Towards intonational typology of Japanese dialects

Yosuke Igarashi
Japan Society for the Promotion of Science
RIKEN Brain Science Institute
National Institute for Japanese Language
yosuke.igarashi@kokken.go.jp
January 13, 2007
Kyushu University

Overview

1. Intonational typology of Japanese dialects
   1.1 Approach
   1.2 Advantages of the present approach
   1.3 Summary
2. The prosodic structure of Goshogawara
   2.1 Introduction
   2.2 Experiment
   2.3 Explanation of findings
3. Conclusion

Expansion of “analysis window”

Prosody of Japanese dialects

• Examination of phrase-level prosody (intonation)
  – Unlike word-level prosody, the examination of phrase-level prosody requires the expansion of the “analysis window”
    word-size window → phrase-size window

• Expansion of domain
  – The domain of prosodic phenomena to be analyzed is extended from (prosodic) word to (prosodic) phrase
  – Derivationally: the primary concern is shifted from lexical tones to post-lexical tones

• Examination of prosody of Japanese dialects
  – Japanese dialects present a rich variety of prosodic systems
    • Prosodic system of one dialect differs considerably from other dialects, as if “they were different languages” (Sugito 2001)
  – Description of the prosodic system of Japanese dialect has been a central issue in Japanese phonetics/phonology
    • The study has a long tradition with tremendous amount of literature
  – However, the researchers’ primary concern has been word-level prosody, not phrase-level prosody

• Phrase-level prosody, or intonation is now a central concern in studies on phonetics and phonology (Ladd 1996, Gussenhoven 2004)
• Since the emergence of Pierrehumbert’s dissertation on English intonation (1980), intonation of world languages has been described in comparative terms, and the findings have contributed to developing the theory of intonation (Jun 2005)
• Japanese language has played a leading role in the understanding of intonation (Pierrehumbert and Beckman 1988)

• This presentation concerns my research project on intonation of Japanese dialects

Part I

1. Approach
  – My approach to the intonation of Japanese prosody
  – How does this approach differ from the past ones?
  – What contributions will this approach yield?

Review of past studies, including my own

Part II

2. Experimental results on Goshogawara dialects (Aomori Prefecture)
  – It shows that the present approach contributes to more adequate description of the prosodic system of a specific dialect

Expansion of analysis window

Prosody of Japanese dialects

• Examination of prosody of Japanese dialects
  – Japanese dialects present a rich variety of prosodic systems
    • Prosodic system of one dialect differs considerably from other dialects, as if “they were different languages” (Sugito 2001)
  – Description of the prosodic system of Japanese dialect has been a central issue in Japanese phonetics/phonology
    • The study has a long tradition with tremendous amount of literature
  – However, the researchers’ primary concern has been word-level prosody, not phrase-level prosody
Word level prosody vs. phrase-level prosody

- Existing prosodic classifications of Japanese dialects
  - Kindaichi (1964)
  - Motivated by an interest in historical development of word-level prosody
  - Hirayama (1960)
  - Approach similar to Kindaichi (1964)
  - A purely synchronic classification of prosodic systems
  - Hayata (1999)
  - An unique classification of prosodic systems which is argued to be correlated with prosodic rules of compound words
  - etc...
  - See Shibatani (1990, chap. 9 for review written in English)

All the above are classifications of word-level prosody

Word level prosody vs. phrase-level prosody

- Rough classification of dialectal prosodic systems
  - **Accentless dialects** (yu-akusento)
    - Dialects with lexically specified tones
      - e.g. Tokyo, Osaka, Kyoto, Nagoya, Hiroshima, Hirohima, Gojogawara, Kagoshima, etc.
  - **Fixed accent dialects**
    - or "one-pattern accent" (ikkei-akusento)
    - Dialects without lexically specified tones
      - The pitch pattern for prosodic word is fixed
        - e.g. Miyakonojo, Kibayashi, Nichinan, etc.
  - **Accentless dialects** (mu-akusento)
    - or "pattern-less" dialect (mukei-akusento)
    - Dialects without lexically specified tones
    - The pitch pattern for prosodic word is not fixed
      - e.g. Sendai, Koriyama, Utsunomiya, Tochigi, Fukui, Kumamoto, Omuta etc.

Word level prosody vs. phrase-level prosody

- What advantages does the present approach have?
  - Study on phrase-level prosody (intonation) of Japanese dialects will make it possible...
  1. to treat accentless dialects in the same framework as the accented dialects
  2. to re-examine word-level prosody in a phrasal perspective
  3. to examine the nature of the relationship between prosody and syntax

Accentless and accented dialects in a unified framework

- The accentless dialects are classified into many subgroups, while the accentless dialects are clumped into a single group... as if researchers lost their interest in the accentless dialects, only because they do not have lexical tones

Questions arise:
- Is there any prosodic difference within the accentless dialects?
- Is there any similarity between the accentless and accented dialects?
Accentless and accented dialects in a unified framework

- Similarities between the accentless dialects and the accented dialects
  - e.g. Wh question vs. Yes-no question
    - Wh question is merged into a single intonational phrase, while yes-no question is divided into two intonational phrases (cf. Maekawa 1994)

Word-level prosody in phrasal perspectives

- The examination of phrase-level prosody
  - leads us to re-examine word-level prosody
  - leads us to more adequate description of word-level prosody
  - contributes to the development of prosodic theory in general

Bruce (1977): “Phrase accent” in Stockholm Swedish
Kawakami (1957): “Phrase tone” (phrase-initial rise) in Tokyo Japanese

Word-level prosody in phrasal perspectives

- Contributions of Kawakami (1957)
  - Introduction of a notion of phrase (prosodic unit larger than a prosodic word)
  - Introduction of a notion of tone, whose domain is the phrase
  - Demonstration that phrase-level tones (intonational tones) can be subject to linguistic investigations
    - ‘Dawn’ of intonational phonology (cf. Ladd 1996) in Japan...

- Theoretical development after Kawakami
  - A notion of phrase-initial rise is adopted to Pierrehumbert and Beckman’s model for Tokyo Japanese (1988)
  - Pierrehumbert and Beckman’s model plays leading role in developing intonational phonology of world languages (see Ladd 1996, Gussenhoven 2004, Jun 2005)

- Expected contributions from Japanese dialects
  - Phrase-level prosody of Japanese dialects has not been fully examined
  - The investigations of Japanese dialects (with rich prosodic varieties) will shed light on research of prosody in general

So far, we have seen a situation where the tone which has been taken as a property of the word turned out to be a property of the phrase.

Can the opposite be true?

Yes, it can.

The tone which has been taken as a property of the phrase can actually be a property of the word.

In Part II, we will see the concrete case in the analysis of Goshogawara dialect.
The nature of the relationship between prosody and syntax

- Prosody-syntax interface
  - Primary motivation for work on phrase-level prosody
  - A central topic of this workshop
- Advantages in the investigation of Japanese dialects
  - Their rich varieties in prosody
  - The rich variety in syntax
  - It is easy to design test sentences with 'identical' syntactic structure for the sake of comparison
  - It is easy to identify syntactic factors causing prosodic differences than to compare between different languages

The nature of the relationship between prosody and syntax

- Similarities in prosody-syntax mapping among Japanese dialects
  1. WH question vs. Yes-no question
     - WH question is merged into a single intonational phrase, while yes-no question is divided into two intonational phrases (cf. Maekawa 1994)

The nature of the relationship between prosody and syntax

- A distinction between WH- and yes-no questions

<table>
<thead>
<tr>
<th>Dialect</th>
<th>Method</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tokyo</td>
<td>Accented</td>
<td>Maekawa (1997)</td>
</tr>
<tr>
<td>Osaka</td>
<td>Accentless</td>
<td>Igarashi (ms)</td>
</tr>
<tr>
<td>Hiroshima</td>
<td>Accentless</td>
<td>Kubozono (1988)</td>
</tr>
<tr>
<td>Goshogawara</td>
<td>Accentless</td>
<td>Igarashi (2006a)</td>
</tr>
<tr>
<td>Fukuoka</td>
<td>Accentless</td>
<td>Igarashi (2006b)</td>
</tr>
<tr>
<td>Koriyama</td>
<td>Accentless</td>
<td>Igarashi (ms)</td>
</tr>
<tr>
<td>Omura</td>
<td>Accentless</td>
<td>Igarashi (ms)</td>
</tr>
</tbody>
</table>

The nature of the relationship between prosody and syntax

- Similarities in prosody-syntax mapping among Japanese dialects
  2. Left-branching vs. Right-branching
     - "Branching Constraint": Right-branching syntactic boundary introduces pitch range expansion (metrical boost) (Kubozono 1988, 1997)
The nature of the relationship between prosody and syntax

Maekawa (1997)
Fukui
(Kumamoto
Accentless dialect)

Maekawa (1997)

Kumamoto

( aoi yaneno iega mieruwa )

( aoi )

( o:kina iega mieruwa )

Maekawa (1997)

Left-branching

Right-branching

From Maekawa (1997: 103)

From Maekawa (1997)

Left-branching

Right-branching

( aoka yazen ien miyukken )

( aoka )

( futoka ien miyukken )

Branching Constraint in Japanese dialects

Tokyo

yes

Hiroaki

yes

Ibaraki (ms)

yes

Kumamoto

yes

Kori (2006b)

yes

Fukui

yes

Ibaraki (ms)

yes

Kori (2006b)

yes

Igarashi (2006a)

yes

Ibaraki

no?

Fukui

no

Ibaraki (ms)

no

Utsunomiya

no?

No pilot studies

Accentless dialects

Kumamoto

yes

Maekawa (1990, 1997)

Kori (2006b)

yes

Sato (2006)

yes

Igarashi (2006a)

yes

Sugino (2006)

no

Igarashi (2006b)

yes

Kori (2006a)

yes

P&B (1999)

yes

Accented dialects

Kori (2006b)

yes

Igarashi (2006a)

yes

Kori (2006a)

yes

P&B (1999)

yes

The nature of the relationship between prosody and syntax

Dialect-specific difference in Prosody-syntax interface

- Difference in prosody-syntax mapping rules
  - In Fukuoka lexical tones are deleted in wh question (Hayata 1985, Kubo 1989), while in Tokyo deletion does not occur (Maekawa 1994)
  - Presence or absence of a certain mapping rule
  - Controversial results for the presence of branching constraint in Osaka (Kori 1989, Sugito 2001) and Kobayashi (Sato 2006, Igarashi 2006a)
  - Some of the accentless dialects (North Kanto dialects?) might lack branching constraint (my pilot studies)

- Why do some of the dialects have a certain mapping rule, while others do not?
  - The absence of a certain mapping rule might be related to dialect-specific difference in prosodic structure
    - There might be correlation between prosodic structure and the presence or absence of mapping rules
    - Those dialects which share the same mapping rules might share the same prosodic features
    - "Implicational universal"?
      - If a dialect has a prosodic feature X, then it does not have a mapping rule Y
      - If a dialect does not have a prosodic feature X, then it has a mapping rule Y

Summary

- The present research project concerns phrase-level prosody (intonation) of Japanese dialects
- While there is a vast number of literature about word-level prosody in Japanese dialects, phrase-level prosody has not been a central concern in Japanese linguistics
- By expanding the analysis window the primary focus of the research shifts from word-level prosody to phrase-level prosody
- The examination of phrase-level prosody makes it possible to capture similarities and differences across boundaries of the past classification based on word-level prosody
- The present approach will contribute to
  - more adequate description of a specific dialect
  - the development of theory of prosody in general
  - the understanding of prosody-syntax interface

1. Intonational typology of Japanese dialects
   1.1 Approach
   1.2 Advantages of the present approach
   1.3 Summary
2. The prosodic structure of Goshogawara
   2.1 Introduction
   2.2 Experiment
   2.3 Explanation of findings
3. Conclusion
1. Intonational typology of Japanese dialects
   1.1 Approach
   1.2 Advantages of the present approach
   1.3 Summary

2. The prosodic structure of Goshogawara
   2.1 Introduction
   2.2 Experiment
   2.3 Explanation of findings

3. Conclusion

Introduction

- **Overview**
  - In Part I, it was claimed that the examination of phrase-level prosody leads us to more adequate description of word-level prosody.
  - In Part II, we will see concrete examples in the analysis of a specific dialect, Goshogawara dialect (Aomori pref.).

- **It will be shown that...**
  - The tone that has been claimed to be a property of the phrase is actually a property of the word.
  - The lexical pitch accent that has been claimed to be LH (rising) is actually HL.

- **Goshogawara Japanese**
  - An accented dialect.
  - Words can be either accented or unaccented.
    - The accented words have a syllable that is lexically specified as accented.
    - The unaccented words have no syllable that is lexically specified as accented.
  - The prosodic system is similar to Hirosaki Japanese (described in Uwano 1977).
    - Rising pitch accent (or ‘ascending kernel’).
    - Pitch pattern alternation.

- **Pitch pattern alternation**
  - Accented words show two types of pitch patterns (Uwano 1977).
    - Non-connective form:
      - The form which occurs when the word is pronounced with juncture.
      - The pitch pattern with the final fall.
    - Connective form:
      - The form which occurs when the word is pronounced without juncture.
      - The pitch pattern without the final fall.
  - Unaccented words do not exhibit alternation.

Rising pitch accent & pitch pattern alternation

- **Rising pitch accent**
  - Falling pitch accent
    - The accented syllable or mora exhibits pitch fall.
      - Tokyo, Osaka, and many other dialects.
    - Rising pitch accent
      - The accented syllable or mora exhibits pitch rise.

- **Non-connective form**
  - a mi do -ka ra
  - a mi do -mo
  - A window screen.
  - A window screen, too.
  - From a window screen.

- **Connective form**
  - a mi do -ka ra
  - a mi do -mo
  - a mi do -ko ra
  - “He bought a window screen.”
  - “He bought a window screen, too.”
  - “He broke (into the house) by a window screen.”

- **Unaccented words**
  - ki mo mo -ka ra
  - ki mo mo -mo
  - “He bought a window screen.”
  - “He bought a window screen, too.”
  - “He broke (into the house) by a window screen.”
Question

• Is the final fall a property of word or phrase?

Phrasal fall hypothesis

"The final fall is a property of the phrase." (Uwano 1998 for Shizukuishi)

There should be no pitch difference regardless of whether the preceding word is accented or unaccented

 Accentual fall hypothesis

"The final fall is a property of the accented word." (Hattori 1979 for Hirosaki)

There should be a certain pitch difference depending on whether the preceding word is accented or unaccented.

The accented words should exhibit a 'falling' property even if there is no actual fall in the word-final syllable (connective form).

The 'falling' property of an accented word (which is not manifested as the final fall) should lend certain effects on the following words.

Prediction regarding the pitch of the following word

• Downstep

– descriptions suggestive of downstep in Hirosaki can be found in Uwano (1977)

• The existence of downstep is considered as support for the Accentual Fall Hypothesis by Hattori (1979)

Prediction regarding the pitch of the following word

• Initial lowering

– according to Uwano (1977, 1980, 1992), words (both accented and unaccented) always exhibit the initial lowering in Hirosaki and Shizukuishi.

Methods

• Aim

– To investigate whether the final fall of the accented words in non-connective form is a property of the phrase or a property of the word

• Subjects

– Two 21-year old female native speakers of Goshogawara

• Recordings

– Marantz PMD660, 48kHz, 16bit

• Analysis procedures

– Subjects are asked to translate test sentence written in standard Japanese into Goshogawara

– Subjects are asked to read aloud the translated sentences five times

– F0 was extracted using the Praat software

• Four possible word combinations (unaccented / accented) were designed

Downstep

Downstep should occur only when the accented word precedes
Downstep

- Downstep: only when the accented word precedes

- Summary (Downstep)
  - Clear downstep effect of the accented words was found
    - The pitch range of the following word was significantly smaller for A+A and A+U than for U+A and U+U
  - The downstep effect (lowering effect) should be a property of the accented words
  - The results agree with the Accentual Fall Hypothesis

Initial lowering

- Four possible word combinations (unaccented / accented) were designed
  - Location of focus (1st vs. 2nd word) was also manipulated for control of intonational phrase boundaries
    - When focus is on the 2nd word, there should be an intonational phrase boundary between the 1st and 2nd words
    - When focus is on the 1st word, there should be no intonational phrase boundary

- Initial lowering would be found when accented word precedes

Focus on the 2nd word
  - Weak initial lowering (u precedes, weak; a precedes, strong)

Focus on the 1st word
  - Strong initial lowering (a precedes, strong; u precedes, weak)

Accentedness of 2nd word

- Peak in the 2nd word (Hz) (120 tokens for each speaker)

- Downstep
  - Only when the accented word precedes

- Summary (Downstep)
  - Clear downstep effect of the accented words was found
    - The pitch range of the following word was significantly smaller for A+A and A+U than for U+A and U+U
  - The downstep effect (lowering effect) should be a property of the accented words
  - The results agree with the Accentual Fall Hypothesis
**Initial lowering**

- **Focus on the first word**
  - No initial lowering when focused unaccented word precedes (and "accentual" rise also disappears)

![Graph of Initial lowering](image)

**Summary (Initial lowering)**
- Accentedness (A or U) affected the initial lowering
  - With focus on the following (2nd) word, degree of the initial lowering was smaller when the preceding word was accented.
  - With focus on the preceding (1st) word, the initial lowering disappeared, when the preceding word was unaccented.

- The (strong) initial lowering can be regarded as a property of the preceding accented word.
- The weak initial lowering should be a property of the intonational phrase, introduced by focus.
- The results favor the Accentual Fall Hypothesis.

**Representation of pitch accent**

- The lexical pitch accent in Goshogawara always shows "falling" property
  - In non-connective form
    - Fall in the finally syllable
    - Downstep effect on the following word
    - Initial lowering of the following word
  - 'Rising' property can disappear depending on phrasing of utterance
    - When the focused unaccented word precedes, 'accentual' rise can disappear.
    - Representation of the pitch accent should not be LH (rising), but HL (falling), just as Tokyo.

**Representation below prosodic word**

- Difference between Tokyo and Goshogawara
  - **Tokyo**: H of the HL is linked to the accented syllable, with HL behaving as a cluster (P&B 1989)
  - **Goshogawara**: H of the HL is linked to the accented syllable, while the L is linked to the right edge of prosodic word

![Representation of pitch accent](image)
1. Intonational typology of Japanese dialects
   1.1 Approach
   1.2 Advantages of the present approach
   1.3 Summary
2. The prosodic structure of Goshogawara
   2.1 Introduction
   2.2 Experiment
   2.3 Explanation of findings
3. Conclusion

This presentation is a glimpse of my research on phrase-level prosody, or intonation of Japanese dialects.

Intonation of Japanese dialects have not been fully investigated.

Since prosody of Japanese dialects exhibit rich variety, its examination should play an important role in the understanding of intonation in general.

It was shown that studies on intonation of Japanese dialect will contribute to a more adequate description of a specific dialect, to the development of theory of prosody in general, and to the understanding of prosody-syntax interface.
Igarashi, Yosuke (2006c) 'Rising' pitch accent of Goshogawara Japanese?

Igarashi, Yosuke (2006b) Dephrasing in Kobayashi Japanese: Is it a reality?

Igarashi, Yosuke (2006a) A preliminary analysis of the relation between

Hayata, Teruhiro (1999)

Hattori, Shiro (1954) On'inron kara mita kokugo no akusento.

Hattori, Shiro (1979) Hyoso akusentoso to kiete akusentoso. S. Hattori and

Hayata, Teruhiro (1985)


Reference


Kindaichi's "Accent Map"

Adopted from Akinaga ed. (2002: pp. 1)