. My assumption about (4.24) is that the H plateau is formed by the interpolation of the PWd-final H% boundary tone in the unaccented *wh*-interrogative *eti=se* 'where=at'.

(4.23) *Pitch compression prosody in Daegu Korean* = (4.20)

{$_{ip}$ ($_{AP}$ Yéngmi=ka)} {$_{ip}$ ($_{AP}$ éncéy) ($_{AP}$ énni=lul) ($_{AP}$ mánna-ss-no)}?

'When did Youngmi meet (her) sister?'

(4.24) *H plateau prosody in Daegu Korean* = (4.21)

(AP Yéngmi=ka) (AP eti=se enni=lul manná-ss-no)?

'Where did Youngmi meet (her) sister?'

In this subsection, together with the previous subsection, I showed that [+multiword AP] languages use AP to mark *wh*-scope. This can be achieved only when *wh*-indeterminates are unaccented. Since accented *wh*-indeterminates cannot form a large AP, ip is used in this case. Gyeongsang Korean is a particularly interesting case because it has both accented and unaccented *wh*-interrogatives; the behavior of these two classes of indeterminate pronouns in *wh*-questions is realized exactly as predicted. Accented *wh*-indeterminates produce focus prosody in an ip because the domain for focus happens to be ip. With unaccented *wh*-indeterminates, H plateau prosody is obtained in an AP in [+lexical tone, +multiword AP] languages because it happens to be the post-lexical melody in an AP. The pitch contour of H plateau prosody becomes different, depending on what type of H tone produces it. The summary is given in (4.25).

(4.25) *[+lexical tone, +multiword AP] languages*

a. Accented *wh*-indeterminates → Pitch compression prosody at the ip level

b. Unaccented *wh*-indeterminates → H plateau prosody at the AP level

4.4.3 Osaka Japanese ([+lexical tone, −multiword AP])

Osaka Japanese is classified as [+lexical tone, −multiword AP] by Igarashi (2012, 2014) because it is a lexical pitch accent language and one AP always contains only one PWd. Thus, Osaka Japanese must use ip for *wh*-scope marking. The data in this subsection are due to the author, a native speaker of Osaka Japanese.

Wh-interrogatives in Osaka Japanese are always unaccented with an initial register tone ^{H} or ^{L} as in (4.26); for initial register tones (or PWd-initial boundary tones),

see Pierrehumbert and Beckman (1988) and Chapter 1. H-beginning unaccented PWds have an H...H melody, while L-beginning unaccented PWds have an L...H melody. Recall Kuroda's (2005/2013) and Hwang's (2011a; 2011b) proposal that accented *wh*-indeterminates cause pitch compression prosody (at the ip level), while unaccented *wh*-indeterminates cause H plateau prosody (at the AP level) in lexical pitch accent languages ([+lexical tone]). I show that this hypothesis does not work in Osaka Japanese and that therefore we must take into consideration which prosodic level can be used for *wh*-scope marking.

(4.26) Wh-*interrogatives in Osaka Japanese*

a. *H-beginning unaccented*

^{H}dare 'who' (HH 誰), ^{H}doko 'where' (HH どこ)

b. *L-beginning unaccented*

^{L}nani 'what' (LH 何), ^{L}itu 'when' (LH いつ)

Figure 4.11 is the pitch track of the *wh*-question in (4.27), while Figure 4.12 is the pitch track of the *wh*-question in (4.28); the sentences end in an IP-final H% boundary tones to mark interrogatives.[20] Note that all PWds are H-beginning unaccented, which has an H...H melody, except for the third PWd in each sentence. The only difference between the two sentences is the third PWd; the H-beginning accented PWd ^{H}*Kyóoto=no* 'Kyoto=GEN' is used in (4.27), while the H-beginning unaccented PWd ^{H}*Oosaka=no* 'Osaka=GEN' is used in (4.28). Pitch compression prosody is observed in Figure 4.11, while H plateau prosody is observed in Figure 4.12. In [+lexical tone, +multiword AP] languages, pitch compression prosody is realized in an ip, while H plateau prosody is realized in an AP (see Sections 4.4.1 and 4.4.2), but in Figures 4.11 and 4.12, both prosodies are realized at the ip level because they are both focus prosodies due to the focus on the *wh*-interrogative ^{H}*dare* 'who'. The domain for focus is ip in Osaka Japanese (Pierrehumbert and Beckman

[20] I recorded myself for Figures 4.11, 4.12, 4.13, and 4.14, which were made by Praat (Boersma 2001).

1988).

(4.27) *Pitch compression prosody in Osaka Japanese*

明日誰が京都の大学に行く？
^{H}Asita ^{H}dare=ga ^{H}Kyóoto=no ^{H}daigaku=ni ^{H}ik-u?
tomorrow who=NOM Kyoto=GEN university=to go-NPST(-Q)
'Who is going to a university in Kyoto tomorrow?'

(4.28) *H plateau prosody in Osaka Japanese*

明日誰が大阪の大学に行く？
^{H}Asita ^{H}dare=ga ^{H}Oosaka=no ^{H}daigaku=ni ^{H}ik-u-?
tomorrow who=NOM Osaka=GEN university=to go-NPST(-Q)
'Who is going to a university in Osaka tomorrow?'

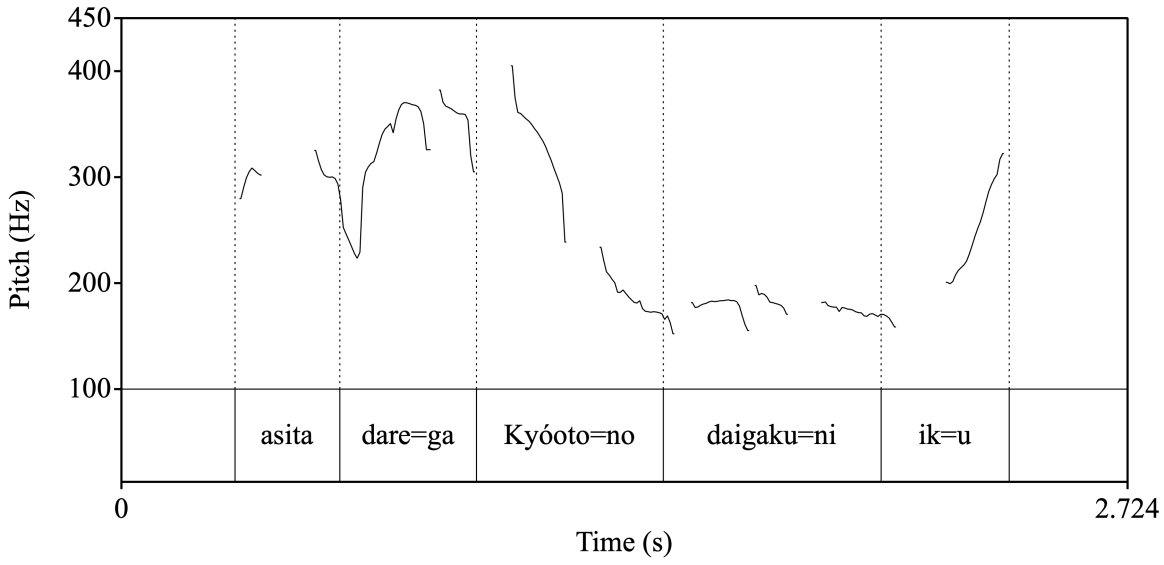


Figure 4.11: *Wh*-prosody in Osaka Japanese (Pitch compression prosody)

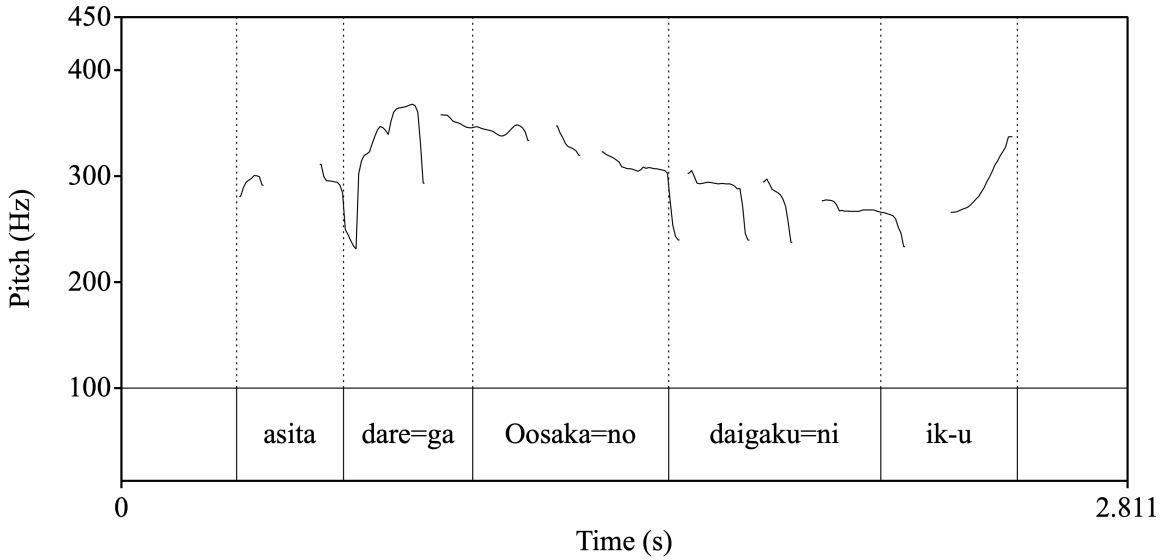


Figure 4.12: *Wh*-prosody in Osaka Japanese (H plateau prosody)

Comparison with non-*wh*-questions makes the differences between [+lexical tone, +multiword AP] languages and Osaka Japanese clear. (4.29) is the non-*wh*-counterpart of (4.27), while (4.30) is the non-*wh*-counterpart of (4.28). Figure 4.13 is the pitch track of (4.29), whereas Figure 4.14 is the pitch track of (4.30).[21] If we compare the pitch tracks of the two *wh*-questions and the pitch tracks of the two non-*wh*-questions, we can see that the lexical prosody of each PWd is always retained in *wh*-prosody. The only difference between *wh*-prosody and non-*wh*-prosody is the pitch boost on the *wh*-interrogative ^{H}*dare* 'who'. Pitch compression occurs in the *wh*-prosody in Figure 4.11 because ^{H}*Kyóoto* 'Kyoto' in the *wh*-domain is accented. H plateau prosody is used superficially in the *wh*-prosody in Figure 4.12 because all the PWds in the *wh*-domain happen to be H-beginning unaccented, which has an H...H melody. The prosodic structure of (4.27) and that of (4.28) are schematized in (4.31) and (4.32), respectively.

[21] In Figure 4.13, ^{H}*Kyóoto* 'Kyoto' is not focused, but the pitch peak of ^{H}*daigaku* 'university' and the pitch peak of ^{H}*ik-u* 'go-NPST' are reduced. This is because ^{H}*Kyóoto* 'Kyoto' has a pitch accent and triggers downstep (see Chapter 1).

(4.29) *Non-*wh*-prosody in Osaka Japanese*

明日まなみが京都の大学に行く？

^{H}Asita ^{H}Manami=ga ^{H}Kyóoto=no ^{H}daigaku=ni ^{H}ik-u?

tomorrow Manami=NOM Kyoto=GEN university=to go-NPST(-Q)

'Is Manami going to a university in Kyoto tomorrow?'

(4.30) *Non-*wh*-prosody in Osaka Japanese*

明日まなみが大阪の大学に行く？

^{H}Asita ^{H}Manami=ga ^{H}Oosaka=no ^{H}daigaku=ni ^{H}ik-u?

tomorrow Manami=NOM Osaka=GEN university=to go-NPST(-Q)

'Is Manami going to a university in Osaka tomorrow?'

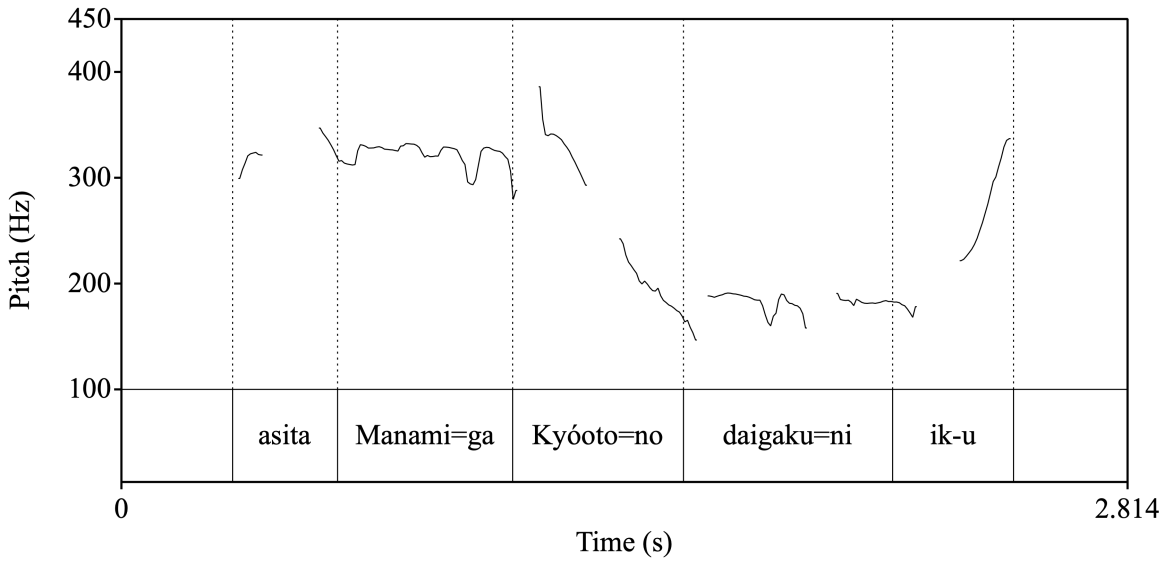


Figure 4.13: Non-*wh*-prosody in Osaka Japanese 1

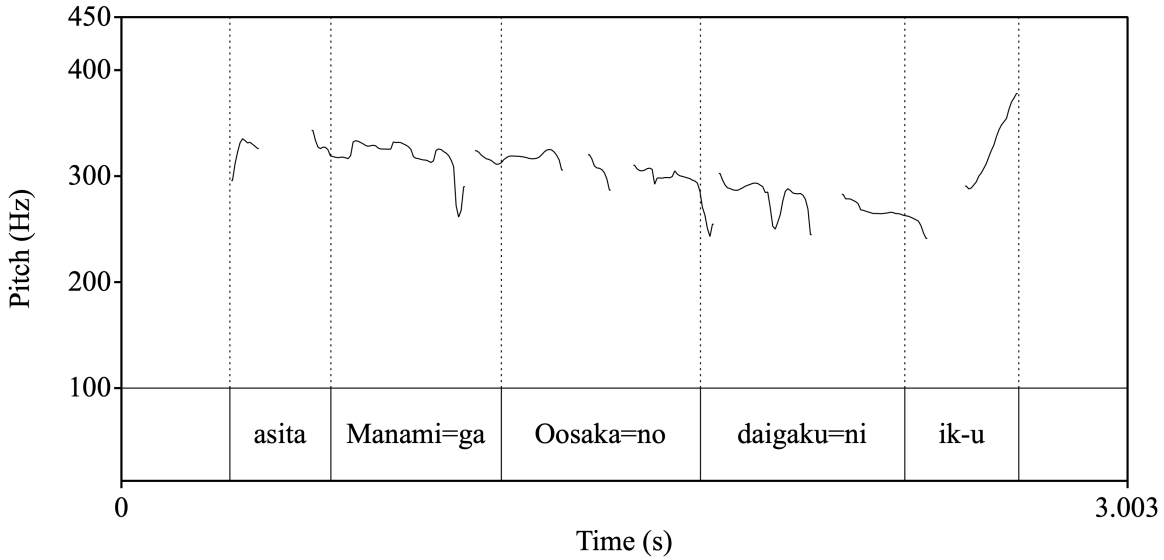


Figure 4.14: Non-*wh*-prosody in Osaka Japanese 2

(4.31) *Pitch compression prosody in Osaka Japanese* = (4.27)

{$_{ip}$ ($_{AP}$ ^{H}Asita)} {$_{ip}$ ($_{AP}$ ^{H}dare=ga) ($_{AP}$ ^{H}Kyóoto=no) ($_{AP}$ ^{H}daigaku=ni) ($_{AP}$ ^{H}ik-u-∅)}?

'Who is going to a university in Kyoto tomorrow?'

(4.32) *H plateau prosody in Osaka Japanese* = (4.28)

{$_{ip}$ ($_{AP}$ ^{H}Asita)} {$_{ip}$ ($_{AP}$ ^{H}dare=ga) ($_{AP}$ ^{H}Oosaka=no) ($_{AP}$ ^{H}daigaku=ni) ($_{AP}$ ^{H}ik-u-∅)}?

'Who is going to a university in Osaka tomorrow?'

We have seen a counterexample to the hypothesis by Kuroda (2005/2013) and Hwang (2011a,b) (see also (4.25)). In [−multiword AP] languages, pitch compression prosody can be observed even when *wh*-indeterminates are unaccented. In addition, in [−multiword AP] languages, (superficial) H plateau prosody can be realized at the ip level. These are because the property [−multiword AP] blocks the use of AP. Osaka Japanese shows that the accentuation of *wh*-indeterminates is not the sole factor in determining whether and when a language uses pitch compression prosody or H plateau prosody in *wh*-questions.

4.4.4 Seoul Korean ([−lexical tone, +multiword AP])

Seoul Korean is [−lexical tone, +multiword AP] (Igarashi 2012, 2014) because it lacks a lexical pitch accent system and one AP can contain more than one PWd. Seoul Korean is another example that shows that which prosodic phrase level is used is more important than surface *wh*-prosody, because neither pitch compression prosody nor H plateau prosody is used. Recall that in [+lexical tone, +multiword AP] languages such as Tokyo Japanese, large AP formation is blocked by accented PWds; as a result, accented *wh*-indeterminates cannot use AP. Since Seoul Korean is accentless, *wh*-interrogatives are always unaccented and they can always make a large AP with more than one PWd within *wh*-domains. Seoul Korean does not have to use ip for *wh*-scope marking because AP is the lowest possible prosodic phrase level for this language.

In fact, Jun and Oh (1996) and Yun (2019) both show that Seoul Korean uses AP to mark *wh*-scope through a set of experiments. An AP in Seoul Korean has the post-lexical melody LHLH (or HHLH) (Jun 1993, 1998; see Chapter 1 for details). The first LH is linked to the first two syllables of an AP and the next LH is linked to the final two syllables of an AP; if there is not a large enough number of syllables in an AP, the H tone and the L tone in the middle are undershot.

(4.33) is an ambiguous question; the *wh*-indeterminate *encey* is interpreted as the *wh*-interrogative *when* or the *wh*-indefinite *any time*. Figure 4.15 and Figure 4.16 show how this ambiguity is disambiguated by prosody; *encey* forms an AP with the following PWd when it is interpreted as a *wh*-interrogative as in Figure 4.15, while it forms an AP by itself when it is interpreted as a *wh*-indefinite as in Figure 4.16. Dashed lines in the figures indicate AP boundaries.

(4.33) *Ambiguity in Seoul Korean*

아주머니는 언제 어지러워요?

Acwumeni=nun **encey** ecilew-e-yo?
madam=TOP when/any time feel dizzy-INF-POL(-Q)
Wh-interrogative: 'Madam, when do you feel dizzy?'
Wh-indefinite: 'Madam, is there any time that you feel dizzy?'

(Jun and Oh 1996: (3a), (3b))

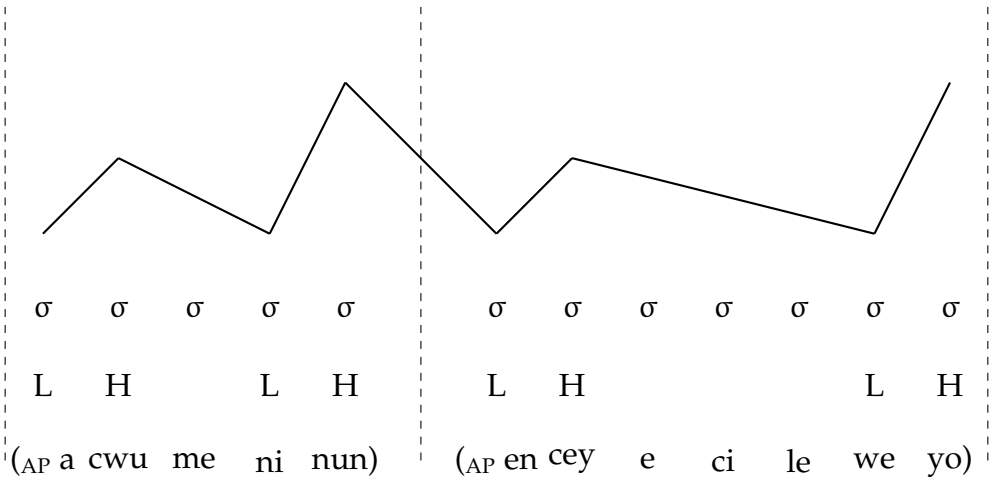


Figure 4.15: A schematic pitch track of *wh*-prosody in Seoul Korean (adapted from Jun and Oh 1996: Figure 5)

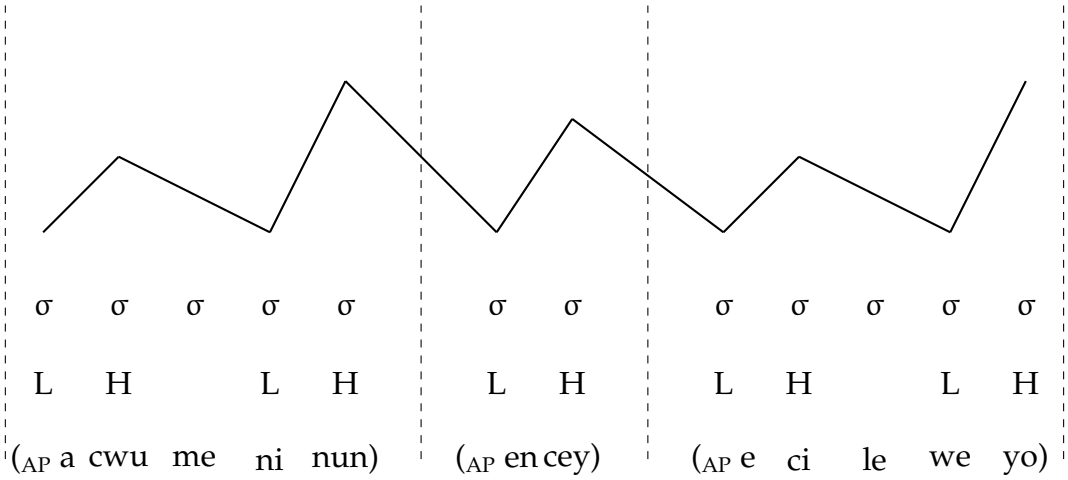


Figure 4.16: A schematic pitch track of non-*wh*-prosody in Seoul Korean (adapted from Jun and Oh 1996: Figure 5)

4.4.5 Kobayashi Japanese ([−lexical tone, −multiword AP])

Kobayashi Japanese is a language that does not have a lexical pitch accent system ([−lexical tone]) and does not allow a large AP with more than one PWd ([−multiword AP]), according to Igarashi (2012, 2014). Each PWd has an L...H melody in this language (see Sato 2013). As in Osaka Japanese ([−multiword AP]), Kobayashi Japanese is predicted to use ip for *wh*-scope marking, because it is impossible to use the AP level.

Igarashi (2006) and Sato (2013) claim that *wh*-prosody in Kobayashi Japanese is focus prosody. (4.34) is a *wh*-question and (4.35) is the declarative counterpart.[22] In the *wh*-prosody in Figure 4.17, the pitch track of (4.34), the focused *wh*-interrogative *dai* 'who' causes pitch compression on the PWds in the *wh*-domain (see also Igarashi 2006).[23] In

[22]The pitch tracks of these sentences (Figures 4.17 and 4.18, respectively) are cited, following the citation guidelines of Kyushu University Press.

[23]Sato (2013) claims that the PWd-final H tone of each PWd is deleted in *wh*-prosody based on her impressionistic observation. Statistical analyses must be done to distinguish H deletion from pitch compression. For example, Maekawa (1994) shows that the pitch accent melody H*+L in Tokyo Japanese, which appears to be deleted after an accented *wh*-interrogative, is just reduced with a statistical examination. Igarashi's (2006) claim that pitch compression occurs in *wh*-prosody in Kobayashi Japanese is based on his statistical analysis.

contrast, the L...H melody in each PWd is clearly seen in Figure 4.18, the pitch track of (4.35).

(4.34) Wh-*prosody in Kobayashi Japanese*

だぃがビール飲んだとけ？

Dai=ga biiru non-da to ke?
who=NOM beer(=ACC) drink-PST NZR Q
'Who drank (the) beer?' (Sato 2013: (2.6b))

(4.35) *Non*-wh-*prosody in Kobayashi Japanese*

直也がビール飲んだど。

Naoya=ga biiru non-da do.
Naoya=NOM beer(=ACC) drink-PST SFP
'Naoya drank beer.' (Sato 2013: (2.6a))

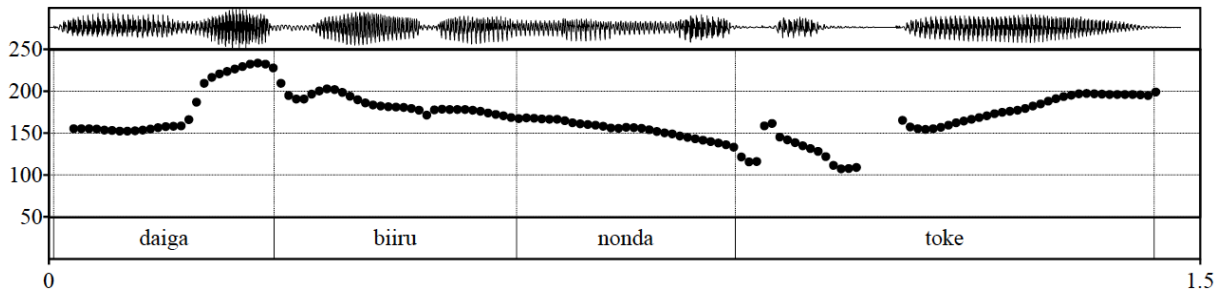


Figure 4.17: *Wh*-prosody in Kobayashi Japanese (Sato 2013: Figure 2.2)

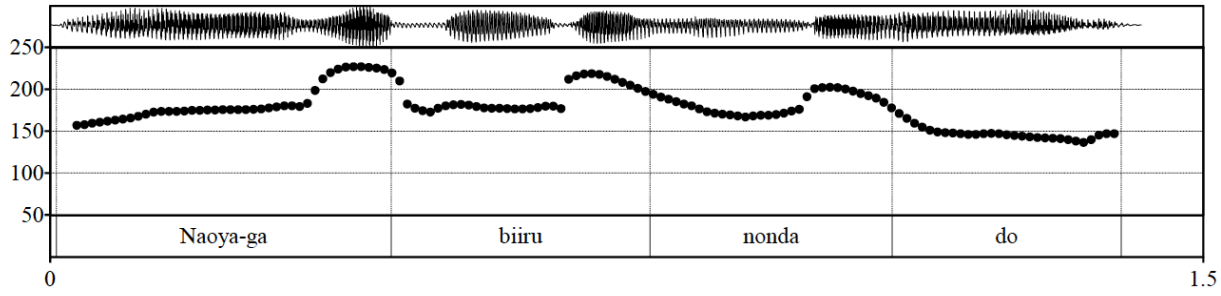


Figure 4.18: Non-*wh*-prosody in Kobayashi Japanese (Sato 2013: Figure 2.1)

The fact that *wh*-prosody in Kobayashi Japanese is equivalent to focus prosody as well as the fact that the lexical prosody of each PWd (L...H) is maintained in *wh*-prosody tell us that ip, not AP, is the domain for *wh*-prosody in this language, which fits with my analysis. The prosodic structure of (4.34) is given in (4.36).

(4.36) Wh-*prosody in Kobayashi Japanese* = (4.34)

{$_{ip}$ ($_{AP}$ Dai-ga) ($_{AP}$ biiru) ($_{AP}$ non-da) to ke}?

4.4.6 Dhaka Bengali ([−lexical tone, +multiword AP])

In his book, Richards (2010) makes a prediction that *wh*-in-situ in Bengali, which is prosodically similar to Japanese, uses special prosody in *wh*-domains. I will show that this prediction is correct and that my hypothesis can apply to languages other than Japanese and Korean.

Khan (2008, 2014) argues that Dhaka Bengali has exactly the same prosodic hierarchy as the one that we assume in this dissertation (PWd < AP < ip < IP; see Figure 1.7). Dhaka Bengali is similar to Seoul Korean in terms of prosody (Khan 2014); thus, Dhaka Bengali is [−lexical tone, +multiword AP], according to the classification by Igarashi (2012, 2014).

In Section 4.4.4, we saw that *wh*-prosody in Seoul Korean uses the AP level, which tells us that Dhaka Bengali is expected to realize *wh*-prosody at the AP level. Khan's (2008; 2014) data indicate that this prediction is borne out. Figure 4.19 is an example of *wh*-questions in Dhaka Bengali, while Figure 4.20 is the declarative counterpart.[24] Ha in the figures indicates an AP-final boundary tone. The two figures show that the boundary tones at the AP level, which exist in the declarative sentence in Figure 4.20, are deleted in the *wh*-domain in Figure 4.19. This tells us that an AP is formed in the *wh*-domain in Figure 4.19.

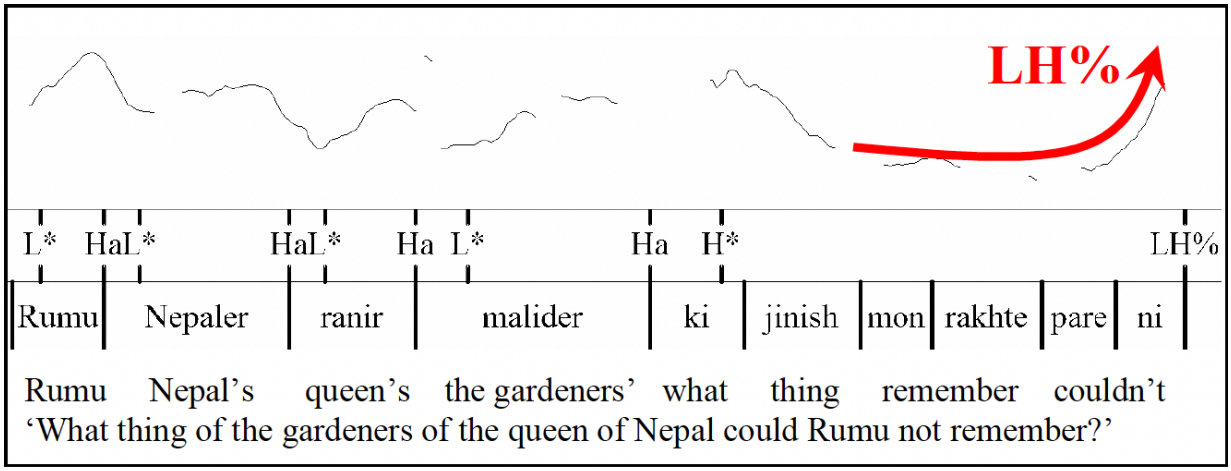


Figure 4.19: *Wh*-prosody in Dhaka Bengali (Khan 2008: Figure 66)

[24] I received permission to cite these figures from Sameer ud Dowla Khan. Similar images are also in Khan (2014) (Figures 4.3 and 4.19). I also received permission to use these figures from Oxford University Press.

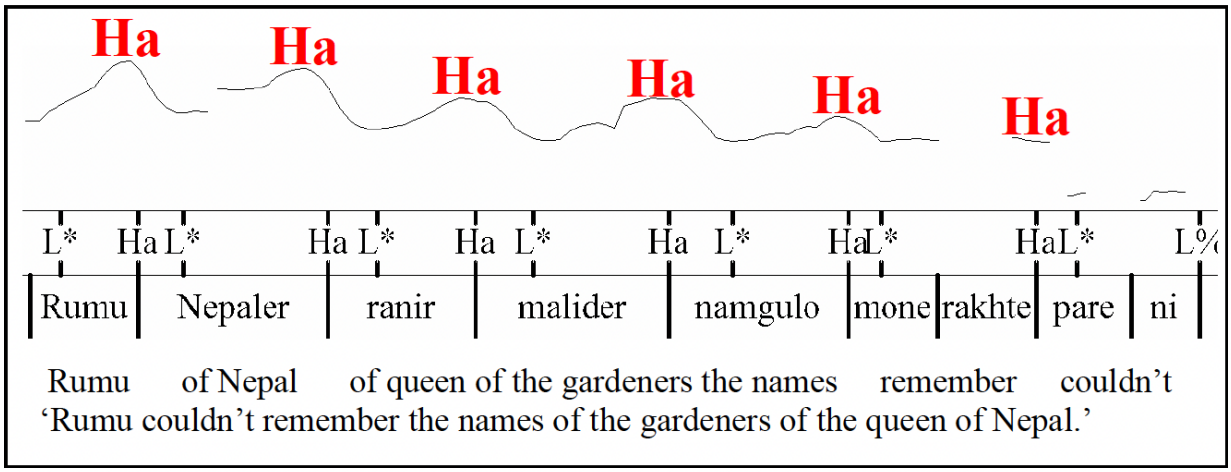


Figure 4.20: Non-*wh*-prosody in Dhaka Bengali (Khan 2008: Figure 11)

4.5 *Wh*-constructions with antecedents

The previous section showed that unaccented *wh*-indeterminates trigger H plateau prosody within *wh*-domains in [+lexical tone, +multiword AP] languages. This section discusses counterexamples, where pitch compression prosody (= focus prosody) appears with unaccented *wh*-indeterminates in [+lexical tone, +multiword AP] languages. I will show that there are at least two reasons for the counterexamples. First, antecedents and given discourse elements trigger focus prosody. Second, dominant languages that generally use pitch compression prosody may affect languages that use H plateau prosody. Sections 4.5.1, 4.5.2, and 4.5.3 discuss Fukuoka Japanese, Tokyo Japanese, and Busan Korean, respectively. I revise my proposal in (4.7) in Section 4.5.4. Since the main topic of this section is to figure out when counterexamples appear, I will not discuss the prosodic structure of each counterexample in detail. I will leave this issue for future research.

4.5.1 Fukuoka Japanese

As we saw in Section 4.4.1, Fukuoka Japanese uses H plateau prosody in *wh*-questions because *wh*-interrogatives in this language are all unaccented. However, Igarashi (2007a), Hwang (2011a, 2015), and Smith (2013) found speakers who use pitch compression prosody, which is identical to focus prosody in this variety (see Igarashi 2007a), with unaccented *wh*-interrogatives in their production experiments. (4.37) is the same sentence as (4.3) in Section 4.2, but the corresponding figure, Figure 4.21, shows that an AP with the first unaccented *wh*-interrogative and the second accented PWd causes pitch compression on the post-focus PWds and that the pitch accent on each accented PWd is retained. This is shown clearly by Smith's experiment.

(4.37) *Pitch compression prosody in Fukuoka Japanese* (cf. (4.3))

誰が土曜日青虫にやられたと？

Dare=ga doyóobi aomúsi=ni yar-are-ta-to-∅?

who=NOM Saturday caterpillar=by affect-PASS-PST-SFP-Q

'Who was affected by caterpillars on Saturday?' (Smith 2013: (2))

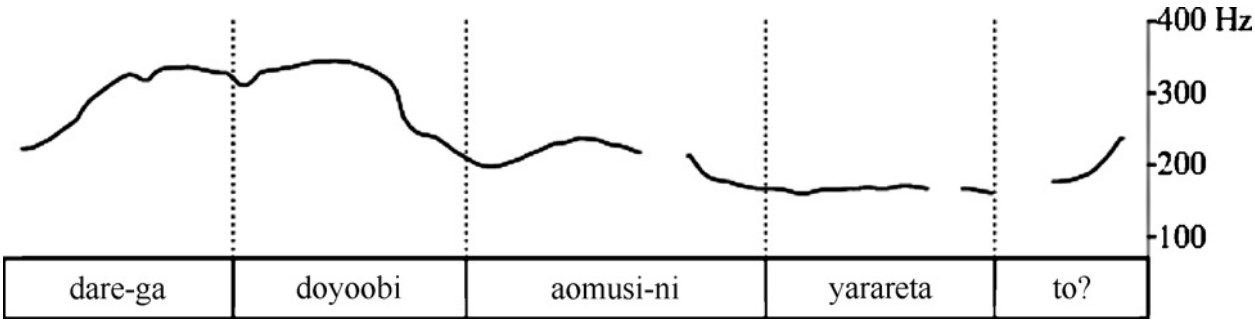


Figure 4.21: Pitch compression prosody in Fukuoka Japanese (Smith 2013: (5b))

Igarashi (2007a) recorded four native speakers of Fukuoka Japanese. The participants were shown dialogues such as (4.38) and recorded the B part. Each stimulus sentence was designed to give echo focus to the first word (i.e. *dare=ga* 'who=NOM' in this case).

Igarashi reports that one of the four speakers used pitch compression prosody when she read (4.38B), but that she used H plateau prosody when she recorded a similar sentence outside the experiment.[25]

(4.38) *Echo focus in Fukuoka Japanese*

誰がなおやと長野で紅葉を見たって？

Dare=ga	Náoya=to	Nágano=de	mómizi=o	mi-ta-tte?
who=NOM	Naoya=with	Nagano=in	autumn leaves=ACC	see-PST-C

'Who enjoyed autumn leaves with Naoya in Nagano?'

A. 山田はなおやと長野で紅葉を見たんよ。

Yamada=wa Náoya=to Nágano=de mómizi=o mi-ta-n-yo.

'Yamada enjoyed autumn leaves with Naoya in Nagano.'

B. え？誰がなおやと長野で紅葉を見たって？

E? DARE=ga Náoya=to Nágano=de mómizi=o mi-ta-tte?

'Uh? WHO enjoyed autumn leaves with Naoya in Nagano?'

A. 山田がよ。

Yamada=ga yo.

'It's Yamada.' (Igarashi 2007a: Dataset IV (a))

4.5.2 Tokyo Japanese

According to Kuroda (2005/2013), when a *wh*-indeterminate is used with the negative concord marker *=mo* '=even/also', the *wh*-indeterminate becomes unaccented and triggers H plateau prosody until *=mo* '=even/also' in Tokyo Japanese. One example is given in (4.39). This H plateau prosody is exactly the same as the one in languages such as Fukuoka Japanese (e.g. Figure 4.3) because the pitch accents in the *wh*-domain (*kái-ta* 'write-PST' and *hón=mo* 'book=even/also') get deleted.

[25] Igarashi (2007a) does not mention how he made the recording.

(4.39) *H plateau prosody in Tokyo Japanese*

花子は誰が書いた本も読まなかった。

Hánako=wa dare=ga kai-ta hon=mo yomá-nakat-ta.
Hanako=TOP who=NOM write-PST book=even/also read-NEG-PST
Lit. 'Of anyone, Hanako did not read books that they wrote.'

(Kuroda 2005/2013: (70), (71a))

However, Kuroda (2005/2013) points out that focus pitch compression prosody can appear in *wh*-domains with unaccented *wh*-indeterminates. In (4.40), the last sentence (4.40d) includes the *wh*-expression *nani...=mo* 'anything'. The unaccented *wh*-indeterminate *nani* 'what' would be predicted to trigger H plateau prosody up until the particle *=mo* '=even/also' by Kuroda's initial generalization, but the pitch accent on *tó=mo* 'C=even/also' does not get deleted; note that the verb *kat-ta* 'buy-PST' is unaccented, but if it were accented, it would retain its pitch accent in this context. Kuroda mentions that the non-H plateau prosody in (4.40d) involves "some emphatic/contrastive effect" (p. 84) on the verb *kat-ta* 'buy-PST', summarizing the discourse context in (4.40a)–(4.40c).

(4.40) *Emphatic focus in Tokyo Japanese*

a. ジョンはメアリーが指輪を買ったとトムに言わなかった。

Zyón=wa Méarii=ga yubiwa=o kat-tá-to Tómu=ni iwa-nákat-ta.
John=TOP Mary=NOM ring=ACC buy-PST-C Tom=DAT say-NEG-PST
'John did not tell Tom that Mary bought a ring.'

b. イヤリングを買ったとも言わなかった。

Íyaringu=o kat-ta tó=mo iwa-nákat-ta.
earring=ACC buy-PST C=even/also say-NEG-PST
'Nor that she bought an earring.'

c. 時計を買ったとも言わなかった。

Tokei=o kat-ta tó=mo iwa-nákat-ta.
watch=ACC buy-PST C=even/also say-NEG-PST
'Nor that she bought a watch.'

d. 結局、ジョンはメアリーが何を買ったともトムに言わなかった。

Kekkyoku, Zyón=wa Méarii=ga nani=o KAT-TA tó=mo
after all John=TOP Mary=NOM what=ACC buy-PST C=even/also

Tómu=ni iwa-nákat-ta.
Tom=DAT say-NEG-PST
'After all, John did not tell Tom that Mary bought anything.'

(Kuroda 2005/2013: (92))

Kuroda (2005/2013) observes that (4.39) above can involve pitch compression prosody with contrastive focus. (4.41) presents two examples. The pitch accent on *hón=mo* 'book=even/also' is retained in (4.41a), triggering pitch compression prosody, because *hón* 'book' receives contrastive focus. The pitch accent on *kái-ta* 'write-PST' is also retained and triggers pitch compression prosody in (4.41b) because *kái-ta* 'write-PST' receives contrastive focus.

(4.41) *Contrastive focus in Tokyo Japanese*

a. *Focus on* hón

Hánako=wa dare=ga kai-ta HÓN=mo yomá-nakat-ta.

b. *Focus on* kái-ta

Hánako=wa dare=ga KÁI-TA hón=mo yomá-nakat-ta.

(Kuroda 2005/2013: (71b), (71c))

4.5.3 Busan Korean

Kubo (2001) reports that an effect similar to (4.41) in Tokyo Japanese occurs in Busan Korean. The canonical prosody for (4.42) is H plateau prosody, triggered by the unaccented *wh*-interrogative *nwu=ka* 'who=NOM'. However, focused elements trigger pitch compression prosody, as shown in (4.42a)–(4.42b).[26] In (4.42a), *nwú=ká* 'who=NOM' is focused

[26] Kubo (2001) does not specify what kind of focus is involved here.

and causes pitch compression prosody; notice that each PWd retains its pitch accent.[27] In (4.42b)–(4.42d), *ónul* 'today', *kímchi* 'kimchi', and *mék-no* 'eat-$Q_{[+wh]}$' are focused, respectively; the focused elements trigger pitch compression prosody and the post-focus PWds are still accented. It appears that the pre-focus PWds undergo deaccenting, forming H plateau prosody due to the unaccented *wh*-interrogative.

(4.42) *Focus in Busan Korean*

누가 오늘 김치 먹노?
Nwu=ka onul kimchi mék-no?
who=NOM today kimchi eat-$Q_{[+wh]}$
'Who eats kimchi today?'

a. NWÚ=ká ónul kímchi mék-no? 'WHO eats kimchi today?'

b. Nwu=ka ÓNUL kímchi mék-no? 'Who eats kimchi TODAY?'

c. Nwu=ka onul KÍMCHI mék-no? 'Who eats KIMCHI today?'

d. Nwu=ka onul kimchi MÉK-no? 'Who EATS kimchi today?'

(Kubo 2001: (29)–(32))

4.5.4 Revised proposal

As we have seen, *wh*-indeterminates behave exceptionally in what we might call "special" focus contexts.[28] *Wh*-questions are of course always semantically focused in the basic sense of Rooth (1985), but this "default" *wh*-question pattern need not be prosodically realized in the same way as focus in declaratives, when the *wh*-indeterminate is unaccented. The result is the H plateau pattern. What the counterexamples above have in common is that "special" focus, triggered by an antecedent in discourse, is involved,

[27] Also notice that the *wh*-interrogative *nwú=ká* 'who=NOM' is double-accented. Hwang (2011a,b) observes that the unaccented *nwu=ka* and the accented *nwú=ká* can be used in the same context, but this observation might be wrong.

[28] A similar proposal is briefly discussed in Hwang (2011a,b).

such as in Igarashi's (2007a) Fukuoka echo focus example in (4.38). In this example, *Yamada=wa* 'Yamada=TOP' is the relevant antecedent. In the Busan examples in (4.42), as the questions are given out of the blue, it might seem like such an antecedent is lacking, but in the most natural discourse context, we can come up with one easily; an antecedent is present or inferable. Antecedents make the information in the corresponding *wh*-contexts given or old. It is known that focus scoping over given information prosodically differs from focus scoping over new information; in English, for instance, given information in the scope of focus is destressed (see Rooth 2015). In Tokyo Japanese, given information undergoes more pitch compression than new information after a focused element (Sugahara 2003). Given this, it is natural that we get focus pitch compression prosody in these counterexamples. When speakers need to make it clear that non-default focus is involved in a discourse context, it is natural that they invoke the cross-linguistic tendency that given information is realized with lower pitch. H plateau prosody is not appropriate to mark special focus because it is not focus prosody and it involves H tones.

An additional possibility is the influence of dominant languages. It has been suggested that some Fukuoka speakers use pitch compression prosody in *wh*-questions due to the influence of Tokyo Japanese, which uses pitch compression prosody in *wh*-questions in general (Igarashi 2007a; Hwang 2011a, 2015). This hypothesis can explain the Fukuoka pitch compression prosody in Figure 4.21 by Smith (2013) because this sentence seems to have been recorded without any context. It appears that Gyeongsang Korean is not influenced by Seoul Korean in *wh*-prosody in the same way, because it is impossible for Gyeongsang Korean to take on Seoul Korean prosodic features; Gyeongsang Korean is a lexical pitch accent language, while Seoul Korean is an accentless language.

(4.43) is the revised proposal for the typology of prosodic *wh*-scope marking strategies, based on the discussion in this section.

(4.43) *The typology of prosodic* wh*-scope marking strategies (final version)*

Wh-prosody in *wh*-in-situ languages (e.g. Japanese and Korean) is realized at the lowest possible prosodic phrase level in the prosodic hierarchy. However, this rule can be overridden by non-default "special" focus with antecedents and the influence of dominant languages.

4.6 Conclusion

In this chapter, I showed that *wh*-in-situ languages form a prosodic phrase at the lowest possible level in the prosodic hierarchy; AP is preferred over ip. The main focus of this chapter was Japanese and Korean, but I also showed that this hypothesis can apply to Dhaka Bengali. We also saw that special focus with antecedents and the influence of dominant languages can override the typology.

In general, [±multiword AP] and accentedness or unaccentedness of *wh*-indeterminates determine whether AP or ip is used for *wh*-scope marking. How the prosodic phrase level is chosen is shown in the flowchart in Figure 4.22.

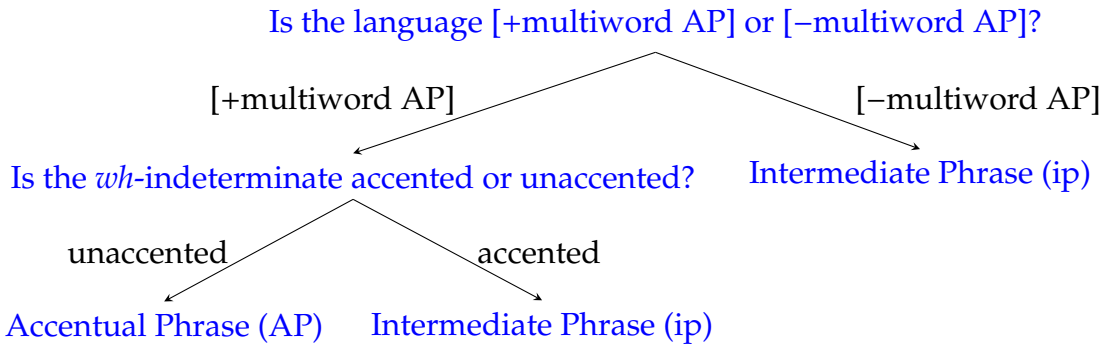


Figure 4.22: Which prosodic phrase level is chosen for *wh*-scope marking?

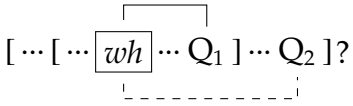
CHAPTER 5

PROSODY AND *WH*-SCOPE IN OSAKA JAPANESE

5.1 Introduction

The traditional view of *wh*-islands in Japanese is that Japanese *wh*-questions are sensitive to *wh*-islands (Nishigauchi 1990, Watanabe 1992). That is, in the biclausal construction in (5.1), where a *wh*-word is in the embedded clause and a question marker is in both the embedded and matrix clauses, only the association between the *wh*-word and the question marker in the embedded clause (Q_1) is acceptable; I will call this scope **embedded scope (ES)**. The *wh*-word cannot be associated with the question marker in the matrix clause (Q_2); I will call this scope **matrix scope (MS)**. (5.2) is an example in Japanese; the ES reading is a matrix yes/no question with an embedded *wh*-question, while the MS reading is a matrix *wh*-question. Note that the English translation of the MS reading in (5.2) is marginal to ungrammatical for native English speakers.

(5.1) *Associations*



(5.2) *Japanese*

太郎は花子が何を食べたか言いましたか？

[Taro=wa [Hanako=ga nani=o tabe-ta-ka$_1$] ii-masi-ta-ka$_2$]?
Taro=TOP Hanako=NOM what=ACC eat-PST-Q say-POL-PST-Q

ES reading: '[Did Taro say [what$_i$ Hanako ate t_i]]?'

MS reading: '[What$_i$ did Taro say [whether Hanako ate t_i]]?'

Deguchi and Kitagawa (2002) and Ishihara (2003) argue against the traditional claim that Japanese is sensitive to *wh*-islands and claim that (5.1) can yield an MS reading if the appropriate prosody is used in Tokyo Japanese. As we saw in Chapter 4, *wh*-prosody in Tokyo Japanese (= pitch compression prosody) is realized in Intermediate Phrase (ip).

Deguchi and Kitagawa and Ishihara mention that *wh*-prosody (= ip formation) applies from the *wh*-word until the embedded question marker Q_1 (ES prosody) to get an ES reading, while it applies until the matrix question marker Q_2 (MS prosody) to get an MS reading (see Chapter 1 for details). In other words, Deguchi and Kitagawa and Ishihara claim that there is a strict one-to-one mapping between prosody and interpretation in Tokyo Japanese, overriding *wh*-islands.

As pointed out by Hirotani (2005), Deguchi and Kitagawa's (2002) and Ishihara's (2003) claim is not supported by empirical data. In fact, perception experiments conducted by researchers such as Hirotani (2005), Hirose and Kitagawa (2011), and Hwang (2011a, 2015) have shown that there is no one-to-one mapping between MS prosody and an MS reading although these researchers still claim that prosody can override *wh*-islands in Japanese (and Korean). Another problem is that many Japanese (and Korean) linguists do not dispute the validity of the view that Japanese (and Korean) can overcome *wh*-islands with prosody; in fact, some studies such as Hirotani (2005) and Kitagawa and Hirose (2012) excluded participants who do not accept their judgments. The author, who is bidialectal in Osaka Japanese and Tokyo Japanese, agrees with the traditional view of *wh*-islands in Japanese; that is, (5.2) can only be interpreted as a yes/no question and ES prosody is the only appropriate prosody for (5.2). We also have to keep in mind that the ES reading in (5.2) also allows what I dub "super-informative answers" that look like *wh*-answers (e.g. "Sushi.") just as the English translation of the ES reading in (5.2) allows this kind of answer (see Section 5.2.3 for details).

In this chapter, I present data from a perception experiment on Osaka Japanese. I will show that Osaka Japanese is subject to *wh*-islands, and suggest that the same is almost likely true of other varieties of Japanese (and Korean), in conformity with the traditional view. This chapter is organized as follows. Section 5.2 provides a literature review focused on two previous perception experiments on Tokyo Japanese and discusses Kitagawa and Fodor (2003). Section 5.3 includes my perception experiment and discussion

on the data. Section 5.4 concludes the chapter.

5.2 Previous studies on Tokyo Japanese

In this section, I review two previous perception experiments on Tokyo Japanese (Hirotani 2005 and Hirose and Kitagawa 2011) in Section 5.2.1 and Section 5.2.2, respectively. After a literature review, I discuss Kitagawa and Fodor (2003) in Section 5.2.3. Kitagawa and Fodor claim that there is a strict one-to-one correspondence between prosody and interpretation in Japanese, but admit that the MS interpretation from (5.1) is marginal, proposing three possible factors that make it so. In this subsection, I also discuss "super-informative answers", which are relevant to one of the three factors. Finally, Section 5.2.4 presents the research questions of this chapter.

5.2.1 Hirotani (2005)

Hirotani ran a series of (production and) perception experiments on Tokyo Japanese and found that there is no one-to-one mapping between prosody and interpretation in Tokyo Japanese; ES prosody gives us only an ES reading, but MS prosody gives us both ES and MS readings. Based on the results of the experiments, Hirotani proposed a principle she called the Scope Prosody Correspondence, given in (5.3); Hirotani's Major Phrase corresponds to Intermediate Phrase (ip) in this dissertation.

(5.3) *Scope Prosody Correspondence*

The scope of a term X should not extend beyond the Major (phonological) Phrase (MaP) containing X. (Hirotani 2005: (1,5))

I focus on Hirotani's Experiment 5 here because it is the most relevant. In this experiment, Hirotani examined how MaP(= ip)-insertion and pitch compression interact with each other and affect the interpretation of (5.1). As we saw in Chapter 4, ip-insertion and

pitch compression are essentially the same; I ignore the difference in this review.[1] (5.4) is an example from Hirotani (2005); (5.4a) illustrates ES prosody with an ip-boundary after the embedded question marker, whereas (5.4b) illustrates MS prosody without such an ip-boundary. Hirotani asked the participants to listen to sentences similar to (5.4) with ES or MS prosody and to choose one of the two answers: a yes/no answer (e.g. "Yes, he did.") or a *wh*-answer with a DP (e.g. "A car.") written in Japanese. No context was provided in the experiment. The acute accent symbol ´ indicates pitch accent assignment.

(5.4) *Tokyo Japanese*

ジョンはメアリーが何を買ったか聞きましたか？

[Zyón=wa [Méarii=ga náni=o kát-ta-ka$_1$] kiki-másІ-ta-ka$_2$]?
John=TOP Mary=NOM what=ACC buy-PST-Q ask-POL-PST-Q

ES reading: '[Did John ask [what$_i$ Mary bought t_i]]?'
MS reading: '[What$_i$ did John say [whether Mary bought t_i]]?'

a. *ES prosody*

($_{ip}$ Zyón=wa Méarii=ga) ($_{ip}$ náni=o kát-ta-ka$_1$) ($_{ip}$ kiki-másІ-ta-ka$_2$)?

b. *MS prosody*

($_{ip}$ Zyón=wa Méarii=ga) ($_{ip}$ náni=o kát-ta-ka$_1$ kiki-másІ-ta-ka$_2$)?

(Hirotani 2005: (3,7))

Table 5.1 shows the results of Hirotani's (2005) Experiment 5.[2] Each row in the table shows the proportion of each answer choice for each prosody type; I will use this format throughout the chapter. With ES prosody, 85% of the responses were ES answers (yes/no answers), while 15% of the responses were MS answers (*wh*-answers). With MS prosody, 58% of the responses were MS answers, while 42% of the responses were ES answers. As mentioned earlier, Hirotani interpreted the results as follows: there is a one-to-one

[1] In Hirotani's (2005) stimuli, sentences "without" pitch compression also undergo some degree of pitch compression; the degree of pitch compression is larger in sentences "with" pitch compression.

[2] "ES prosody" in this table is the average of "Boundary, No Pitch Compression" and "Boundary, Pitch Compression", while "MS prosody" is the average of "No Boundary, No Pitch Compression" and "No Boundary, Pitch Compression" in Hirotani's (2005) Table 3.4.

mapping between prosody and interpretation for ES prosody and an ES reading, but there is no such one-to-one mapping for MS prosody and an MS reading. One shortcoming of Hirotani's Experiment 5 is that she did not consider the possibility that the construction in (5.1) with MS prosody is ill-formed. In addition, Hirotani excluded participants who never chose an MS answer with MS prosody.

	ES answers	**MS answers**	**Total**
ES prosody	85%	15%	100%
MS prosody	58%	42%	100%

Table 5.1: Results of Hirotani's (2005) Experiment 5 (adapted from Hirotani 2005: Table 3.4)

5.2.2 Hirose and Kitagawa (2011)

Hirose and Kitagawa (2011) ran a perception experiment on Tokyo Japanese. The task of Hirose and Kitagawa's experiment was also forced-choice between an ES answer and an MS answer, but they added the third answer choice "The question itself was ungrammatical."[3]

Table 5.2 presents the results of Hirose and Kitagawa's (2011) perception experiment.[4] The results reproduce the results of Hirotani's (2005) experiment on Tokyo Japanese. ES answers are strongly preferred with ES prosody, but MS answers are not so preferred with MS prosody. Also notice that 19% of the responses to MS prosody were "ungrammatical" unlike the responses to ES prosody. Despite this fact, Hirose and Kitagawa still argue that MS prosody is just "marked" prosody for the construction in (5.1). In addition, the wording of the answer choice "The question itself was ungrammatical." is inappropriate; it is possible that some participants misjudged MS prosody as not ungrammatical because

[3]「疑問文自体が日本語として間違っている。」 in Japanese (Yoshihisa Kitagawa p.c.).

[4]Yoshihisa Kitagawa, one of the co-authors of Hirose and Kitagawa (2011), and a female native speaker of Tokyo Japanese recorded the stimuli for the experiment. I present the responses to Kitagawa's recordings here because the other speaker did not know the purpose of the experiment.

the stimulus sentences themselves, setting aside prosody, are grammatical. Each recorded question was also shown in written form on the monitor in Hirose and Kitagawa's experiment unlike in Hirotani's experiment.

	ES answers	MS answers	Ungrammatical	Total
ES prosody	91%	9%	0%	100%
MS prosody	51%	30%	19%	100%

Table 5.2: Results of Hirose and Kitagawa's (2011) perception experiment (adapted from Hirose and Kitagawa 2011: Tables 5.8 and 5.9)

5.2.3 Kitagawa and Fodor (2003)

As we have seen so far, Yoshihisa Kitagawa's argument in Deguchi and Kitagawa (2002) and Hirose and Kitagawa (2011) is that Japanese can overcome *wh*-islands if the appropriate prosody is assigned. In Kitagawa and Fodor (2003), Kitagawa takes on the question of why the ES reading is preferred for (5.1) even when the prosody is MS prosody, as shown by Hirotani's (2005) data and Hirose and Kitagawa's (2011) data. Kitagawa and Fodor claim that this is not due to a *wh*-island effect, but rather due to the three possible reasons given in (5.5).

(5.5) *Three possible reasons why the ES reading is preferred in (5.1)*

a. Semantic/pragmatic complexity

b. Minimize Dependencies

c. Prosodic influences (Kitagawa and Fodor 2003: (13))

(5.5a) Semantic/pragmatic complexity relates to what I define as "super-informative answers", triggered by pragmatics. As briefly mentioned in Section 5.1, in order to be cooperative in conversation, we can answer the English question in (5.6), which is equivalent to the ES reading in (5.2), by saying "Sushi.", "Miso soup.", and so on, providing a

value for the variable associated with the embedded *wh*-word *what*.[5]

(5.6) *"Super-informative answers" in English*

[Did Taro say [what Hanako ate]]?

→ "Yes/No.", → "Sushi.", → "Miso soup."

Kitagawa and Fodor (2003) argue that the MS reading is dispreferred because a pragmatic presupposition is required to make it happen. In (5.2), for example, the speaker has the presupposition that Taro said something about Hanako and that the hearer knows what Hanako ate. One problem with this analysis is that the availability of pragmatic super-informative answers has nothing to do with prosody; thus even English, which is sensitive to *wh*-islands (Chomsky 1964, 1973; Ross 1967) and cannot override them by means of prosody, allows super-informative answers to (5.2) (see (5.6)) given the presupposition discussed above.

In addition, there are some matrix verbs that do not allow super-informative answers.[6] For example, the matrix verb *care* cannot trigger super-informative answers because answers such as "Sushi." are inappropriate even with context in (5.7); this suggests that the sentence does not produce the MS reading *What does Taro care whether Hanako ate?*.

(5.7) *Japanese*

太郎は花子が何を食べたか気にしますか？

[Taro=wa [Hanako=ga nani=o tabe-ta-ka] kinisi-mas-u-ka]?
Taro=TOP Hanako=NOM what=ACC eat-PST-Q care-POL-NPST-Q

'[Does Taro care [what$_i$ Hanako ate t_i]]?'

→ "Yes/No.", → #"Sushi.", → #"Miso soup."

(5.5b) Minimize Dependencies are based on Miyamoto and Takahashi (2002). Miyamoto and Takahashi found that in the two sentences in (5.8), (5.8a) is easier to process than (5.8b) because the *wh*-association is local and it requires less working memory.

[5] If the subject of the matrix clause is *you*, it will be easier to obtain "super-informative answers". See the discussion in the paragraph below.

[6] I would like to thank Mats Rooth for pointing this out.

Kitagawa and Fodor (2003) paraphrase Miyamoto and Takahashi's findings as the Minimize Dependencies principle in (5.9) and claim that an ES reading is preferred in (5.1) because the association with the embedded question marker is more economical than the association with the matrix question marker, according to the principle. To truly establish this hypothesis, it would be necessary to show that the Minimize Dependencies principle works to favor an ES reading over an MS reading in truly ambiguous sentences involving *wh*-scope. We will see that this is exactly not the case in my experiment in Section 5.3.

(5.8) *Japanese*

a. あなたは誰が来るか知っていますか？

[Anata=wa [dare=ga kur-u-ka] sit-te-i-mas-u-ka]?
you=TOP who=NOM come-NPST-Q know-GER-be-POL-NPST-Q

'[Do you know [who$_i$ t_i comes]]?'

b. あなたは誰が来ると思いますか？

[Anata=wa [dare=ga kur-u-to] omoi-mas-u-ka]?
you=TOP who=NOM come-NPST-C think-POL-NPST-Q

'[Who$_i$ do you think [t_i will come]]?'

(Kitagawa and Fodor 2003: (9))

(5.9) *Minimize Dependencies in processing*

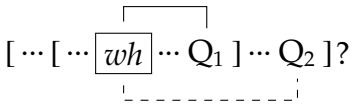
Resolve all dependencies as soon as possible. (Kitagawa and Fodor 2003: (10))

(5.5c) Prosodic influences have to do with the default prosody in silent reading. Kitagawa and Fodor (2003) argue that the default prosody for (5.1) is ES prosody because MS prosody produces a long monotonous melody; it is a universal tendency that languages avoid such prosody. The point here is that Kitagawa and Fodor admit that MS prosody is less natural than ES prosody for (5.1).

5.2.4 Research questions

There is a large research question regarding the structure in (5.1), which is repeated below. Can prosody override *wh*-islands in Japanese (and Korean)? In other words, is there a strict one-to-one mapping between prosody and interpretation? This question can also be interpreted in the following way. Is (5.1) with MS prosody well-formed? The perception experiments so far have shown that the one-to-one mapping holds for ES prosody and an ES reading, while it does not hold for MS prosody and an MS reading in (5.1). If MS prosody is ill-formed for (5.1), however, it will be proved that there is in fact a one-to-one mapping between prosody and interpretation, simply because (5.1) with MS prosody is just unacceptable in the languages under study. Of course, cross-dialectal and cross-linguistic variation is another research question.

(5.1) *Associations*



In the next section, I will show the results of my perception experiment on Osaka Japanese. The results tell us that the traditional view by Nishigauchi (1990) and Watanabe (1992) is correct; that is (Osaka) Japanese is sensitive to *wh*-islands. I will also discuss each of Kitagawa and Fodor's (2003) three factors in (5.5) in connection with my experimental data. First, (5.1) appears to be ambiguous, but part of the reason is because (5.1) yields super-informative answers that look like *wh*-answers (see (5.5a)). Second, the Minimize Dependencies principle makes the wrong predictions for the Osaka data (see (5.5b)). Finally, MS prosody is inappropriate for (5.1) (see (5.5c)). I will also compare my Osaka Japanese data with the data on other varieties of Japanese and Korean in Hwang (2011a, 2015).

5.3 Perception experiment on Osaka Japanese

This section presents my perception experiment with Osaka Japanese speakers. I chose Osaka Japanese for this experiment for the following reasons. First, it is the native language of the author. Second, it will enable us to make a comparison between different varieties and languages under study in this dissertation. Third, there has been no formal experimental work on Osaka Japanese. Nishigauchi (1990) mentions that Osaka Japanese speakers are less likely to get an MS reading from (5.1) than Tokyo Japanese speakers, probably based on informal consultation. Validation of this observation is also one of the purposes of the experiment.

Section 5.3.1 is about the stimuli and the procedure of this experiment. Section 5.3.2 is about the people who participated in the experiment. Section 5.3.3 discusses what is predicted in the experiment. Section 5.3.4 shows the results of the experiment; *wh*-islands cannot be overcome by prosody in Osaka Japanese. Section 5.3.5 discusses why previous studies claimed that prosody can solve *wh*-islands in (Tokyo) Japanese, focusing on what I call super-informative answers. Section 5.3.6 makes dialect and language comparisons.

5.3.1 Stimuli and procedure

I replicated Hirotani's (2005) and Hirose and Kitagawa's (2011) perception experiments for comparison. Recall that in these previous experiments, participants chose an appropriate answer from two to three answer choices to each question with ES or MS prosody. I made two modifications to correct defects in these experiments. First, I added control items, which were completely absent in the previous studies. Second, I added the third answer choice to see if the prosody is appropriate just as Hirose and Kitagawa did, but I slightly changed the wording.

I made 16 sentences in the construction in (5.1) as the experimental items; I will call these sentences ***ka*-sentences** because the embedded complementizer is *-ka*, which is al-

ways [+Q]. Two example sentences are given in (5.10). The sentences are in colloquial speech in Osaka Japanese. The matrix question marker is covert in the stimuli, which is common in colloquial speech. The embedded verbs are transitive verbs and I used the *wh*-word ^{H}*dare* 'who' in subject position in 8 sentences (see (5.10a)) and the *wh*-word ^{L}*nani* 'what' in object position in the rest of the sentences (see (5.10b)). I avoided using D-linked *wh*-phrases (Pesetsky 1987; see Chapter 1) because they can affect the interpretation of the stimuli (see Goodall 2015). I used ^{H}*yúu-ta* 'say-PST' in 8 sentences and ^{H}*kíi-ta* 'ask/hear-PST' in the rest of the 8 sentences as the matrix verb. I chose these two matrix verbs because of their high frequency and availability of both [+Q] and [−Q] complements. The superscript on each Prosodic Word (PWd) indicates H-beginningness or L-beginningness (see Chapter 1). The acute accent symbol ´ shows where a pitch accent is located.

(5.10) Ka-*sentences (experimental items) in Osaka Japanese*

a. えみ子は誰がセーター編んだか言うた？
[^{H}Émiko=wa [^{H}dare=ga ^{H}séetaa ^{L}an-dá-ka] ^{H}yúu-ta]?
Emiko=TOP who=NOM sweater(=ACC) knit-PST-Q say-PST(-Q)
ES reading: '[Did Emiko say [who$_i$ t_i knitted the sweater t_i]]?'
MS reading: '[Who$_i$ did Emiko say [whether t_i knitted the sweater]]?'

b. みよ子はまり子が何飲んだか言うた？
[^{H}Míyoko=wa [^{H}Máriko=ga ^{L}nani ^{L}non-dá-ka] ^{H}yúu-ta]?
Miyoko=TOP Mariko=NOM what(=ACC) drink-PST-Q say-PST(-Q)
ES reading: '[Did Miyoko say [what$_i$ Mariko drank t_i]]?'
MS reading: '[What$_i$ did Miyoko say [whether Mariko drank t_i]]?'

As control items, I also prepared sentences where the embedded complementizer is *-te*, which I will call ***te*-sentences**. The *te*-counterparts of the two sentences in (5.10) are presented in (5.11). *-Te* is a quotative complementizer used in colloquial speech, which is equivalent to *-tte* in Tokyo Japanese. This complementizer is undoubtedly ambiguous between [−Q] and [+Q]. *-Te* can be disambiguated with prosody; it is interpreted as [+Q] with ES prosody, while it is interpreted as [−Q] with MS prosody. These control items are

important in examining Kitagawa and Fodor's (2003) two of the three factors (Minimize Dependencies and prosodic influences in (5.5b) and (5.5c), respectively); if there is a clear one-to-one correspondence between prosody and interpretation in *te*-sentences, the two factors will be proved to be untenable.

(5.11) Te-*sentences (control items) in Osaka Japanese*

a. えみ子は誰がセーター編んだて言うた？
[^{H}Émiko=wa [^{H}dare=ga ^{H}séetaa ^{L}an-dá-te] ^{H}yúu-ta]?
Emiko=TOP who=NOM sweater(=ACC) knit-PST-C/Q say-PST(-Q)
ES reading: '[Did Emiko say [who$_i$ t_i knitted the sweater]]?'
MS reading: '[Who$_i$ did Emiko say [(that) t_i knitted the sweater]]?'

b. みよ子はまり子が何飲んだて言うた？
[^{H}Míyoko=wa [^{H}Máriko=ga ^{L}nani ^{L}non-dá-te] ^{H}yúu-ta
Miyoko=TOP Mariko=NOM what(=ACC) drink-PST-C/Q say-PST(-Q)
]?

ES reading: '[Did Miyoko say [what$_i$ Mariko drank t_i]]?'
MS reading: '[What$_i$ did Miyoko say [that Mariko drank t_i]]?'

Each of the 32 sentences (16 experimental and 16 control) is accompanied with ES prosody or MS prosody in Osaka Japanese; thus, the total number of the stimuli is 64 (see Appendix A for all the stimuli). There are 4 combinations with respect to the embedded complementizer and prosody: (a) *ka*-sentences with ES prosody, (b) *ka*-sentences with MS prosody, (c) *te*-sentences with ES prosody, and (d) *te*-sentences with MS prosody. The main focus of the experiment is the interaction between the two embedded complementizers and the two types of prosody, but I also wish to investigate how the location of a *wh*-word affects the interpretation of (5.1) because there have been no studies that investigate it to my knowledge. The 64 stimuli were divided into 4 lists using the Latin Square design; each list has 16 experimental sentences and the same 32 filler items were added to the 4 lists. Each list has 2 sentences per condition (^{H}*dare* 'who' in subject position

or ^{L}*nani* 'what' in object position × [+Q] *-ka* or [±Q] *-te* × ES prosody or MS prosody = 8 conditions). The author, a native speaker of Osaka Japanese, recorded all the stimuli. I did my best to use the same ES prosody and MS prosody for each sentence. I found it hard to read *ka*-sentences with MS prosody due to the unnaturalness of this pattern, but I tried to read those sentences just like *te*-sentences with MS prosody. The conditions are summarized in (5.12).

(5.12) *Conditions*

a. Subject ^{H}*dare* 'who' + [+Q] *-ka* + ES prosody

a′. Object ^{L}*nani* 'what' + [+Q] *-ka* + ES prosody

b. Subject ^{H}*dare* 'who' + [+Q] *-ka* + MS prosody

b′. Object ^{L}*nani* 'what' + [+Q] *-ka* + MS prosody

c. Subject ^{H}*dare* 'who' + [±Q] *-te* + ES prosody

c′. Object ^{L}*nani* 'what' + [±Q] *-te* + ES prosody

d. Subject ^{H}*dare* 'who' + [±Q] *-te* + MS prosody

d′. Object ^{L}*nani* 'what' + [±Q] *-te* + MS prosody

Figures 5.1-5.4 show the pitch tracks of the 4 sentence types: Figure 5.1 shows the pitch tracks of (5.10a) and (5.10b) (*ka*-sentences) with ES prosody, Figure 5.2 shows the pitch tracks of (5.10a) and (5.10b) (*ka*-sentences) with MS prosody, Figure 5.3 shows the pitch tracks of (5.11a) and (5.11b) (*te*-sentences) with ES prosody, and Figure 5.4 shows the pitch tracks of (5.11a) and (5.11b) (*te*-sentences) with MS prosody. In each figure, focus prosody is used in the *wh*-domain; the *wh*-words ^{H}*dare* 'who' and ^{L}*nani* 'what' receive a pitch boost and the lexical pitch fall in the *wh*-domain causes pitch compression, forming an ip (see Chapter 4). ES prosody inserts a pitch reset (an ip boundary) after the embedded complementizer, while MS prosody does not insert such a pitch reset; the *wh*-domain

is indicated by red lines in each figure. The sentences end with an Intonation Phrase (IP)-final H% boundary tone, which marks interrogative sentences.

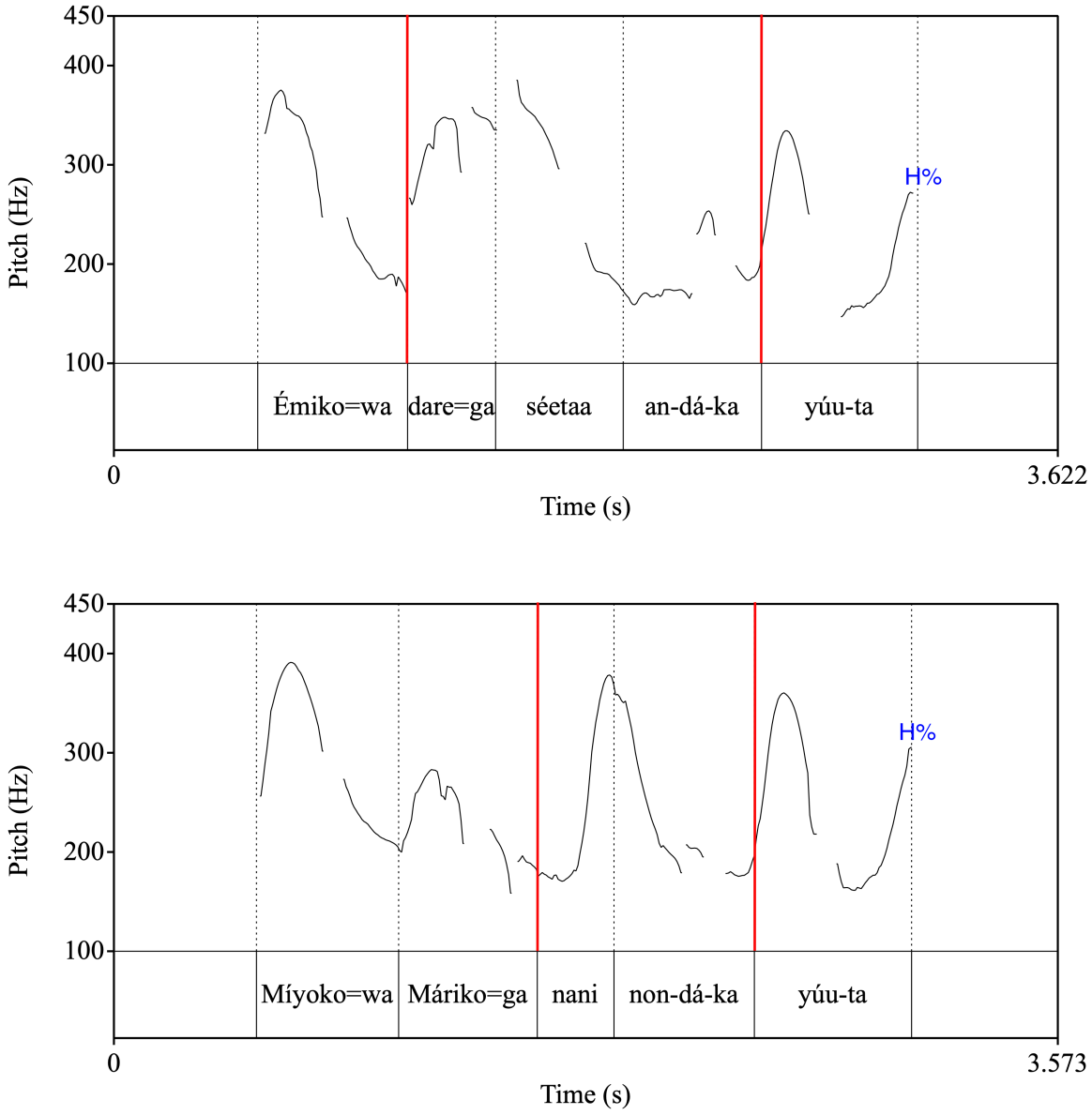


Figure 5.1: Pitch tracks of *ka*-sentences with ES prosody

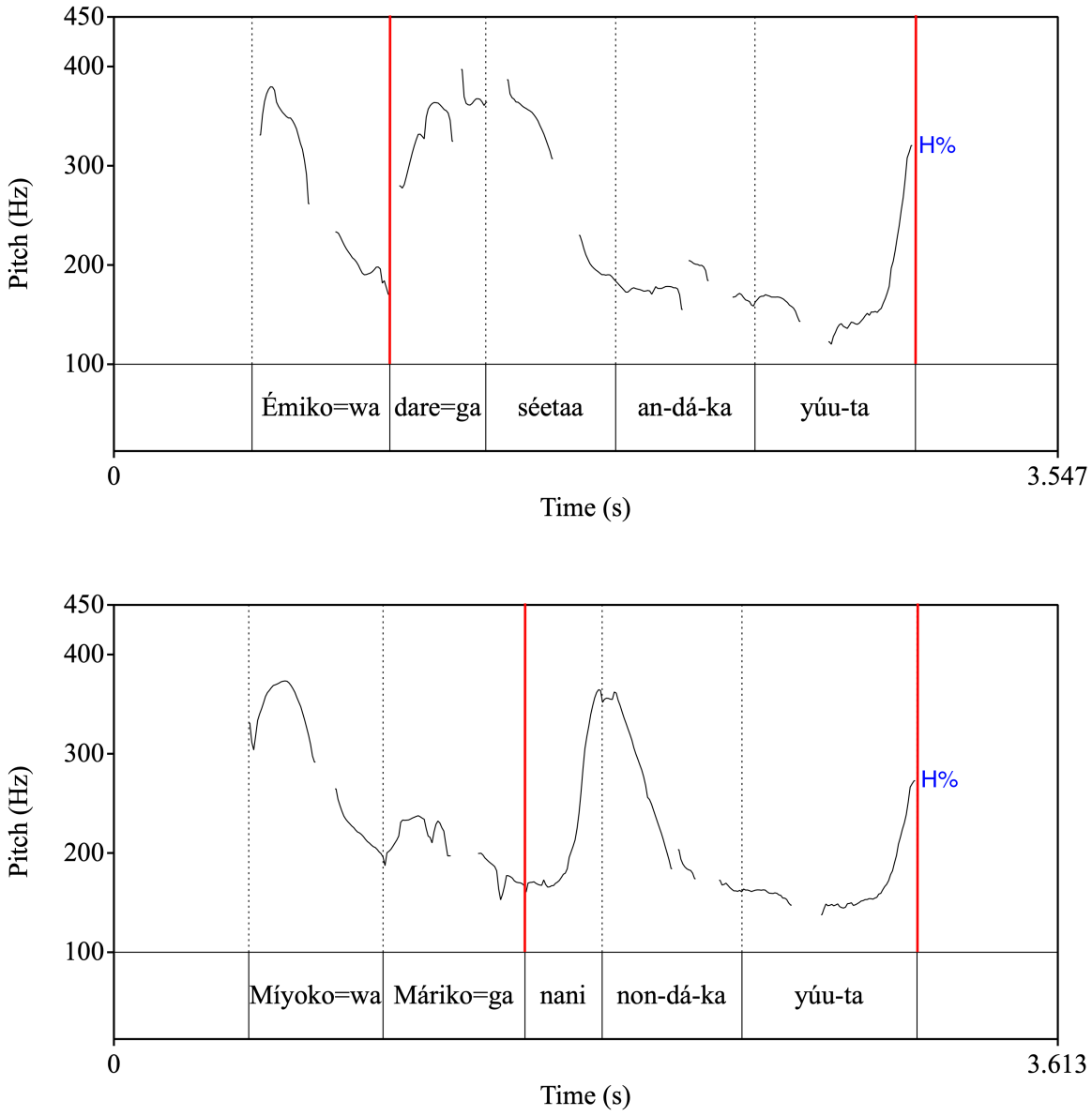


Figure 5.2: Pitch tracks of *ka*-sentences with MS prosody

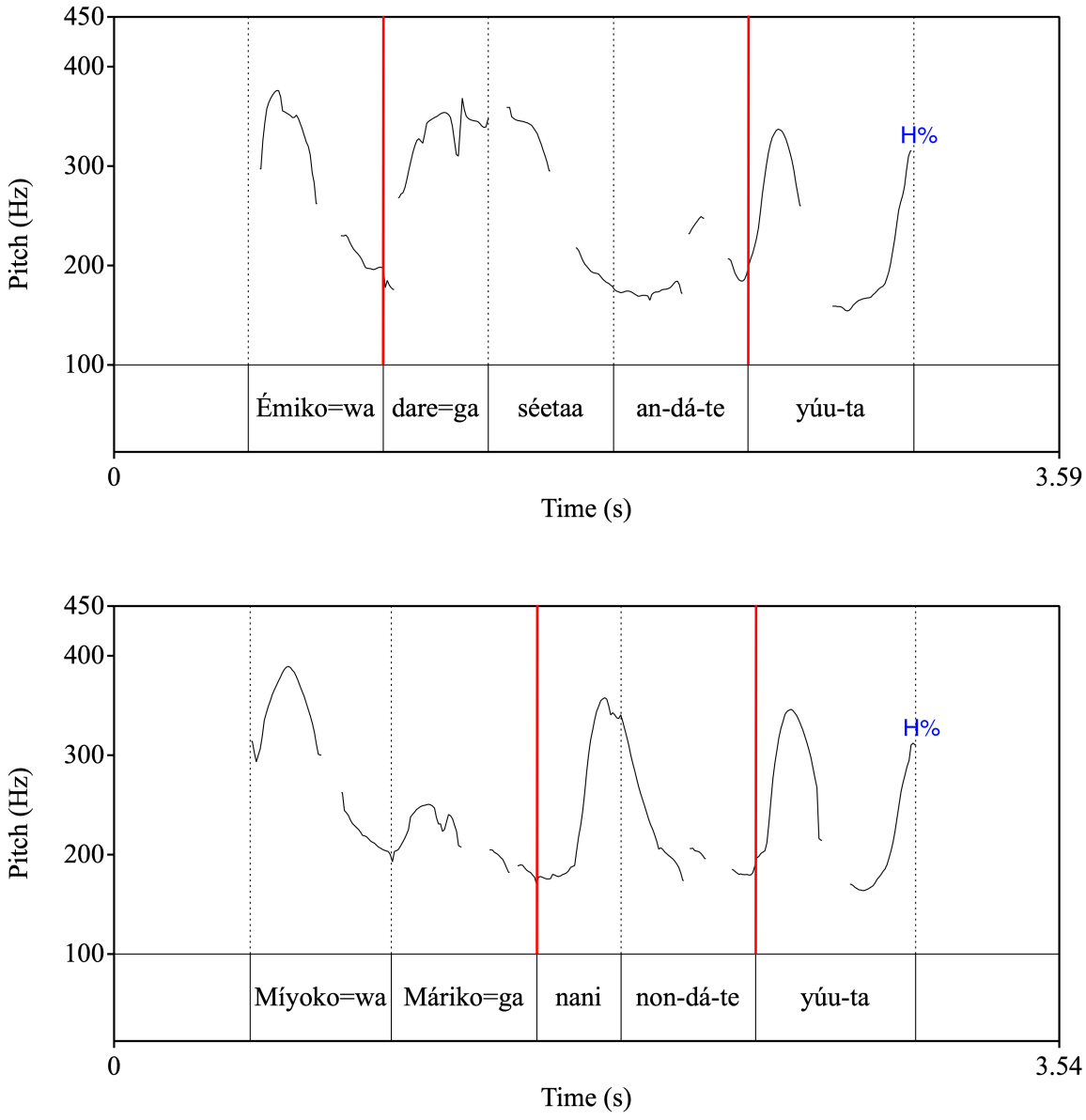


Figure 5.3: Pitch tracks of *te*-sentences with ES prosody

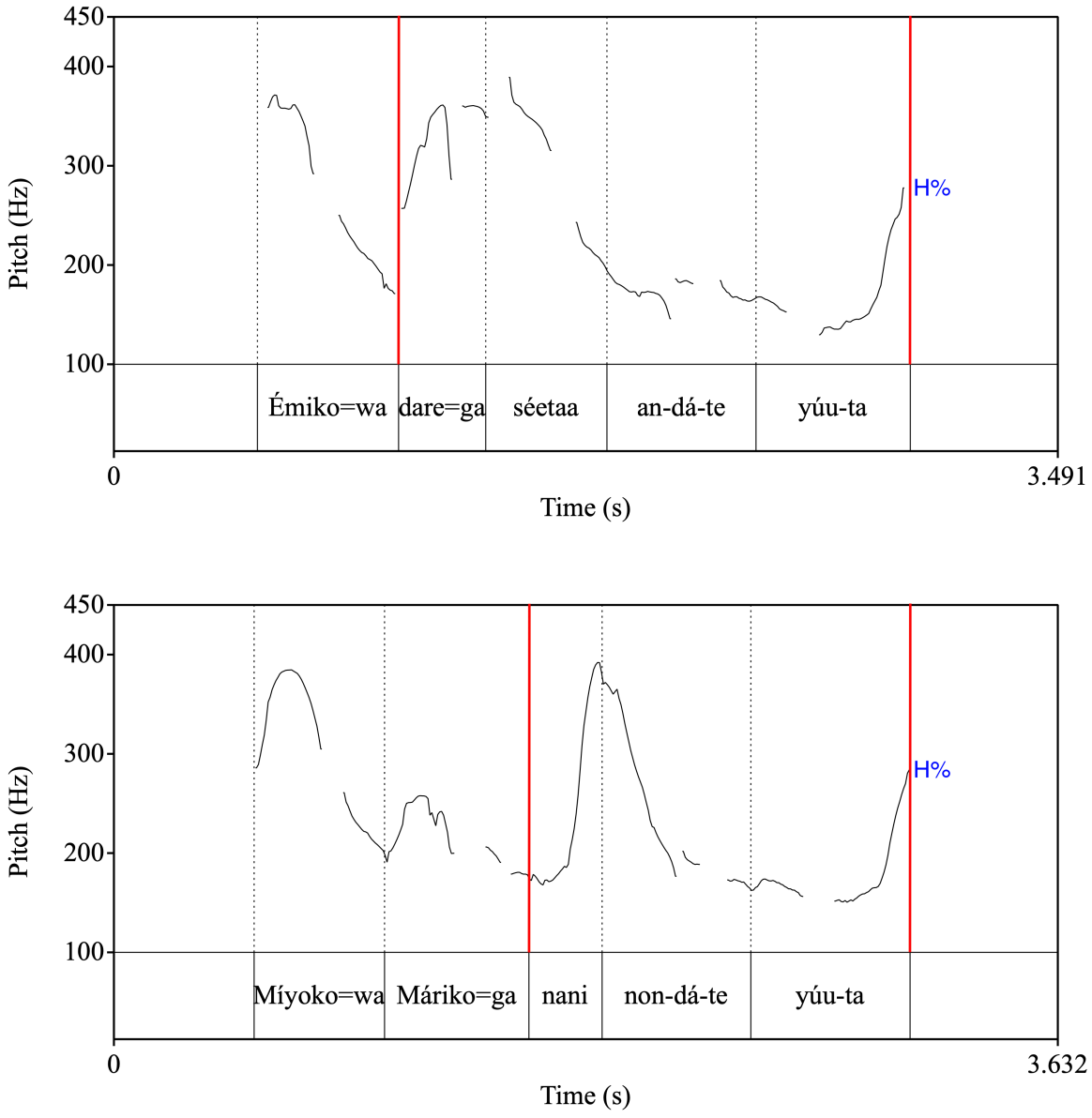


Figure 5.4: Pitch tracks of *te*-sentences with MS prosody

The task of this experiment is a forced-choice task. For each question, I gave three answer choices written in Japanese as in (5.13): the ES answer was always "Yes." and a DP was provided as an MS answer. The third answer choice was "Unnatural intonation."[7] Recall that Hirose and Kitagawa's (2011) third answer choice was "The question itself was ungrammatical." I did not use the word *ungrammatical* because the only thing that could be ill-formed in my (and Hirose and Kitagawa's) stimuli was the prosody. I also offered a practice session before the experiment and asked my participants to write comments if they had any after the experiment.

(5.13) *Answer choices*

a. ES answer: *Un.* 'Yes.' (うん。)

b. MS answer: e.g. *Yooko.* 'Yoko (female name).' (葉子。), *Otya.* 'Tea.' (お茶。)

c. *Husizen-na intoneesyon de ar-u.* 'Unnatural intonation.' (不自然なイントネーションである。)

I used the toolkit called *PsyToolkit*[8] (Stoet 2010, 2017) for this experiment. The survey screen is presented in Figure 5.5. I provided only the picture where Hanako (right) is asking "you" (left) a question.[9]

[7] I used the word *intoneesyon* 'intonation' instead of the word *purosodii* 'prosody' in (5.13c) because the word *intonation* is more familiar to Japanese people.

[8] https://www.psytoolkit.org/

[9] This picture is from いらすとや *Irasutoya* (https://www.irasutoya.com/).

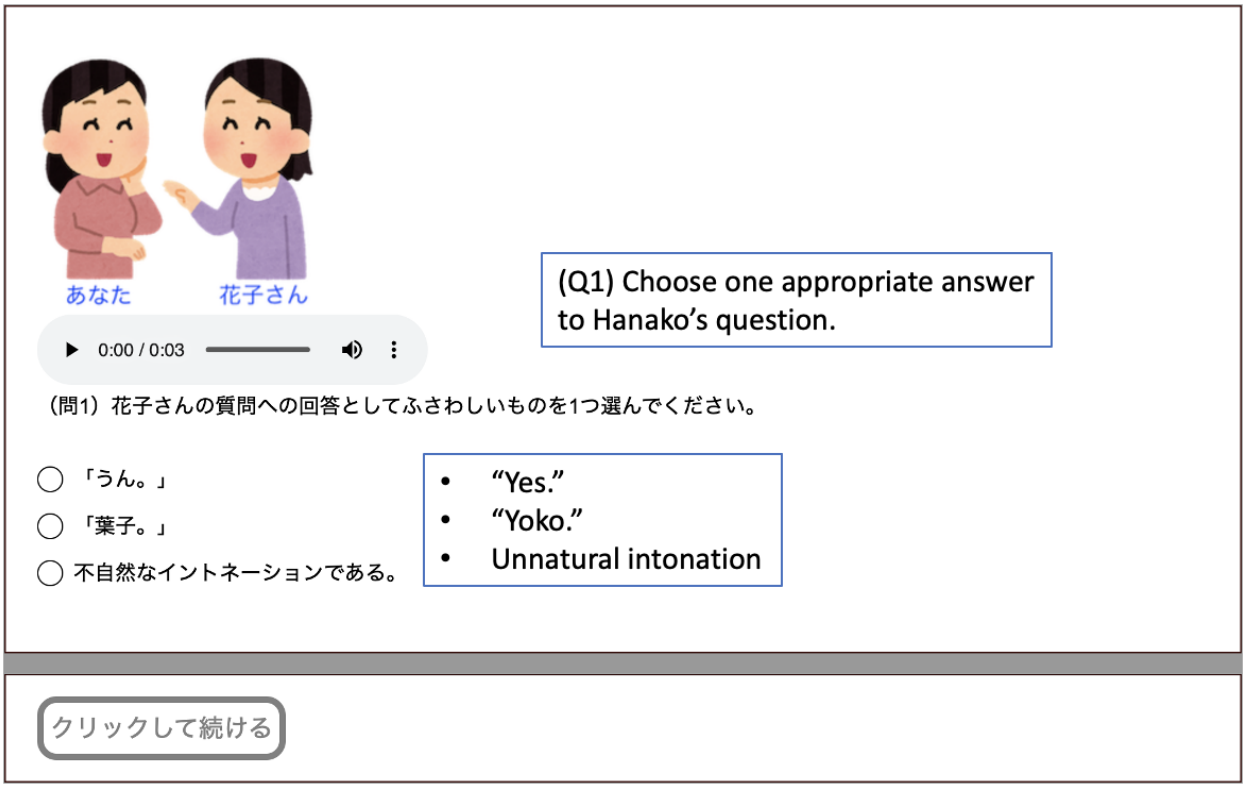


Figure 5.5: Survey screen

5.3.2 Participants

The participants of this experiment are 328 alumni[10] (female: 85, male: 242[11], prefer not to say: 1) of Osaka Prefectural Kozu High School （大阪府立高津高校）[12]. The average age was 53 at the time of the experiment (July 2022); the youngest participants were 18 years old and the oldest participants were 89 years old. Recall that I divided the stimuli into 4 list using the Latin Square design; 82 people answered List 1, 81 people answered List 2, 82 people answered List 3, and 83 people answered list 4. Since Kozu High School

[10]The number of the participants includes people who could not or did not answer all the questions in the survey.

[11]There are two reasons why a majority of the participants were male. First, Kozu High School used to be a boys' school before WWII. Second, it seems that male alumni are more active in the alumni association.

[12]https://kozu-osaka.jp/

is a public high school in Osaka, almost all of the alumni grew up in Osaka and speak Osaka Japanese as their native language. All the participants are non-linguists except for one participant.

5.3.3 Predictions

Two possible predictions can be made about the results of this experiment. First, in Deguchi and Kitagawa's (2002) and Ishihara's (2003)'s view that prosody can override *wh*-islands, both *ka*-sentences (experimental) and *te*-sentences (control) should show similar results; ES answers should be strongly preferred with ES prosody, while MS answers should be strongly preferred with MS prosody. The predicted results based on this view are in Table 5.3. Second, if the traditional view (Nishigauchi 1990; Watanabe 1992) that Japanese has strong *wh*-islands is correct, the two constructions should show different results. *Te*-sentences will be clearly ambiguous, while *ka*-sentences will not be ambiguous. In addition, if the traditional view is correct, a large proportion of the responses to *ka*-sentences with MS prosody should be "Unnatural intonation". The results in Table 5.4 will be obtained under the traditional view.

	ES answers	**MS answers**	**Unnatural**
***Ka* + ES**	✓		
***Ka* + MS**		✓	
***Te* + ES**	✓		
***Te* + MS**		✓	

Table 5.3: Predicted results of the experiment (Deguchi and Kitagawa's 2002 and Ishihara's 2003 view)

	ES answers	MS answers	Unnatural
***Ka* + ES**	✓		
***Ka* + MS**			✓
***Te* + ES**	✓		
***Te* + MS**		✓	

Table 5.4: Predicted results of the experiment (traditional view)

I also have two predictions based on my native intuition. First, some speakers will judge *te*-sentences as unnatural regardless of prosody because the quotative complementizer *-te* is used only in colloquial speech unlike the question marker *-ka*, which is used both in formal and colloquial speech, and some non-linguists will likely be influenced by prescriptive grammar. Second, the position of a *wh*-phrase (^{H}*dare* 'who' in subject position and ^{L}*nani* 'what' in object position) does not make a difference.

5.3.4 Results

The results of the perception experiment are presented in Tables 5.5–5.8. Each table corresponds to each sentence type: Table 5.5 is *ka*-sentences with ES prosody, Table 5.6 is *ka*-sentences with MS prosody, Table 5.7 is *te*-sentences with ES prosody, and Table 5.8 is *te*-sentences with MS prosody. Each table also presents the data on each *wh*-position: subject (^{H}*dare* 'who') and object (^{L}*nani* 'what') positions.

	ES answers	MS answers	Unnatural	Total
Subject	545 (83.4%)	97 (14.9%)	11 (1.7%)	653 (100%)
Object	504 (77.3%)	125 (19.2%)	23 (3.5%)	652 (100%)
Total	1,049 (80.4%)	222 (17%)	34 (2.6%)	1,305 (100%)

Table 5.5: Results of the perception experiment (*ka* + ES)

	ES answers	MS answers	Unnatural	Total
Subject	153 (23.5%)	107 (16.5%)	391 (60%)	651 (100%)
Object	118 (18.1%)	108 (16.6%)	426 (65.3%)	652 (100%)
Total	271 (20.8%)	215 (16.5%)	817 (62.7%)	1,303 (100%)

Table 5.6: Results of the perception experiment (*ka* + MS)

	ES answers	MS answers	Unnatural	Total
Subject	429 (65.8%)	143 (21.9%)	80 (12.3%)	652 (100%)
Object	384 (58.8%)	157 (24%)	112 (17.2%)	653 (100%)
Total	813 (62.3%)	300 (23%)	192 (14.7%)	1,305 (100%)

Table 5.7: Results of the perception experiment (*te* + ES)

	ES answers	MS answers	Unnatural	Total
Subject	11 (1.7%)	526 (80.6%)	115 (17.7%)	652 (100%)
Object	8 (1.2%)	492 (75.6%)	151 (23.2%)	651 (100%)
Total	19 (1.5%)	1,018 (78%)	266 (20.5%)	1,303 (100%)

Table 5.8: Results of the perception experiment (*te* + MS)

I conducted a statistical analysis using R (R Core Team 2021).[13] I applied generalized linear mixed effects regression with a binomial distribution and logit link to model the three answer choices (ES answers, MS answers, and Unnatural) as a function of condition with a random effect of participant.[14] The predicted probabilities from the data are given in Tables 5.9–5.12: Table 5.9 is *ka* + ES, Table 5.10 is *ka* + MS, Table 5.11 is *te* + ES, and Table 5.12 is *te* + MS. The p-values in the tables show the differences between the subject ^{H}*dare* 'who' and the object ^{L}*nani* 'what'. Although some of the p-values are a bit smaller than 0.05, the data show that the position of a *wh*-word does not affect the interpretation of both *ka*-sentences and *te*-sentences (experimental and control, respectively).

[13] I would like to thank Stephen Parry at the Cornell Statistical Consulting Unit (https://cscu.cornell.edu/) for assisting me with the analysis. Of course, all errors and misinterpretations are my own.

[14] For the statistical analysis in this chapter, I used the following packages in R: emmeans (Lenth 2023), lme4 (Bates et al. 2015), and tidyr (Wickham et al. 2023).

	ES answers	MS answers	Unnatural
Subject	90.9%	9.8%	0.4%
Object	85.3%	13.3%	0.9%
p-values (Subject vs. Object)	0.0259	0.3876	0.3809

Table 5.9: Predicted probabilities (*ka* + ES)

	ES answers	MS answers	Unnatural
Subject	15.6%	10.9%	64.4%
Object	10.5%	11%	72.8%
p-values (Subject vs. Object)	0.0993	1.0000	0.1728

Table 5.10: Predicted probabilities (*ka* + MS)

	ES answers	MS answers	Unnatural
Subject	72.2%	16.1%	4.3%
Object	62.7%	18.4%	7.1%
p-values (Subject vs. Object)	0.0359	0.9560	0.0740

Table 5.11: Predicted probabilities (*te* + ES)

	ES answers	MS answers	Unnatural
Subject	0.6%	86.3%	7.4%
Object	0.4%	81.2%	11.6%
p-values (Subject vs. Object)	0.9970	0.1927	0.0634

Table 5.12: Predicted probabilities (*te* + MS)

Since the position of a *wh*-word does not make a difference, I grouped the subject ^{H}*dare* 'who' and the object ^{L}*nani* 'what' together in Table 5.13. Table 5.14 shows the predicted probabilities. Table 5.14 reveals that there is no strict one-to-one mapping between prosody and interpretation in Osaka Japanese. In *ka*-sentences, ES answers are strongly preferred over MS answers with ES prosody; the difference in the predicted probabilities is statistically significant ($p < 0.0001$).[15] In contrast, "Unnatural" is the most preferred answer choice in *ka*-sentences with MS prosody; both the difference between "Unnatural"

[15]I applied post hoc custom contrasts to see the differences in the data here.

and ES answers and the difference between "Unnatural" and MS answers are statistically significant ($p < 0.0001$). The data indicate that *ka*-sentences become ill-formed with MS prosody. Comments from some participants also suggest that this combination is ill-formed; they pointed out that the sentence-final pitch lowering was unnatural.[16] Their comments imply that pitch compression until the end of a sentence (= MS prosody) is unnatural. In fact, the large majority of the participants who wrote these comments found only specifically *ka*-sentences with MS prosody unnatural although some of them also found *te*-sentences with MS prosody unnatural. The data also tell us that ES answers and MS answers are almost equally chosen in *ka*-sentences with MS prosody; there is no significant difference between the predicted probabilities ($p = 0.0745$). Although the most preferred answer choice is "Unnatural", this finding is consistent with Hirotani's (2005) finding that there is no strong difference in preference between ES and MS answers in *ka*-sentences with MS prosody.

	ES answers	**MS answers**	**Unnatural**	**Total**
***Ka* + ES prosody**	1,049 (80.4%)	222 (17%)	34 (2.6%)	1,305 (100%)
***Ka* + MS prosody**	271 (20.8%)	215 (16.5%)	817 (62.7%)	1,303 (100%)
***Te* + ES prosody**	813 (62.3%)	300 (23%)	192 (14.7%)	1,305 (100%)
***Te* + MS prosody**	19 (1.5%)	1,018 (78%)	266 (20.5%)	1,303 (100%)

Table 5.13: Results of the perception experiment

[16] Here are some of the original comments in Japanese. いくつか疑問文の文末で「～聞いた」とありましたが、聞いた↓と最後の「た」が下がるのが使わない不自然なイントネーションだと感じた。 "Some of the questions involved '*kii-ta*' sentence-finally. I felt that the pitch lowering of *-ta* like *kii-ta*↓ was unnatural because I would not use it." 最後の「言うた～」、の音がが下がるのが不自然に聞こえました。 "The pitch lowering of the final sound of '*yuu-ta*' sounded unnatural." 質問の語尾のイントネーションが下がるのに違和感あり。 "The question-final pitch lowering sounded unnatural." 語尾のイントネーションが低めでおかしいのが多々あったと思う。 "I found many sentences unnatural because of the sentence-final lower pitch." 「…か（て）いうた（きいた）?」というところで、声の調子を下げるときがあると不自然に感じました。 "I felt that the sentences sounded unnatural when the pitch was lowered in '*...-ka/te yuu-ta/kii-ta*'."

	ES answers	MS answers	Unnatural
***Ka* + ES prosody**	91.7%	6.9%	0.4%
***Ka* + MS prosody**	9.3%	6.4%	71.7%
***Te* + ES prosody**	70.3%	12.2%	4.7%
***Te* + MS prosody**	0.2%	89.3%	7.9%

Table 5.14: Predicted probabilities

Comparison between my data on Osaka Japanese and Hirose and Kitagawa's (2011) data on Tokyo Japanese in Table 5.2 show that these two varieties do not exhibit much difference. Recall that Tokyo Japanese speakers appear to get an MS reading from *ka*-sentences (with ES prosody) more easily than Osaka Japanese speakers, according to Nishigauchi (1990). My data show that this is not correct. The proportions of MS answers to *ka*-sentences with ES prosody were 17% in my raw Osaka Japanese data (see Table 5.13) and 9% in Hirose and Kitagawa's Tokyo Japanese data (see also Hirotani's 2005 Tokyo Japanese data in Table 5.1). The proportion of "Unnatural" to *ka*-sentences with MS prosody in my raw Osaka Japanese data (62.7%; see Table 5.13) is larger than the proportion of "Ungrammatical" to *ka*-sentences with MS prosody in Hirose and Kitagawa's Tokyo Japanese data (19%; see Table 5.2), but this difference may come from the wording in our third answer choices: I used the word *unnatural*, while Hirose and Kitagawa used the word *ungrammatical*. As I pointed out, the word *ungrammatical* is inappropriate because our stimulus sentences are perfect sentences in Japanese, if judged independently of prosody. In addition, Hirose and Kitagawa also provided written text for each question, which is likely to have affected the participants' responses.

In contrast to *ka*-sentences, the predicted probabilities in Table 5.14 indicate that there is a one-to-one mapping between prosody and interpretation in *te*-sentences; ES answers are strongly preferred over MS answers with ES prosody ($p < 0.0001$), while MS answers are strongly preferred over ES answers with MS prosody ($p < 0.0001$). My data show that two of the three factors (Minimize Dependencies in (5.5b) and prosodic influences in (5.5c)) suggested by Kitagawa and Fodor (2003) are not tenable. If Kitagawa and Fodor's

proposal held, ES answers would be preferred in *te*-sentences even with MS prosody and MS prosody would be unnatural in *te*-sentences.

As I also predicted, the predicted probabilities of "Unnatural" are slightly larger in *te*-sentences than in *ka*-sentences with ES prosody (see Table 5.14) because *-te* occurs only in colloquial speech. There might also have been some participants who do not use this complementizer.

In summary, the data from the experiment are close to Table 5.4, not to Table 5.3. That is, prosody cannot override *wh*-islands in (Osaka) Japanese, which supports the traditional view of Nishigauchi (1990) and Watanabe (1992).

5.3.5 Discussion

This subsection reexamines the proposals made by Deguchi and Kitagawa (2002), Ishihara (2003), and Hirotani (2005). Recall that Deguchi and Kitagawa and Ishihara argue that (5.1) (= *ka*-sentences) is potentially ambiguous and that Hirotani argues that (5.1) with MS prosody is ambiguous between ES and MS interpretations.

I showed that (5.1) is not ambiguous at all with my experimental data. Since I already showed that two of the three factors claimed by Kitagawa and Fodor (2003) to make MS reading difficult to obtain from (5.1) are not tenable, I discuss the final factor (5.5a) semantic/pragmatic complexity in this subsection. I argue that what previous studies such as Deguchi and Kitagawa (2002) and Ishihara (2003) have interpreted as ambiguity in (5.1) is partially due to the possibility of pragmatic super-informative yes/no answers that look like *wh*-answers. (5.1) with MS prosody does not give us an MS reading simply because this combination is ungrammatical.

As discussed in Section 5.2.3, super-informative answers are answers triggered by the cooperative principle in pragmatics. The construction in (5.1) is a matrix yes/no question, but speakers may fill the variable associated with the embedded *wh*-word to be cooperative. In particular, super-informative answers may serve to satisfy the Maxim of Quantity

(Grice 1975), as I spell out in more detail below. Some of the participants of my experiment noticed exactly this: they pointed out in their comments that some of the stimulus questions allowed both ES and MS answers. One participant said, "Some questions allowed either answer choice. We can answer yes, but it is often the case that we give answers more than 'Yes' to be cooperative..."[17] Another participant said, "There were many questions that can be answered by saying either 'Yes' or 'Yoko'."[18] The stimuli that allow both answer types seem to be *ka*-sentences with ES prosody and *te*-sentences with ES prosody from the participants' responses.[19]

My experimental data also suggest that this analysis is correct. Let us look at the dispreferred answer choices in Table 5.13 and Table 5.14, which are repeated below. Sentences (both *ka*- and *te*-) with ES prosody give us an ES reading, while *te*-sentences with MS prosody give us an MS reading; thus, the dispreferred answer choices are MS answers for sentences with ES prosody and ES answers for *te*-sentences with MS prosody. The proportions of MS answers to *ka*-sentences with ES prosody and to *te*-sentences with ES prosody are 17% and 23%, respectively (see Table 5.13); the predicted probabilities of these conditions are 6.9% and 12.2%, respectively (see Table 5.14). In contrast, the proportion of ES answers to *te*-sentences with MS prosody is only 1.5% (see Table 5.13); the predicted probability is 0.2% (see Table 5.14). I performed post hoc custom contrasts to the data in Table 5.14 to compare the three predicted probabilities; (5.14) shows that all the predicted probabilities are significantly different at the 0.05 level, but that the differences between the predicted probabilities of *ka* + ES prosody + MS answers and *te* + ES prosody + MS answers and the predicted probability of *te* + MS prosody + ES answers are much larger ($p < 0.0001$). I claim that the differences in these values come from the possibility of

[17] どちらの答えもありうると思うものがいくつかありました。うんと答えるか、先読みしてサービス精神から「うん」という以上の答えを言うことも多いので、… in Japanese.

[18] 「うん」と言う回答でもいいし、「葉子」と回答しても良い質問が多くありました。 in Japanese.

[19] Some of the participants who wrote these comments also interpreted *ka*-sentences with MS prosody as ambiguous probably because they were not so attentive to prosody and ignored prosody to interpret the sentences (see Strategy 1 in (5.18a)). However, they never chose ES answers for *te*-sentences with MS prosody.

super-informative answers. There are two important points here. First, super-informative yes/no answers happen to be the same as *wh*-answers (= MS answers). Second, getting MS answers does not mean that sentences are *wh*-questions.

	ES answers	**MS answers**	**Unnatural**	**Total**
***Ka* + ES prosody**	1,049 (80.4%)	222 (17%)	34 (2.6%)	1,305 (100%)
(*Ka* + MS prosody)	271 (20.8%)	215 (16.5%)	817 (62.7%)	1,303 (100%)
***Te* + ES prosody**	813 (62.3%)	300 (23%)	192 (14.7%)	1,305 (100%)
***Te* + MS prosody**	19 (1.5%)	1,018 (78%)	266 (20.5%)	1,303 (100%)

Table 5.13: Results of the perception experiment

	ES answers	**MS answers**	**Unnatural**
***Ka* + ES prosody**	91.7%	6.9%	0.4%
(*Ka* + MS prosody)	9.3%	6.4%	71.7%
***Te* + ES prosody**	70.3%	12.2%	4.7%
***Te* + MS prosody**	0.2%	89.3%	7.9%

Table 5.14: Predicted probabilities

(5.14) *Post hoc custom contrasts and p-values*

a. *Ka* + ES + MS answers vs. *Te* + ES + MS answers → $p = 0.0003$

b. *Ka* + ES + MS answers vs. *Te* + MS + ES answers → $p < 0.0001$

c. *Te* + ES + MS answers vs. *Te* + MS + ES answers → $p < 0.0001$

I suggest that evidentiality is related to the felicity of super-informative answers with the type of matrix predicate used in my experiment. It is known that some verbs that take complement clauses have evidential meanings (Rooryck 2001a,b; Simons 2007). Simons argues that an embedded clause obtains "main point status" when the matrix verb functions as evidential. (5.15) gives a dialogue in English. The matrix clause in (5.15b) is not a direct answer to the *wh*-question in (5.15a); it is the embedded clause in (5.15b) that gives an answer to (5.15a). This is because the embedded clause in (5.15b) receives main point

status due to the evidentiality of the matrix verb *said*. (5.16) is a *ka*-sentence from my experiment. Recall that the matrix verbs that I used in my experiment are ^{H}*yúu-ta* 'say-PST' and ^{H}*kíi-ta* 'ask/hear-PST', which are both evidential.[20] I argue that super-informative answers occur to this type of question because the embedded *wh*-question obtains main point status.

(5.15) *English*

a. Who was Louise with last night?

b. [Henry said [that she was with Bill]]. (Simons 2007: (2))

(5.16) *Osaka Japanese* = (5.10a)

えみ子は誰がセーター編んだか言うた？

[^{H}Émiko=wa [^{H}dare=ga ^{H}séetaa ^{L}an-dá-ka] ^{H}yúu-ta]?
Emiko=TOP who=NOM sweater(=ACC) knit-PST-Q say-PST(-Q)

'[Did Emiko say [who$_i$ t_i knitted the sweater]]?'

→ "Yes." (yes/no) or "(Yes,) Yoko." (super-informative)

We can relate the felicity of super-informative answers to the evidential status of the matrix predicate in terms of Grice's (1975) Maxim of Quantity: "Make your contribution as informative as is required (for the current purposes of the exchange)" (p. 45). When the embedded *wh*-question has main point status, in Simons's (2007) terms, the answer that is "as informative as is required" is a *wh*-answer.

My analysis answers the question why some matrix verbs such as *care* do not trigger super-informative answers as we saw in (5.7) in Section 5.2.3. Ross (1973) found that evidential embedding verbs can be parenthetical as in (5.17) and called this construction "slifting (sentence lifting)". While verbs such as *say* and *hear* can be slifted, *care* cannot be slifted.[21]

[20] I discuss the 'hear-PST' meaning of the verb ^{H}*kíi-ta* here.
[21] I would like to thank Sarah Murray for pointing this out.

(5.17) *Slifting*

Max is a Martian, {*I feel*, *we realized*, ...}. (Ross 1973: (1))

Let us move on to Hirotani's (2005) proposal that in Tokyo Japanese, (5.1) (= *ka*-sentences) with ES prosody gives us only an ES reading, but that (5.1) with MS prosody gives us both ES and MS readings (see the Scope Prosody Correspondence in (5.3)). Although I did not run an experiment on Tokyo Japanese, my intuition and Hirose and Kitagawa's (2011) data suggest that (5.1) with MS prosody is ill-formed. Then, the question here is how speakers answer ill-formed questions when there are only two answer choices (ES and MS answers).

I claim that speakers use either one of the two strategies in (5.18) to interpret ill-formed questions (*ka*-sentences with MS prosody). They ignore either the prosody or the embedded question marker *-ka*. If speakers ignore the prosody as in (5.18a), they interpret the questions as matrix yes/no questions. If speakers ignore the embedded Q-marker *-ka* as in (5.18b), they interpret the questions as matrix *wh*-questions. This hypothesis can explain why Hirotani's (2005) data with MS prosody did not show a strong preference between the two answer types.[22]

(5.18) *Two strategies*

a. Speakers ignore MS prosody and interpret *ka*-sentences with MS prosody with the embedded Q-marker *-ka*. (= yes/no questions)

b. Speakers ignore the embedded Q-marker *-ka* and interpret *ka*-sentences with MS prosody with MS prosody. (= *wh*-questions)

[22] In fact, my hypothesis is supported by a comment from a participant of the pilot version of this experiment. S/he interpreted *ka* + MS as if it were *te* + MS. The original Japanese comment is as follows: 「何をも↑ろたか↓き↓いた↑?」のところで、「何をも↑ろたて↓き↓い↓た↑?」にすると、すんなり入ってきました。 I used the verb もろた (^{H}*móro-ta* 'receive-PST'), which is もらった (*morat-ta*) in Tokyo Japanese, as one of the embedded verbs in the pilot experiment.

5.3.6 Comparison between varieties and languages

Hwang (2011a, 2015) conducted similar perception experiments to Hirotani's (2005) and Hirose and Kitagawa's (2011) perception experiments, but Hwang tested two more languages aside from Tokyo Japanese: Fukuoka Japanese and Busan Korean. The task of the experiments was forced-choice; participants chose either an ES answer or an MS answer after listening to each question with ES or MS prosody. No context was given in these experiments, either. In addition, Hwang provided neither control items nor the third answer choice (unnatural/ungrammatical).

Table 5.15 shows the results of the experiments by Hwang (2011a, 2015). With ES prosody, almost all responses were ES answers in all three languages. Note that Hwang told participants to "answer exactly and only what they were asked" (pp. 136–137 in Hwang 2011a and p. 50 in Hwang 2015) to avoid what I call super-informative answers. This is probably the reason why the proportion of ES answers with ES prosody in Hwang's data on Tokyo Japanese is larger than Hirotani's (2005) data in Table 5.1. Although Hwang argues that a one-to-one correspondence between prosody and interpretation holds for MS prosody and the MS reading, the degree of acceptance of MS answers is different across the three languages; Busan Korean (98.2%) and Fukuoka Japanese (80.9%) are higher than Tokyo Japanese (62.2%).

		ES answers	**MS answers**	**Total**
Tokyo Japanese	**ES prosody**	96.3%	3.7%	100%
	MS prosody	37.8%	62.2%	100%
Fukuoka Japanese	**ES prosody**	95.2%	4.8%	100%
	MS prosody	19.1%	80.9%	100%
Busan Korean	**ES prosody**	98.6%	1.4%	100%
	MS prosody	1.8%	98.2%	100%

Table 5.15: Results of Hwang's (2011a) perception experiments (adapted from Hwang 2011a: Table 4.10)

It is highly possible that (5.1) (= *ka*-sentences) is ungrammatical with MS prosody in Fukuoka Japanese. Hwang (2011a, 2015) reports that one of the four Fukuoka Japanese

speakers in her production experiment did not accept this combination. Likewise, although there are no clear data that show that (5.1) is ungrammatical with MS prosody in Busan Korean, informal consultation with some native speakers of different varieties of Korean reveals that this combination seems to be marginal in Korean in general. Traditionally, (Seoul) Korean is claimed to be sensitive to *wh*-islands, as shown in (1.7), repeated from Chapter 1. One Seoul Korean consultant supports this view. Gyeongsang Korean has special question markers for both yes/no and *wh*-questions; the question marker for yes/no questions is *-na* and the question marker for *wh*-questions is *-no* (see Cho and Whitman 2020). (1.11) is repeated from Chapter 1. (1.11a) has the question marker *-na* and is interpreted as a matrix yes/no question. In contrast, (1.11b) has the question marker *-no* and Hwang (2011a,b) claims that with the appropriate prosody, this sentence is interpreted as a matrix *wh*-question, overriding the *wh*-island constraint. However, one native speaker of Daegu Korean told me that it is impossible to process (1.11b). Therefore, I conclude that (5.1) is unambiguous both in Japanese and Korean.

(1.7) *(Seoul) Korean*

철수는 영희가 왜 자신을 좋아하는지 아니?

[Chelswu=nun [Yenghi=ka way casin=ul cohaha-nun-ci] a-ni]?
Chelswu=TOP Yenghi=NOM why self=ACC like-ADN-Q know-Q

a. ES reading: '[Does Chelswu$_i$ know [why Yenghi likes him$_i$]]?'

b. MS reading: '*[Why does Chelswu$_i$ know [whether Yenghi likes him$_i$]]?'

(Han 1992: (1))

(1.11) *Busan Korean*

a. *Embedded scope*

민호는 유미가 누구를 만났는지 궁금해하나?
[Minho=nun [Yumi=ka nwukwu=lul manna-ss-nun-ci]
Minho=TOP Yumi=NOM who=ACC meet-PST-ADN-Q

kwungkumhayha-**na**]?
wonder-$Q_{[-wh]}$
'[Does Minho wonder [who$_i$ Yumi met t_i]]?'

b. *Matrix scope*

민호는 유미가 누구를 만났는지 궁금해하노?
[Minho=nun [Yumi=ka nwukwu=lul manna-ss-nun-ci]
Minho=TOP Yumi=NOM who=ACC met-PST-ADN-Q

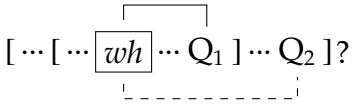
kwungkumhayha-**no**]?
wonder-$Q_{[+wh]}$
'[Who$_i$ does Minho wonder [whether Yumi met t_i]]?' (Hwang 2011a: (2.9))

Then, why did Fukuoka Japanese and Busan Korean speakers tend to choose more MS answers than Tokyo Japanese speakers when they listened to (5.1) with MS prosody in Hwang's (2011a; 2015) experiments where there were only ES and MS answers in the answer choices? As I discussed in Chapter 4, different varieties of Japanese and Korean use different prosodic phrase levels to mark *wh*-scope, depending on the prosodic properties of *wh*-elements and the prosodic properties of each variety. Tokyo Japanese and Osaka Japanese use focus prosody in ip, while Fukuoka Japanese and Busan Korean use non-focus prosody at the level of Accentual Phrase (AP). As Hwang herself pointed out, *wh*-prosody happens to be the same as focus prosody in Tokyo Japanese, while *wh*-prosody is exclusively used for *wh*-scope marking in Fukuoka Japanese and Busan Korean. This suggests that Fukuoka Japanese and Busan Korean speakers may privilege the prosodic cue to interpret ill-formed questions because of the uniqueness of the prosody.

5.4 Conclusion

This chapter examined the claim that Japanese and Korean can overcome *wh*-island effects if the appropriate prosody is assigned. My perception experiment showed that this claim is wrong and that the traditional claim that Japanese has strong *wh*-island effects is correct at least in Osaka Japanese. It appears that the construction in (5.1), which is repeated below, yields what may at first appear to be an answer to a matrix *wh*-question interpretation, but this appearance is misleading. The alternative possibility I have suggested is that cooperative speakers supply a value for the variable in the embedded *wh*-question with what I have called a super-informative answer.

(5.1) *Associations*



CHAPTER 6

CONCLUSION

In this dissertation, I investigated the relationship between prosody and *wh*-scope in two *wh*-in-situ languages, Japanese and Korean. In relation to this investigation, I also analyzed the prosodic properties of Gyeongsang Korean in detail. This chapter summarizes Chapters 2–5, discussing the contributions to (Japanese and Korean) linguistics and the directions for future research.

In Chapters 2 and 3, I discussed the accent classes and the prosodic structure of Gyeongsang Korean, respectively. I proposed that native words and loanwords have different sets of accent classes in Gyeongsang Korean. Native words lack a final-accented class for historical reasons (Ramsey 1978), but have an unaccented class. In contrast, loanwords lack an unaccented class, but have a final-accented class because pitch accent assignment is determined by syllable weight (Chung 2000; Lee 2009, among others). I supported my analysis with synchronic data, focusing on the differences between unaccented words and final-accented words in lexical pitch accent languages in general. I also supported my analysis of the accent classes with my analysis of the intonational phonology of Gyeongsang Korean. In these two chapters, I showed that Gyeongsang Korean is similar to Tokyo Japanese in that these languages are [+lexical tone, +multiword AP] (see Igarashi 2012, 2014) with an unaccented class. My hope is that the fuller understanding of the Gyeongsang lexical pitch accent system provided here will help us better understand the Tokyo lexical pitch accent system, and vice versa.

In Chapter 4, I proposed that *wh*-in-situ languages form a prosodic phrase at the lowest possible prosodic phrase level in the prosodic hierarchy; Accentual Phrase (AP) is preferred over Intermediate Phrase (ip). [±lexical tone] and [±multiword AP] proposed by Igarashi (2012, 2014) are responsible for whether AP can be used for prosodic *wh*-scope marking. I showed that my proposal works for Japanese and Korean as well as Bengali. I also discussed default focus in *wh*-indeterminates and non-default focus with antecedents

such as contrastive focus; non-focus H plateau prosody can be overridden by non-default focus. How specific subtypes of focus affect prosodic *wh*-scope marking is the natural next step in this line of research.

Finally, I discussed whether prosody overcomes *wh*-islands in Chapter 5. I showed that the traditional claim about *wh*-islands in Japanese (Nishigauchi 1990; Watanabe 1992) is correct with my experimental data on Osaka Japanese; that is, (Osaka) Japanese has strong *wh*-island effects. Comparison with other varieties of Japanese and Korean tells us that the same thing is likely to apply to those varieties. My data suggest that the patterning of island effects in these varieties can be masked by the possibility of "super-informative answers". Three particular features distinguish my experiment from the previous experiments. First, I added control items, which are clearly ambiguous. Second, I provided the answer choice "Unnatural" in addition to yes/no and *wh*-answers so that participants can judge naturalness. Third, the research language is Osaka Japanese, which has not been studied for this topic. A natural next step in my research is to conduct similar experiments with speakers of different varieties of Japanese and Korean to corroborate my findings.

In Japanese and Korean linguistics, it is still relatively uncommon to compare the two languages and to look at non-Tokyo and non-Seoul varieties. I hope that this dissertation will encourage Japanese and Korean linguists to do Japanese/Korean comparative studies and cross-dialectal studies to have a better understanding of Japanese and Korean.

APPENDIX A

STIMULI FOR THE PERCEPTION EXPERIMENT

(A.1) a. えみ子は誰がセーター編んだか言うた？
[^{H}Émiko=wa [^{H}dare=ga ^{H}séetaa ^{L}an-dá-ka] ^{H}yúu-ta]?
Emiko=TOP who=NOM sweater(=ACC) knit-PST-Q say-PST(-Q)
ES reading: '[Did Emiko say [who$_i$ t_i knitted the sweater]]?'
MS reading: '[Who$_i$ did Emiko say [whether t_i knitted the sweater]]?'

b. えみ子は誰がセーター編んだて言うた？
[^{H}Émiko=wa [^{H}dare=ga ^{H}séetaa ^{L}an-dá-te] ^{H}yúu-ta]?
Emiko=TOP who=NOM sweater(=ACC) knit-PST-C/Q say-PST(-Q)
ES reading: '[Did Emiko say [who$_i$ t_i knitted the sweater]]?'
MS reading: '[Who$_i$ did Emiko say [(that) t_i knitted the sweater]]?'

(A.2) a. くみ子は誰が鍵失くしたか言うた？
[^{H}Kúmiko=wa [^{H}dare=ga ^{H}kági ^{H}nákusi-ta-ka] ^{H}yúu-ta]?
Kumiko=TOP who=NOM key(=ACC) lose-PST-Q say-PST(-Q)
ES reading: '[Did Kumiko say [who$_i$ t_i lost the key]]?'
MS reading: '[Who$_i$ did Kumiko say [whether t_i lost the key]]?'

b. くみ子は誰が鍵失くしたて言うた？
[^{H}Kúmiko=wa [^{H}dare=ga ^{H}kági ^{H}nákusi-ta-te] ^{H}yúu-ta]?
Kumiko=TOP who=NOM key(=ACC) lose-PST-C/Q say-PST(-Q)
ES reading: '[Did Kumiko say [who$_i$ t_i lost the key]]?'
MS reading: '[Who$_i$ did Kumiko say [(that) t_i lost the key]]?'

(A.3) a. なお子は誰がピアノ弾いたか言うた？
[^{H}Náoko=wa [^{H}dare=ga ^{H}píano ^{H}híi-ta-ka] ^{H}yúu-ta]?
Naoko=TOP who=NOM piano(=ACC) play-PST-Q say-PST(-Q)
ES reading: '[Did Naoko say [who$_i$ t_i played the piano]]?'
MS reading: '[Who$_i$ did Naoko say [whether t_i played the piano]]?'

b. なお子は誰がピアノ弾いたて言うた？

[HNáoko=wa [Hdare=ga Hpíano Hhíi-ta-te] Hyúu-ta]?
Naoko=TOP who=NOM piano(=ACC) play-PST-C/Q say-PST(-Q)

ES reading: '[Did Naoko say [who$_i$ t_i played the piano]]?'
MS reading: '[Who$_i$ did Naoko say [(that) t_i played the piano]]?'

(A.4) a. たか子は誰がドア閉めたか言うた？

[HTákako=wa [Hdare=ga Hdóa Lsimé-ta-ka] Hyúu-ta]?
Takako=TOP who=NOM door(=ACC) close-PST-Q say-PST(-Q)

ES reading: '[Did Takako say [who$_i$ t_i closed the door]]?'
MS reading: '[Who$_i$ did Takako say [whether t_i closed the door]]?'

b. たか子は誰がドア閉めたて言うた？

[HTákako=wa [Hdare=ga Hdóa Lsimé-ta-te] Hyúu-ta]?
Takako=TOP who=NOM door(=ACC) close-PST-C/Q say-PST(-Q)

ES reading: '[Did Takako say [who$_i$ t_i closed the door]]?'
MS reading: '[Who$_i$ did Takako say [(that) t_i closed the door]]?'

(A.5) a. みな子は誰がお湯沸かしたか聞いた？

[HMínako=wa [Hdare=ga Loyu Hwákasi-ta-ka]
Minako=TOP who=NOM hot water(=ACC) boil-PST-Q

Hkíi-ta]?
ask/hear-PST(-Q)

ES reading: '[Did Minako ask/hear [who$_i$ t_i boiled water]]?'
MS reading: '[Who$_i$ did Minako ask/hear [whether t_i boiled water]]?'

b. みな子は誰がお湯沸かしたて聞いた？

[HMínako=wa [Hdare=ga Loyu Hwákasi-ta-te]
Minako=TOP who=NOM hot water(=ACC) boil-PST-C/Q

Hkíi-ta]?
ask/hear-PST(-Q)

ES reading: '[Did Minako ask/hear [who$_i$ t_i boiled water]]?'
MS reading: '[Who$_i$ did Minako ask/hear [(that) t_i boiled water]]?'

(A.6) a. さち子は誰がシャツ洗うたか聞いた？

[HSátiko=wa [Hdare=ga Hsyátu Háro-ta-ka] Hkíi-ta]?
Sachiko=TOP who=NOM shirt(=ACC) wash-PST-Q ask/hear-PST(-Q)

ES reading: '[Did Sachiko ask/hear [who$_i$ t_i washed the shirt]]?'
MS reading: '[Who$_i$ did Sachiko ask/hear [whether t_i washed the shirt]]?'

b. さち子は誰がシャツ洗うたて聞いた？

[HSátiko=wa [Hdare=ga Hsyátu Háro-ta-te] Hkíi-ta
Sachiko=TOP who=NOM shirt(=ACC) wash-PST-C/Q ask/hear-PST(-Q)

]?

ES reading: '[Did Sachiko ask/hear [who$_i$ t_i washed the shirt]]?'
MS reading: '[Who$_i$ did Sachiko ask/hear [(that) t_i washed the shirt]]?'

(A.7) a. まい子は誰が蓋開けたか聞いた？

[HMáiko=wa [Hdare=ga Huta Háke-ta-ka] Hkíi-ta]?
Maiko=TOP who=NOM lid(=ACC) open-PST-Q ask/hear-PST(-Q)

ES reading: '[Did Maiko ask/hear [who$_i$ t_i opened the lid]]?'
MS reading: '[Who$_i$ did Maiko ask/hear [whether t_i opened the lid]]?'

b. まい子は誰が蓋開けたて聞いた？

[HMáiko=wa [Hdare=ga Huta Háke-ta-te] Hkíi-ta]?
Maiko=TOP who=NOM lid(=ACC) open-PST-C/Q ask/hear-PST(-Q)

ES reading: '[Did Maiko ask/hear [who$_i$ t_i opened the lid]]?'
MS reading: '[Who$_i$ did Maiko ask/hear [(that) t_i opened the lid]]?'

(A.8) a. あつ子は誰が写真撮ったか聞いた？

[HÁtuko=wa [Hdare=ga Hsyasin Ltot-tá-ka] Hkíi-ta]?
Atsuko=TOP who=NOM photo(=ACC) take-PST-Q ask/hear-PST(-Q)

ES reading: '[Did Atsuko ask/hear [who$_i$ t_i took a photo]]?'
MS reading: '[Who$_i$ did Atsuko ask/hear [whether t_i took a photo]]?'

b. あつ子は誰が写真撮ったて聞いた？
[HÁtuko=wa [Hdare=ga Hsyasin Ltot-tá-te] Hkíi-ta
Atsuko=TOP who=NOM photo(=ACC) take-PST-C/Q ask/hear-PST(-Q)
]?

ES reading: ‘[Did Atsuko ask/hear [who$_i$ t_i took a photo]]?’
MS reading: ‘[Who$_i$ did Atsuko ask/hear [(that) t_i took a photo]]?’

(A.9) a. あき子はもも子が何食べたか言うた？
[HÁkiko=wa [HMómoko=ga Lnani Ltabé-ta-ka] Hyúu-ta]?
Akiko=TOP Momoko=NOM what(=ACC) eat-PST-Q say-PST(-Q)
ES reading: ‘[Did Akiko say [what$_i$ Momoko ate t_i]]?’
MS reading: ‘[What$_i$ did Akiko say [whether Momoko ate t_i]]?’

b. あき子はもも子が何食べたて言うた？
[HÁkiko=wa [HMómoko=ga Lnani Ltabé-ta-te] Hyúu-ta]?
Akiko=TOP Momoko=NOM what(=ACC) eat-PST-C/Q say-PST(-Q)
ES reading: ‘[Did Akiko say [what$_i$ Momoko ate t_i]]?’
MS reading: ‘[What$_i$ did Akiko say [that Momoko ate t_i]]?’

(A.10) a. みよ子はまり子が何飲んだか言うた？
[HMíyoko=wa [HMáriko=ga Lnani Lnon-dá-ka] Hyúu-ta]?
Miyoko=TOP Mariko=NOM what(=ACC) drink-PST-Q say-PST(-Q)
ES reading: ‘[Did Miyoko say [what$_i$ Mariko drank t_i]]?’
MS reading: ‘[What$_i$ did Miyoko say [whether Mariko drank t_i]?’

b. みよ子はまり子が何飲んだて言うた？
[HMíyoko=wa [HMáriko=ga Lnani Lnon-dá-te] Hyúu-ta
Miyoko=TOP Mariko=NOM what(=ACC) drink-PST-C/Q say-PST(-Q)
]?

ES reading: ‘[Did Miyoko say [what$_i$ Mariko drank t_i]]?’
MS reading: ‘[What$_i$ did Miyoko say [that Mariko drank t_i]]?’

(A.11) a. さと子はえり子が何読んだか言うた？

[^{H}Sátoko=wa [^{H}Ériko=ga ^{L}nani ^{L}yon-dá-ka] ^{H}yúu-ta]?
Satoko=TOP Eriko=NOM what(=ACC) read-PST-Q say-PST(-Q)

ES reading: '[Did Satoko say [what$_i$ Eriko read t_i]]?'
MS reading: '[What$_i$ did Satoko say [whether Eriko read t_i]]?'

b. さと子はえり子が何読んだて言うた？

[^{H}Sátoko=wa [^{H}Ériko=ga ^{L}nani ^{L}yon-dá-te] ^{H}yúu-ta]?
Satoko=TOP Eriko=NOM what(=ACC) read-PST-C/Q say-PST(-Q)

ES reading: '[Did Satoko say [what$_i$ Eriko read t_i]]?'
MS reading: '[What$_i$ did Satoko say [that Eriko read t_i]]?'

(A.12) a. とし子はのり子が何歌うたか言うた？

[^{H}Tósiko=wa [^{H}Nóriko=ga ^{L}nani ^{H}úto-ta-ka] ^{H}yúu-ta]?
Toshiko=TOP Noriko=NOM what(=ACC) sing-PST-Q say-PST(-Q)

ES reading: '[Did Toshiko say [what$_i$ Noriko sang t_i]]?'
MS reading: '[What$_i$ did Toshiko say [whether Noriko sang t_i]]?'

b. とし子はのり子が何歌うたて言うた？

[^{H}Tósiko=wa [^{H}Nóriko=ga ^{L}nani ^{H}úto-ta-te] ^{H}yúu-ta
Toshiko=TOP Noriko=NOM what(=ACC) sing-PST-C/Q say-PST(-Q)

]?

ES reading: '[Did Toshiko say [what$_i$ Noriko sang t_i]]?'
MS reading: '[What$_i$ did Toshiko say [that Noriko sang t_i]]?'

(A.13) a. あや子はゆき子が何見たか聞いた？

[^{H}Áyako=wa [^{H}Yúkiko=ga ^{L}nani ^{H}mí-ta-ka] ^{H}kíi-ta
Ayako=TOP Yukiko=NOM what(=ACC) see-PST-Q ask/hear-PST(-Q)

]?

ES reading: '[Did Ayako ask/hear [what$_i$ Yukiko saw t_i]]?'
MS reading: '[What$_i$ did Ayako ask/hear [whether Yukiko saw t_i]]?'

b. あや子はゆき子が何見たて聞いた？
[HÁyako=wa [HYúkiko=ga Lnani Hmí-ta-te] Hkíi-ta
Ayako=TOP Yukiko=NOM what(=ACC) see-PST-C/Q ask/hear-PST(-Q)
]?

ES reading: '[Did Ayako ask/hear [what$_i$ Yukiko saw t_i]]?'
MS reading: '[What$_i$ did Ayako ask/hear [that Yukiko saw t_i]]?'

(A.14) a. かず子はかな子が何焦がしたか聞いた？
[HKázuko=wa [HKánako=ga Lnani Lkogási-ta-ka]
Kazuko=TOP Kanako=NOM what(=ACC) burn-PST-Q
Hkíi-ta]?
ask/hear-PST(-Q)
ES reading: '[Did Kazuko ask/hear [what$_i$ Kanako burned t_i (while cooking)]]?'
MS reading: '[What$_i$ did Kazuko ask/hear [whether Kanako burned t_i (while cooking)]]?'

b. かず子はかな子が何焦がしたて聞いた？
[HKázuko=wa [HKánako=ga Lnani Lkogási-ta-te]
Kazuko=TOP Kanako=NOM what(=ACC) burn-PST-C/Q
Hkíi-ta]?
ask/hear-PST(-Q)
ES reading: '[Did Kazuko ask/hear [what$_i$ Kanako burned t_i (while cooking)]]?'
MS reading: '[What$_i$ did Kazuko ask/hear [that Kanako burned t_i (while cooking)]]?'

(A.15) a. とも子はひろ子が何拾うたか聞いた？

[HTómoko=wa [HHíroko=ga Lnani Lhiró-ta-ka]
Tomoko=TOP Hiroko=NOM what(=ACC) pick up-PST-Q

Hkíi-ta]?
ask/hear-PST(-Q)

ES reading: ‘[Did Tomoko ask/hear [what$_i$ Hiroko picked up t_i]]?’
MS reading: ‘[What$_i$ did Tomoko ask/hear [whether Hiroko picked up t_i]]?’

b. とも子はひろ子が何拾うたて聞いた？

[HTómoko=wa [HHíroko=ga Lnani Lhiró-ta-te]
Tomoko=TOP Hiroko=NOM what(=ACC) pick up-PST-C/Q

Hkíi-ta]?
ask/hear-PST(-Q)

ES reading: ‘[Did Tomoko ask/hear [what$_i$ Hiroko picked up t_i]]?’
MS reading: ‘[What$_i$ did Tomoko ask/hear [that Hiroko picked up t_i]]?’

(A.16) a. なつ子はちか子が何作ったか聞いた？

[HNátuko=wa [HTíkako=ga Lnani Ltukút-ta-ka]
Natsuko=TOP Chikako=NOM what(=ACC) make-PST-Q

Hkíi-ta]?
ask/hear-PST(-Q)

ES reading: ‘[Did Natsuko ask/hear [what$_i$ Chikako made t_i]]?’
MS reading: ‘[What$_i$ did Natsuko ask/hear [whether Chikako made t_i]]?’

b. なつ子はちか子が何作ったて聞いた？

[HNátuko=wa [HTíkako=ga Lnani Ltukút-ta-te]
Natsuko=TOP Chikako=NOM what(=ACC) make-PST-C/Q

Hkíi-ta]?
ask/hear-PST(-Q)

ES reading: ‘[Did Natsuko ask/hear [what$_i$ Chikako made t_i]]?’
MS reading: ‘[What$_i$ did Natsuko ask/hear [that Chikako made t_i]]?’

BIBLIOGRAPHY

Baker, C. L. 1970. Notes on the description of English questions: The role of an abstract question morpheme. *Foundations of Language* 6(2):197–219. https://www.jstor.org/stable/25000451.

Bates, Douglas, Martin Mächler, Ben Bolker, and Steve Walker. 2015. Fitting linear mixed-effects models using lme4. *Journal of Statistical Software* 67(1):1–48. https://doi.org/10.18637/jss.v067.i01.

Boersma, Paul. 2001. Praat, a system for doing phonetics by computer. *Glot International* 5(9/10):341–345. https://www.fon.hum.uva.nl/praat/.

Cho, Sungdai, and John Whitman. 2020. *Korean: A linguistic introduction*. Cambridge: Cambridge University Press.

Cho, Young-Mee, Hyo Sang Lee, Carol Schulz, Ho-Min Sohn, and Sung-Ock Sohn. 2019. *Integrated Korean: Beginning 1*. Honolulu, HI: University of Hawai'i Press, 3rd edition.

Choe, Hyon Sook. 1995. Focus and topic movement in Korean and licensing. In *Discourse configurational languages*, ed. by Katalin É Kiss, 269–334. Oxford: Oxford University Press.

Chomsky, Noam. 1964. *Current issues in linguistic theory*. The Hague: Mouton.

Chomsky, Noam. 1973. Conditions on transformations. In *A festschrift for Morris Halle*, ed. by Stephen Anderson and Paul Kiparsky, 232–286. New York, NY: Academic Press.

Chung, Young-Hee. 2000. Loanword tonology of the North Kyungsang dialect of Korean revisited. *Korean Journal of Linguistics* 25(2):167–190.

Chung, Young-Hee. 2006. Loanword phonology and learnability: A case from North Kyungsang Korean. *Studies in Phonetics, Phonology and Morphology* 12(3):687–698.

Deguchi, Masanori, and Yoshihisa Kitagawa. 2002. Prosody and *wh*-questions. In *Proceedings of the 32nd Annual Meeting of the North East Linguistics Society (NELS 32)*, ed. by Masako Hirotani, vol. 1, 73–92. Amherst, MA: GLSA Publications. https://scholarworks.umass.edu/nels/vol32/iss1/6.

Do, Young Ah, and Michael Kenstowicz. 2010. A note on phonological phrasing in South Kyungsang. *Studies in Phonetics, Phonology and Morphology* 16(3):371–382. http://doi.org/10.17959/sppm.2010.16.3.371.

Do, Youngah, Chiyuki Ito, and Michael Kenstowicz. 2014. Accent classes in South Kyengsang Korean: Lexical drift, novel words and loanwords. *Lingua* 148:147–182. https://doi.org/10.1016/j.lingua.2014.05.006.

Eberhard, David M., Gary F. Simons, and Charles D. Fennig. 2023. *Ethnologue: Languages of the world*. Dallas, TX: SIL International, 26th edition. http://www.ethnologue.com/.

Gim, Cha Gyun. 1970. 경남 방언의 성조 연구. *Hangul* 145:109–149.

Goodall, Grant. 2015. The D-linking effect on extraction from islands and non-islands. *Frontiers in Psychology* 5(1493). https://doi.org/10.3389%2Ffpsyg.2014.01493.

Grice, H. P. 1975. Logic and conversation. In *Syntax and Semantics 3: Speech Acts*, ed. by Peter Cole and Jerry L Morgan, 41–58. New York, NY: Academic Press.

Hammarström, Harald, Robert Forkel, Martin Haspelmath, and Sebastian Bank. 2023. *Glottolog 4.8*. Leipzig: Max Planck Institute for Evolutionary Anthropology. https://doi.org/10.5281/zenodo.8131084.

Han, Hak-Sung. 1992. Notes on reflexive movement. *Journal of East Asian Linguistics* 1:215–218. https://www.jstor.org/stable/20100617.

Haraguchi, Shosuke. 1977. *The tone pattern of Japanese: An autosegmental theory of tonology*. Tokyo: Kaitakusha.

Hasegawa, Yoko. 2015. *Japanese: A linguistic introduction*. Cambridge: Cambridge University Press.

Hattori, Shiro. 1954. On the accent of Japanese from the phonological point of view（音韻論から見た国語のアクセント）. In *Kokugo kenkyu*, vol. 2, 2–50. Tokyo: Kokugakuin Daigaku Kokugo Kenkyukai. http://doi.org/10.15084/00003111.

Hayata, Teruhiro. 1985. 博多方言のアクセント・形態論. Fukuoka: Kyushu University Press.

Hirose, Yuki, and Yoshihisa Kitagawa. 2011. Production-perception asymmetry in wh-scope marking. In *Processing and producing head-final structures: Studies in theoretical psycholinguistics*, ed. by Hiroko Yamashita, Yuki Hirose, and Jerome L. Packard, vol. 38, 93–110. Dordrecht: Springer. https://doi.org/10.1007/978-90-481-9213-7_5.

Hirotani, Masako. 2005. *Prosody and LF interpretation: Processing Japanese wh-questions*. Amherst, MA: University of Massachusetts Amherst dissertation. https://scholarworks.umass.edu/dissertations/AAI3179881.

Huang, Cheng-Teh James. 1982. *Logical relations in Chinese and the theory of grammar*. Cambridge, MA: Massachusetts Institute of Technology dissertation. http://hdl.handle.net/1721.1/15215.

Hwang, Heeju. 2009. *Wh*-phrase questions and prosody in Korean. In *Japanese/Korean linguistics*, ed. by Shoichi Iwasaki, Hajime Hoji, Patricia M. Clancy, and Sung-Ock Sohn, vol. 17, 295–309. Stanford, CA: CSLI Publications.

Hwang, Hyun Kyung. 2011a. *Scope, prosody, and pitch accent: The prosodic marking of wh-scope in two varieties of Japanese and South Kyeongsang Korean*. Ithaca, NY: Cornell University dissertation. https://hdl.handle.net/1813/33526.

Hwang, Hyun Kyung. 2011b. The interaction of accent and *wh*-intonation in Korean and Japanese. *Language Research* 47(1):45–70.

Hwang, Hyun Kyung. 2015. Overriding syntactic islands with prosodically marked *wh*-scope in South Kyŏngsang Korean and two dialects of Japanese. *Korean Linguistics* 17(1):33–77. https://doi.org/10.1075/kl.17.1.02hwa.

Hwang, Young, and Stuart Davis. 2019. Pitch-pattern diffusion of generational tone change in North Kyungsang Korean English loanwords. *Language Research* 55(1):129–150. https://doi.org/10.30961/lr.2019.55.1.129.

Hyman, Larry M. 2009. How (not) to do phonological typology: The case of pitch-accent. *Language Sciences* 31:213–238. https://doi.org/10.1016/j.langsci.2008.12.007.

Igarashi, Yosuke. 2006. Dephrasing in Kobayashi Japanese: Is it a reality? In *Proceedings of the 126th conference of the Linguistic Society of Japan*, 53–58. Kyoto: Linguistic Society of Japan.

Igarashi, Yosuke. 2007a. Pitch accent deletion and pitch range compression in Fukuoka Japanese. In *Proceedings of the 21st General Meeting of the Phonetic Society of Japan*, 111–116. Tokyo: Phonetic Society of Japan.

Igarashi, Yosuke. 2007b. Typology of prosodic phrasing in Japanese dialects. Paper presented at ICPhS 2007 Satellite Meeting, Workshop on "Intonational Phonology: Understudied or Fieldwork Languages", Saarbrücken, Germany. https://linguistics.ucla.edu/people/jun/Workshop2007ICPhS/Papers/YosukeIgarashi.pdf.

Igarashi, Yosuke. 2012. Prosodic typology in Japanese dialects from a cross-linguistic perspective. *Lingua* 122:1441–1453. https://doi.org/10.1016/j.lingua.2012.04.002.

Igarashi, Yosuke. 2014. Typology of intonational phrasing in Japanese dialects. In *Prosodic typology II: The phonology of intonation and phrasing*, ed. by Sun-Ah Jun, 464–492. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199567300.003.0015.

Ishihara, Shinichiro. 2003. *Intonation and interface conditions*. Cambridge, MA: Massachusetts Institute of Technology dissertation. http://hdl.handle.net/1721.1/17020.

Ito, Junko, and Armin Mester. 2013. Prosodic subcategories in Japanese. *Lingua* 124:20–40. https://doi.org/10.1016/j.lingua.2012.08.016.

Jun, Jongho, Jungsun Kim, Hayoung Lee, and Sun-Ah Jun. 2006. The prosodic structure and pitch accent of Northern Kyungsang Korean. *Journal of East Asian Linguistics* 15(4):289–317. https://doi.org/10.1007/s10831-006-9000-2.

Jun, Sun-Ah. 1993. *The phonetics and phonology of Korean prosody*. Columbus, OH: The Ohio State University dissertation. http://rave.ohiolink.edu/etdc/view?acc_num=osu1220465077.

Jun, Sun-Ah. 1998. The Accentual Phrase in the Korean prosodic hierarchy. *Phonology* 15(2):189–226. https://doi.org/10.1017/S0952675798003571.

Jun, Sun-Ah. 2006. Intonational phonology of Seoul Korean revisited. In *Japanese/Korean linguistics*, ed. by Timothy J. Vance and Kimberly Jones, vol. 14, 15–26. Stanford, CA: CSLI Publications.

Jun, Sun-Ah, and Mira Oh. 1996. A prosodic analysis of three types of wh-phrases in Korean. *Language and Speech* 39(1):37–61. https://doi.org/10.1177/002383099603900103.

Kenstowicz, Michael, Hyesun Cho, and Jieun Kim. 2008. A note on contrasts, mergers, and acquisitions in Kyungsang accent. In *Toronto working papers in linguistics*, ed. by Sarah Clarke, Manami Hirayama, Kyumin Kim, and Eugenia Suh, vol. 28 (Proceedings of the International Conference on East Asian Linguistics), 107–122. Toronto, ON: Department of Linguistics, University of Toronto. https://twpl.library.utoronto.ca/index.php/twpl/article/view/6139.

Kenstowicz, Michael, and Hyang-Sook Sohn. 1997. Phrasing and focus in Northern Kyungsang Korean. In *MIT working papers in linguistics*, ed. by Benjamin Bruening, Yoonjung Kang, and Martha McGinnis, vol. 30 (PF: Papers at the interface), 25–47. Cambridge, MA: Department of Linguistics and Philosophy, Massachusetts Institute of Technology.

Kenstowicz, Michael, and Hyang-Sook Sohn. 2001. Accentual adaptation in North Kyungsang Korean. In *Ken Hale: A life in language*, ed. by Michael Kenstowicz, 239–270. Cambridge, MA: MIT Press. https://doi.org/10.7551/mitpress/4056.003.0010.

Khan, Sameer ud Dowla. 2008. *Intonational phonology and focus prosody of Bengali*. Los Angeles, CA: University of California, Los Angeles dissertation. https://linguistics.ucla.edu/wp-content/uploads/2021/11/Khan2008-Dissertation.pdf.

Khan, Sameer ud Dowla. 2014. The intonational phonology of Bangladeshi Standard Bengali. In *Prosodic typology II: The phonology of intonation and phrasing*, ed. by Sun-Ah Jun, 81–117. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199567300.003.0004.

Kim, Hyun-ju. 2018. Diachronic change in vowel length contrast in North Kyungsang Korean. *Studies in Phonetics, Phonology and Morphology* 24(3):273–295. http://doi.org/10.17959/sppm.2018.24.3.273.

Kim, Jieun, and Sun-Ah Jun. 2009. Prosodic structure and focus prosody of South Kyungsang Korean. *Language Research* 45(1):43–66.

Kim, Jieun, and Russell G. Schuh. 2006. Tone and accent in South Kyengsang Korean nouns. Manuscript, University of California, Los Angeles. https://linguistics.ucla.edu/wp-content/uploads/2018/03/SKS_nominal_tone_system_9-2.pdf.

Kim, Michael Jinwha. 1997. Korean monosyllables: Floating V-slot and edge bracket. In *Harvard studies in Korean linguistics*, ed. by Susumu Kuno, Ik-Hwan Lee, John Whitman, Joan Maling, Young-Se Kang, and Young joo Kim, vol. 12, 138–152. Cambridge, MA: Department of Linguistics, Harvard University.

Kitagawa, Yoshihisa, and Janet Dean Fodor. 2003. Default prosody explains neglected syntactic analyses in Japanese. In *Japanese/Korean linguistics*, ed. by William McClure, vol. 12, 267–279. Stanford, CA: CSLI Publications.

Kitagawa, Yoshihisa, and Yuki Hirose. 2012. Appeals to prosody in Japanese *wh*-interrogatives - Speakers' versus listeners' strategies. *Lingua* 122:608–641. https://doi.org/10.1016/j.lingua.2012.01.005.

Kori, Shiro. 1987. The tonal behavior of Osaka Japanese: An interim report. In *OSU working papers in linguistics*, ed. by Mary Beckman and Gina Lee, vol. 36 (Papers from the linguistics laboratory), 31–61. Columbus, OH: Department of Linguistics, The Ohio State University. http://hdl.handle.net/1811/81304.

Kubo, Tomoyuki. 1989. 福岡市方言の、ダレ・ナニ等の疑問詞を含む文のピッチパターン. *Kokugogaku* 156:82–71.

Kubo, Tomoyuki. 2001. Syntax-phonology interface in the Fukuoka dialect（福岡方言における統語論と音韻論の境界領域）. *Journal of the Phonetic Society of Japan* 5:27–32.

Kubozono, Haruo. 1993. *The organization of Japanese prosody*. Tokyo: Kurosio Publishers.

Kubozono, Haruo. 2015. Introduction to Japanese phonetics and phonology. In *Handbook of Japanese phonetics and phonology*, ed. by Haruo Kubozono, 1–40. Berlin: De Gruyter Mouton. https://doi.org/10.1515/9781614511984.1.

Kubozono, Haruo. 2018. Loanword accent of Kyungsang Korean: A moraic account. In *Topics in theoretical Asian linguistics: Studies in honor of John B. Whitman*, ed. by Kunio Nishiyama, Hideki Kishimoto, and Edith Aldridge, 303–329. Amsterdam: John Benjamins. https://doi.org/10.1075/la.250.15kub.

Kuroda, S.-Y. 2005/2013. Prosody and the syntax of indeterminates. *Lingua* 124:64–95. https://doi.org/10.1016/j.lingua.2012.10.013.

Kuroda, Sige-Yuki. 1965. *Generative grammatical studies in the Japanese language*. Cambridge, MA: Massachusetts Institute of Technology dissertation. http://hdl.handle.net/1721.1/13006.

Ladd, D. Robert. 1996/2008. *Intonational phonology*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511808814.

Lee, Dongmyung. 2009. *The loanword tonology of South Kyungsang Korean*. Bloomington, IN: Indiana University Bloomington dissertation. https://www.proquest.com/dissertations-theses/loanword-tonology-south-kyungsang-korean/docview/275861120/se-2.

Lee, Dongmyung, and Stuart Davis. 2009. On the pitch-accent system of South Kyungsang Korean: A phonological perspective. *Language Research* 45(1):3–22.

Lee, Dongmyung, and Stuart Davis. 2010. Evidence for accentless words in South Kyungsang Korean. *Studies in Phonetics, Phonology and Morphology* 16(2):245–258. http://doi.org/10.17959/sppm.2010.16.2.245.

Lee, So Young, Hongchen Wu, Lei Liu, and Jiwon Yun. 2017. Prosody and *wh*-scope interpretation in Chinese. In *Proceedings of the 29th North American Conference on Chinese Linguistics (NACCL 29)*, ed. by Lan Zhang, vol. 2, 373–380. Columbus, OH: NACCL Proceedings Online. https://naccl.osu.edu/sites/default/files/22-LEEWuLiuYun-p.373-380.pdf.

Lenth, Russell V. 2023. *emmeans: Estimating marginal means*. https://github.com/rvlenth/emmeans.

Maekawa, Kikuo. 1994. Is there 'dephrasing' of the accentual phrase in Japanese? In *OSU working papers in linguistics*, ed. by Jennifer J. Venditti, vol. 44 (Papers from the linguistics laboratory), 146–165. Columbus, OH: Department of Linguistics, The Ohio

State University. http://hdl.handle.net/1811/81865.

Maekawa, Kikuo. 2021. Production of the utterance-final moraic nasal in Japanese: A real-time MRI study. *Journal of the International Phonetic Association* 124:1–24. https://doi.org/10.1017/S0025100321000050.

Maekawa, Kikuo, Hideaki Kikuchi, Yosuke Igarashi, and Jennifer Venditti. 2002. X-JToBI: An extended J-ToBI for spontaneous speech. In *Proceedings of the 7th International Conference on Spoken Language Processing (ICSLP 2002)*, ed. by John H. L. Hansen and Bryan Pellom, 1545–1548. Denver, CO: ISCA Archive. http://doi.org/10.21437/ICSLP.2002-468.

Martin, Samuel E. 1992. *A reference grammar of Korean: A complete guide to the grammar and history of the Korean language*. Rutland, VT: Charles E. Tuttle Company.

McCawley, James D. 1968. *The phonological component of a grammar of Japanese*. The Hague: Mouton.

Miyamoto, Edson T., and Shoichi Takahashi. 2002. The processing of wh-phrases and interrogative complementizers in Japanese. In *Japanese/Korean linguistics*, ed. by Noriko Akatsuka, Susan Strauss, and Bernard Comrie, vol. 10, 62–75. Stanford, CA: CSLI Publications.

National Institute of Korean Language. n.d. Romanization of Korean. https://www.korean.go.kr/front_eng/roman/roman_01.do.

Nishigauchi, Taisuke. 1990. *Quantification in the theory of grammar*. Dordrecht: Kluwer. https://doi.org/10.1007/978-94-009-1972-3.

Ogura, Shinpei. 1944. 朝鮮語方言の研究, vol. 2. Tokyo: Iwanami Shoten. https://dx.doi.org/10.11501/1869845.

Park, Youngmae. 2001. Accent of Yanbian Korean in China（延辺朝鮮語のアクセントに関する考察）. In *Kyoto University linguistic research*, ed. by Kanehiro Nishimura, Noriko Ohsaki, Yasuhiro Kishida, Masahiro Shogaito, Satoko Shirai, Yukinori Takubo, Syuntarô Tida, Tae Nishimura, Youngmae Park, Setsu Fujishiro, Keisuke Huziwara, Wakaha Mori, Shiro Yabu, Kazuhiko Yoshida, and Yutaka Yoshida, vol. 20, 171–195. Kyoto: Department of Linguistics, Graduate School of Letters, Kyoto University. https://doi.org/10.14989/87802.

Pesetsky, David. 1987. *Wh*-in-situ: Movement and unselective binding. In *The representation of (in)definiteness*, ed. by Eric Reuland and Alice ter Meulen, 98–129. Cambridge, MA: MIT Press.

Pierrehumbert, Janet, and Mary Beckman. 1988. *Japanese tone structure*. Cambridge, MA: MIT Press.

Poser, William John. 1984. *The phonetics and phonology of tone and intonation in Japanese*. Cambridge, MA: Massachusetts Institute of Technology dissertation. http://hdl.handle.net/1721.1/15169.

R Core Team. 2021. *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/.

Rah, Sungsook. 1974. Phonology of Taegu Korean: On the description of accentual system（韓国語大邱方言の音韻：アクセントを中心に）. *Gengo Kenkyu* 66:1–44. https://doi.org/10.11435/gengo1939.1974.66_1.

Ramsey, Samuel Robert. 1978. *Accent and morphology in Korean dialects: A descriptive and historical study*. Seoul: Tower Press.

Richards, Norvin. 2010. *Uttering trees*. Cambridge, MA: MIT Press. https://doi.org/10.7551/mitpress/9780262013765.001.0001.

Richards, Norvin. 2016. *Contiguity theory*. Cambridge, MA: MIT Press. https://doi.org/10.7551/mitpress/10542.001.0001.

Rooryck, Johan. 2001a. Evidentiality, Part I. *Glot International* 5(4):125–133. https://hdl.handle.net/1887/14555.

Rooryck, Johan. 2001b. Evidentiality, Part II. *Glot International* 5(5):161–168. https://hdl.handle.net/1887/14586.

Rooth, Mats. 2015. Representing focus scoping over new. In *Proceedings of the 45th Annual Meeting of the North East Linguisic Society (NELS 45)*, ed. by Thuy Bui and Deniz Özyıldız, vol. 3, 1–13. Amherst, MA: GLSA Publications. https://hdl.handle.net/1813/40860.

Rooth, Mats Edward. 1985. *Association with focus*. Amherst, MA: University of Massachusetts Amherst dissertation. https://scholarworks.umass.edu/dissertations/AAI8509599.

Ross, John Robert. 1967. *Constraints on variables in syntax*. Cambridge, MA: Massachusetts Institute of Technology dissertation. http://hdl.handle.net/1721.1/15166.

Ross, John Robert. 1973. Slifting. In *The formal analysis of natural languages: Proceedings of the First International Conference*, ed. by Maurice Gross, Morris Halle, and Marcel-Paul Schutzenberger, 133–169. The Hague: Mouton.

Sato, Kumiko. 2013. 小林方言とトルコ語のプロソディー：一型アクセント言語の共通点. Fukuoka: Kyushu University Press.

Schuh, Russell G., and Jieun Kim. 2010. Tone and accent in South Kyengsang Korean verbs. Manuscript, University of California, Los Angeles.

Selkirk, Elisabeth. 1984. *Phonology and syntax: The relation between sound and structure*. Cambridge, MA: MIT Press.

Selkirk, Elisabeth. 2011. The syntax-phonology interface. In *The handbook of phonological theory*, ed. by John Goldsmith, Jason Riggle, and Alan C. L. Yu, 435–484. Oxford: Blackwell Publishing. https://doi.org/10.1002/9781444343069.ch14.

Selkirk, Elisabeth, and Koichi Tateishi. 1991. Syntax and downstep in Japanese. In *Interdisciplinary approaches to language: Essays in honor of S.-Y. Kuroda*, ed. by Carol Georgopoulos and Roberta Ishihara, 519–543. Dordrecht: Springer.

Shibatani, Masayoshi. 1990. *The languages of Japan*. Cambridge: Cambridge University Press.

Shin, Jiyoung. 2015. Vowels and consonants. In *The handbook of Korean linguistics*, ed. by Lucien Brown and Jaehoon Yeon, 3–21. Hoboken, NJ: John Wiley & Sons, Inc. https://doi.org/10.1002/9781118371008.ch1.

Shin, Jiyoung, Jieun Kiaer, and Jaeeun Cha. 2013. *The sounds of Korean*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139342858.

Simons, Mandy. 2007. Observations on embedding verbs, evidentiality, and presupposition. *Lingua* 117:1034–1056. https://doi.org/10.1016/j.lingua.2006.05.006.

Smith, Jennifer L. 2011. [+wh] complementizers drive phonological phrasing in Fukuoka Japanese. *Natural Language & Linguistic Theory* 29:545–559. https://doi.org/10.1007/s11049-011-9123-7.

Smith, Jennifer L. 2013. Fukuoka Japanese wh prosody in production and perception. *Lingua* 124:96–130. https://doi.org/10.1016/j.lingua.2012.04.004.

Sohn, Ho-Min. 1999. *The Korean language*. Cambridge: Cambridge University Press.

Sohn, Hyang-Sook. 2004. Wh-operator and phonological phrasing in North Kyungsang Korean. *Studies in Phonetics, Phonology, and Morphology* 293–325.

Son, Jaehyun. 2017. 韓国語諸方言のアクセント体系と分布/한국어제방언의 액샌트체계와 분포. Seoul: Chaek-Sarang.

Son, Jaehyun. 2021. Accent material in the Pusan dialect of Korean. *Journal of Humanities* 32:283–324. http://doi.org/10.31658/DSHR.32.11.

Stoet, Gijsbert. 2010. PsyToolkit - A software package for programming psychological experiments using Linux. *Behavior Research Methods* 42(4):1096–1104. https://doi.org/10.3758/BRM.42.4.1096.

Stoet, Gijsbert. 2017. PsyToolkit: A novel web-based method for running online questionnaires and reaction-time experiments. *Teaching of Psychology* 44(1):24–31. https://doi.org/10.1177/0098628316677643.

Sugahara, Mariko. 2003. *Downtrends and post-focus intonation in Tokyo Japanese*. Amherst, MA: University of Massachusetts Amherst dissertation. https://scholarworks.umass.edu/dissertations/AAI3079597.

Utsugi, Akira. 2007. The interplay between lexical and postlexical tonal phenomena and the prosodic structure in Masan/Changwon Korean. Paper presented at ICPhS 2007 Satellite Meeting, Workshop on "Intonational Phonology: Understudied or Fieldwork Languages", Saarbrücken, Germany. https://linguistics.ucla.edu/people/

jun/Workshop2007ICPhS/Papers/Utsugi2007_08.pdf.

Vance, Timothy J. 2008. *The sounds of Japanese*. Cambridge: Cambridge University Press.

Watanabe, Akira. 1992. Subjacency and S-structure movement of *wh*-in-situ. *Journal of East Asian Linguistics* 1:255–291. https://doi.org/10.1007/BF00130554.

Wickham, Hadley, Davis Vaughan, and Maximilian Girlich. 2023. *tidyr: Tidy Messy Data*. https://tidyr.tidyverse.org, https://github.com/tidyverse/tidyr.

Yun, Jiwon. 2019. Meaning and prosody of *wh*-indeterminates in Korean. *Linguistic Inquiry* 50(3):630–647. https://doi.org/10.1162/ling_a_00318.