

## An email from a Canadian learner

Dear OJAD,

I just wanted to say THANK YOU for creating your wonderful website!

I live in Canada and have been studying Japanese for 10 years - 4 of which were at university. I also worked in Japan for two years. And I had NEVER heard of Pitch Accent - I knew from my Japanese friends that there were different ways to say "hashi" and "ame", but I couldn't hear the difference, and I didn't know that pitch accent actually is a feature that ALL Japanese words have. I finally came across the topic of pitch accent when I started searching for pronunciation books while in Japan, and found a Japanese book that talked about 高低アクセント. I was intrigued and started looking online for more information.

Now that I'm back home and continuing my self-study of Japanese, I have discovered pitch accent, and it makes SOOOO much more sense to me! I always wondered how I could sound "more Japanese" and get rid of my painfully obvious foreign accent. And I knew that Japanese people sounded different than me, but I didn't know what it was or how to train myself to copy it. Thanks to finding online resources like your website, I am enjoying learning about Japanese and am now able to hear pitch changes in Japanese. I also feel like my pronunciation is improving. And of all the resources I've found online, your website is definitely my favorite! \*^v^\*

## Bio. of the lecturer



### Nobuaki MINEMATSU

- Professor at Grad. School. of Eng., UTokyo
- Specializing in speech science and technology and its application to supporting L2 learning
- **Private and professional career**
  - wished to become a language teacher in his high school days.
  - was an amateur actor of English drama in his college days.
  - obtained the doctor of **Engineering** from UTokyo in 1995.
  - became a research associate at Toyohashi Univ. of Tech. in 1995.
  - became an associate professor at UTokyo in 2000.
  - became a full professor at UTokyo in 2012.
  - received academic awards from RISP, PSJ, JAAI, IEICE, etc.
  - is a chair of SLP-SIG of IPSJ and a vice chair of IEICE ISS.

## What if you speak Japanese with inadequate control of prosody?

Nobuaki MINEMATSU

Graduate School of *Engineering*,  
The University of Tokyo / Project OJAD

## Speaking with inadequate prosody



# Outline of the lecture

## Fundamentals of word accent and phrase intonation

- Two levels of prosodic grouping with accent and intonation

### Does unnatural prosody cause miscommunications?

- Word accent variability and regional accents
- Inadequate intonation control and intelligibility



### Brief introduction to OJAD

- Guidebook for learning lexical accent with your textbook
- Prosodic reading tutor, Suzuki-kun

### Summary



## First segmentation and then grouping

### Word → bunsetsu → accentual phrase → intonational phrase

生まれて初めて、インドネシアにきました。

↓ Segmentation into words or morphemes and selection of their reading

生まれ (動) | て (助) | 初めて (副) | インドネシア (名)

| に (助) | 来 (動) | まし (助動) | た (助)

↓ Some boundaries become bunsetsu (文節) boundaries.

生まれて | 初めて | インドネシアに | 来ました

↓ Some boundaries become accentual phrase boundaries (accentual grouping).

生まれて初めて | インドネシアに | 来ました

↓ Some boundaries become intonational phrase boundaries (intonational grouping).

生まれて初めて || インドネシアにきました (|| pause)

First segmentation and then grouping.  
Prosody is a kind of glue that combine words and phrases together.

## PCs of today can read Japanese very well.

### In a sense, the lecturer is a teacher of Japanese!!

- But he teaches it not to human learners but to machine learners.
- How good are PCs at reading Japanese sentences?

「生まれて初めて、インドネシアにきました。  
多くの学生が、日本語を学んでいると、聞いています。」



- What is done to enable PCs to read sentences in Tokyo Japanese?
- Especially, what kind of prosody training is provided for them?

## What is word accent in Japanese?

### Word accent in English and Japanese

- It makes a portion or a segment of a word salient.

- English -- stress accent

- Only one syllable of a word is stressed.

gui·tar / gitɑ:r /

- Japanese -- pitch accent

pi·an·o / piænou /

- Only one mora of a word is high? **No!**

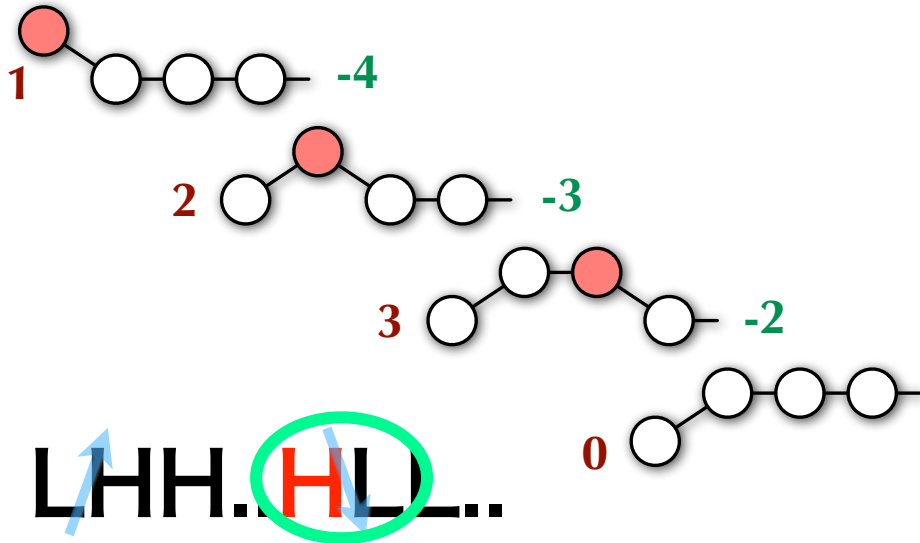
- The principle of word accent control of Tokyo Japanese

- From 1st mora to 2nd mora, the pitch level generally goes up (L → H).
- The pitch level goes down somewhere in the word. Never goes up again.
- Word accents are classified based on the falling position of pitch.
- Accent nucleus = the previous mora before a pitch fall



# HIROSHIMA with four accent types

Say "HIROSHIMA" with different accent types.



## Look similar but totally different!

### Bunsetsu (文節)

- A constituent composed of a content word and adjunct word(s)
  - 私+は+兄+に+も+駅+へ+来+て+と+伝+
  - IC+A IC+A+A IC+A IC+A+A IC+...
- Bunsetsu segmentation is independent of how a sentence is read.
  - 生まれて | 初めて || インドネシアに | 来ました。

### Accental phrase (Japanese unique pitch control)

- (Word) accent control is applied on a phrase (sequence of words)
  - First goes up, then goes down somewhere, and never goes up again.
- The way of assigning accentual phrases onto a sentence can vary!
  - 生まれて | 初めて || インドネシアに | 来ました。
  - 生まれて初めて || インドネシアに 来ました。
  - Bunsetsu = the smallest accentual phrase
- When speaking, unit of accent control is not a word but a phrase!

# First segmentation and then grouping

Word → bunsetsu → accentual phrase → intonational phrase

- 生まれて初めて, インドネシアに 来ました。
- ↓ Segmentation into words or morphemes and selection of their reading
    - 生まれ (動) | て (助) | 初めて (副) | インドネシア (名)
    - | に (助) | 来 (動) | まし (助動) | た (助)
  - ↓ Some boundaries become bunsetsu (文節) boundaries.
    - 生まれて | 初めて | インドネシアに | 来ました
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    - 生まれて初めて | インドネシアに | 来ました
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    - 生まれて初めて || インドネシアに 来ました (|| pause)

First segmentation and then grouping.  
Prosody is a kind of glue that combine words and phrases together.

## Two levels of prosodic groupings

Bunsetsu → Accentual phrase → Intonational phrase

- B: うまれて | はじめて || インドネシアに | きました。
- A: うまれて | はじめて || インドネシアに | きました。
- A: LHHH LHL L LHHH LLL LHL L
- I: [pitch contour]
- A: うまれてはじめて || インドネシアに きました。
- A: LHHHHH L L LHHH L L L L L L
- I: [pitch contour]



Bunsetsu ≤ Accentual Phrase ≤ Intonational Phrase



## How many bunsetsus should be grouped?

### Ambiguity of the length of an accentual phrase

- うまれて | はじめて || インドネシアに | きました
- うまれてはじめて || インドネシアに | きました
- うまれてはじめて || インドネシアに | きました



- Different assignment of accentual phrases can change the nuance.
- A smaller accentual phrase somewhat emphasizes that small phrase.
- Speaking rate also changes the way of grouping bunsetsus.

### Examples of accent grouping when speaking

- A noun + another = a compound noun
  - 赤 (あか) + 鉛筆 (えんぴつ) → あかえんぴつ
- Verb conjugation
  - 歩く → あるく, あるきます, あるいて, あるいた, あるかない
- A bunsetsu + another = an accentual phrase
  - わたしは + たべる = わたしは たべる かれは + たべる = かれは たべる

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## Outline of the lecture

### Fundamentals of word accent and phrase intonation

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- Word accent variability and regional accents
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### Summary



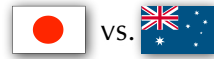
# Are Japanese sensitive to unnatural prosody?

They are **very sensitive** to unnatural prosody.

- A large listening test using native and non-native listeners
  - Speaker: a bilingual speaker of Japanese and American English
  - Native Japanese and a heavily AE accented version
  - Native Japanese pronunciations can be **morphed acoustically** to their AE accented versions **gradually and quantitatively**.



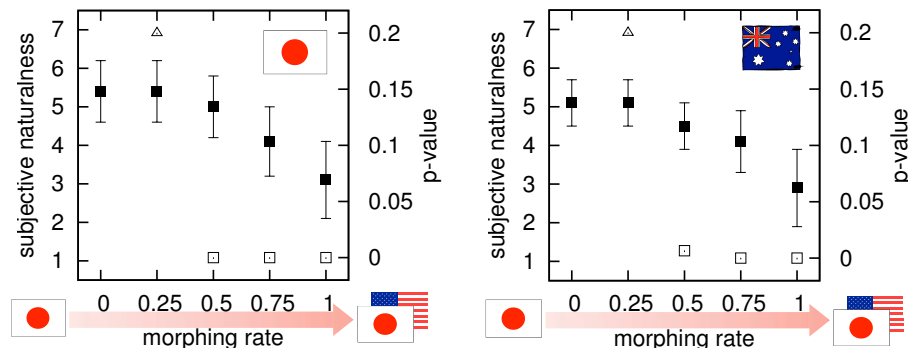
- Morphing conducted for the listening experiment
  - Only Pitch, only loudness, only timbre, and their combination
  - Gradual and quantitative morphing was done from J to AE-J.
- Task of the listening test
  - Subjects: native Japanese and Australian learners
  - Task: judgement of the degree of being accented



## Use of morphed utterances

- Prosodic insensitivity of foreign listeners [Kato+'11]
  - 42 Japanese listeners
  - 15 Australian listeners
  - Judgement of naturalness as Tokyo Japanese

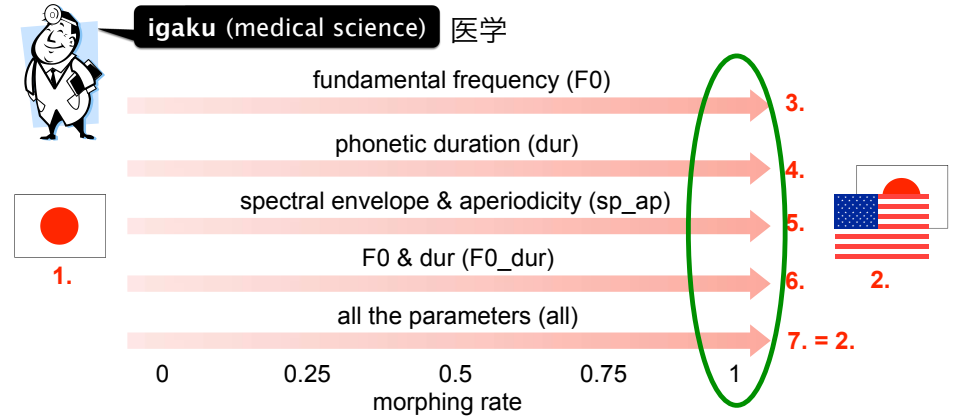
Morphing only in terms of **spectrum & periodicity**



## Use of morphed utterances

- Morphing of a native utterance and its accented version [Kato+'11]

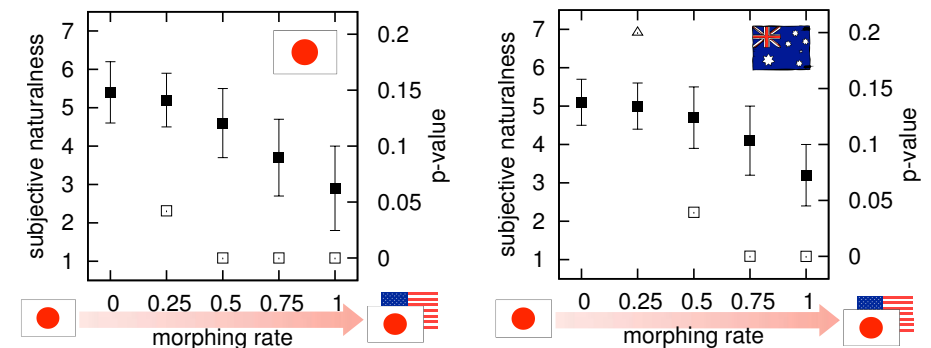
- Use of a pair of word utterances spoken by a bilingual speaker
  - Normal Tokyo Japanese
  - Heavily American accented Japanese



## Use of morphed utterances

- Prosodic insensitivity of foreign listeners [Kato+'11]
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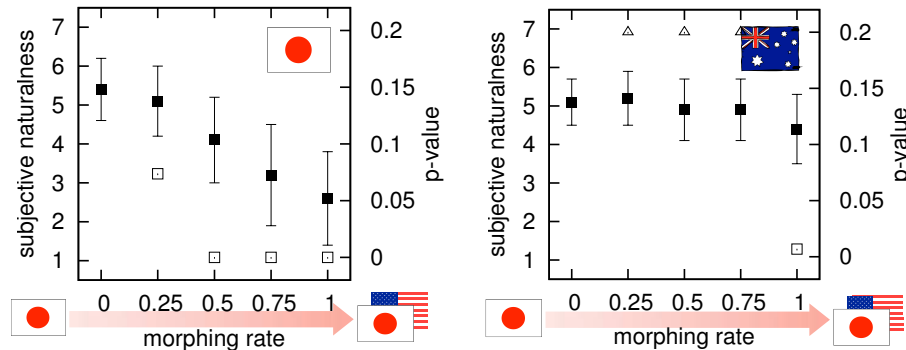
Morphing only in terms of **duration**



## Use of morphed utterances

- Prosodic insensitivity of foreign listeners [Kato+'11]
  - 42 Japanese listeners 
  - 15 Australian listeners 
  - Judgement of naturalness as Tokyo Japanese

### Morphing only in terms of F0




## Tokyo accent as “dress code” of Japanese

**新・アクセント辞典  
ポイント解説!**  
～改訂から見える“放送のことば”～  
NHK放送文化研究所 主任研究員  
塩田 雄大

NHK 文庫 フォーラム 2016


NHKアクセント辞典

①1943(S18)\*  
②1951(S26)\*  
③1966(S41)\*  
④1985(S60)\*  
⑤1998(H10)\*



NHK 文庫 フォーラム 2016

『NHK日本語発音アクセント新辞典』



NHK 文庫 フォーラム 2016

『NHK日本語発音アクセント新辞典』

アクセント変更のための調査 ⇒ 分析 ⇒ 決定

・放送のことばとしてふさわしいか

日本語の現状を正確に把握した上で、放送ではどういった「基準」を打ち立てるのが、いま生きている人たちにとって最善なのか。

日本語の伝統を継承し、21世紀の現代にもっとも合うように調整 “公的な場面でのことばのドレスコード”

NHK 文庫 フォーラム 2016

## Incorrect word accent != miscommunication

### The most frequent phrase accent is type-0.

- うまれて | はじめて | かなだに | きました
- うまれて | はじめて | かなだに | きました
  - Natives will think that you're learning Japanese in 茨城.
- Word accent variations are dialect variations in many cases.
  - Variations of accent nucleus position are dialect variations.
  - Natives generally speak Tokyo Japanese in public (= formal Japanese).



### Examples of accent variation due to dialect variation

#### 東西南北 in 東京

	東	西	南	北
方角として	<u>ひがし</u>	<u>にし</u>	<u>みなみ</u>	<u>きた</u>
人名として	<u>ひがし</u>	<u>にし</u>	<u>みなみ</u>	<u>きた</u>

#### 東西南北 in 浜松

	東	西	南	北
方角として	<u>ひがし</u>	<u>にし</u>	<u>みなみ</u>	<u>きた</u>
人名として	<u>ひがし</u>	<u>にし</u>	<u>みなみ</u>	<u>きた</u>

## Poor Cinderella



I want to be *linguistically and socially* dressed up but I don't know how to do that.





## Poor Cinderella



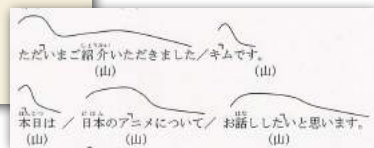
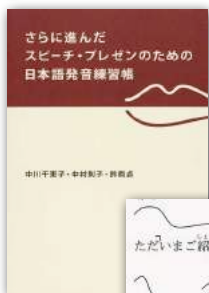
<http://www.disney.co.jp/fc/princess/cinderella.html>

## Incorrect intonation = miscommunication

### Two interesting presentations given by a Chinese learner

- The topic is "food mileage".
  - It is a quantity calculated by multiplying weight and distance
- 10 min intonational self-training is done.
- Before & After

### A very short cut to improve "intelligibility"



## Outline of the lecture

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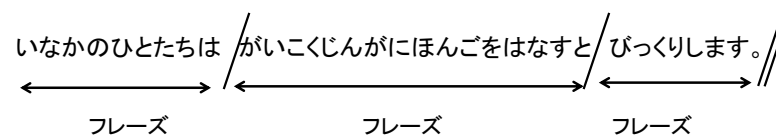
### Summary



## What was done in the 10-min training?

A 簡単なフレージングができる  
「句切り」と「への字」(チャンキングとポージング)  
⇒大きいリズムをとることができる

- 1) 文の意味を理解し、(聞きながら)句切りを入れる
- 2) ピッチカーブを描く

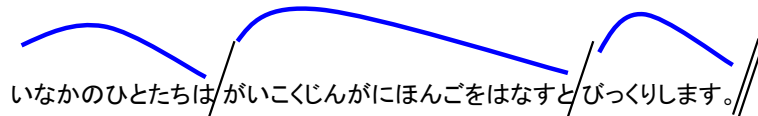


OJAD講習会スライド (中村則子講師@東京外国語大学)

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- 1) 句切りを入れる
- 2) ピッチカーブを描く(「への字」にする)

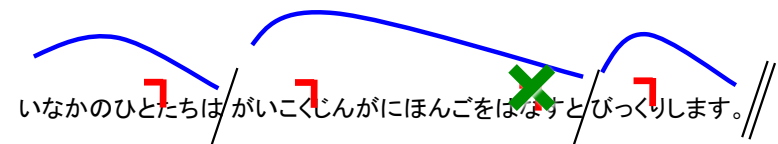


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## What was done in the 10-min training?

C 下がり目があるとしたら、それはどこにあるのかに注意して発音することができる  
(頭高型アクセント⇒複合名詞のアクセント⇒動詞のアクセント)

- 1) 文の意味を理解し、句切りを入れる
- 2) (聞きながら)ピッチカーブを描く(「への字」にする: 山か丘)
- 3) (アクセント辞典を使って) フレーズの中の最初のアクセント核を見つける



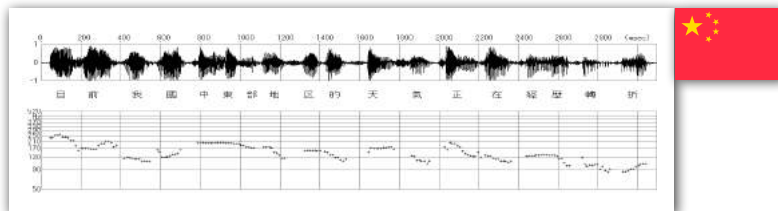
上級学習者・テキストを作る人が使いやすい辞書

OJAD講習会スライド (中村則子講師@東京外国語大学)

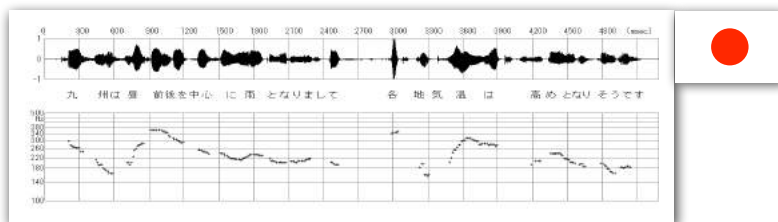
## An interesting comparison

### A huge difference in global prosody between C and J

- 🎧 Pitch changes *acoustically* observed in a Chinese utterance



- 🎧 Pitch changes *acoustically* observed in a Japanese utterance



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### Summary

にほんごは、とてもむずかしいけど、アニメがすげだから、がんばります。  
日本語は、とても難しいけど、アニメが好きだから、頑張ります。





## 3 kinds of introductory pages for OJAD

### OJAD - 4-Feature Intro

Detailed instructions like a manual of a commercial product

### Let's try OJAD

Simplified instructions to learn OJAD by using it

- Let's try Word Search
- Let's try Verb Suffix Search
- Let's try Suzuki-kun

### Let's try OJAD → OJAD Demo for a Tablet

This page is for poster presentation at a conference.



OJAD

Before using...

- OJAD - 4-Feature Intro
- Let's try OJAD

[Let's try Word Search](#)

[Let's try Verb Suffix Search](#)

[Let's try Suzuki-kun](#)

[OJAD Demo for a Tablet](#)

## Accent changes due to conjugations

	辞書形	～ます形	～て形	～た形	～ない形	～なかった形	～ば形	使役形	～う形
<b>1グループの動詞</b>									
無	ひく	ひきます	ひいて	ひいた	ひかない	ひか <b>な</b> かった	ひ <b>け</b> ば	ひか <b>せ</b> る	ひ <b>こ</b> う
無	あらう	あら <b>い</b> ます	あら <b>っ</b> て	あら <b>っ</b> た	あら <b>わ</b> ない	あら <b>わ</b> な <b>か</b> った	あら <b>え</b> ば	あら <b>わ</b> せる	あら <b>ら</b> う
無	うたう	うた <b>い</b> ます	うた <b>っ</b> て	うた <b>っ</b> た	うた <b>わ</b> ない	うた <b>わ</b> な <b>か</b> った	うた <b>え</b> ば	うた <b>わ</b> せる	うた <b>ら</b> う
有	なる	な <b>り</b> ます	な <b>っ</b> て	な <b>っ</b> た	な <b>ら</b> ない	な <b>ら</b> な <b>か</b> った	な <b>れ</b> ば	な <b>ら</b> せる	な <b>ら</b> う
<b>2グループの動詞</b>									
無	かえる	か <b>え</b> ます	か <b>え</b> て	か <b>え</b> た	か <b>え</b> ない	か <b>え</b> な <b>か</b> った	か <b>え</b> れば	か <b>え</b> せる	か <b>え</b> らう
無	捨てる	す <b>て</b> る	す <b>て</b> ます	す <b>て</b> て	す <b>て</b> た	す <b>て</b> な <b>か</b> った	す <b>て</b> れば	す <b>て</b> せる	す <b>て</b> らう
有	出来る	で <b>き</b> る	で <b>き</b> ます	で <b>き</b> て	で <b>き</b> た	で <b>き</b> な <b>か</b> った	で <b>き</b> れば	で <b>き</b> せる	で <b>き</b> らう
有	集める	あ <b>つ</b> める	あ <b>つ</b> めます	あ <b>つ</b> めて	あ <b>つ</b> めた	あ <b>つ</b> めな <b>か</b> った	あ <b>つ</b> めれば	あ <b>つ</b> めせる	あ <b>つ</b> めらう
	0型 or -2型	-2型	0型 or -3型	0型 or -3型	0型 or -3型	-4型 or -5型	-2型 or -3型	0型 or -2型	-2型

Only two manners of accent changes. How systematic they are!!

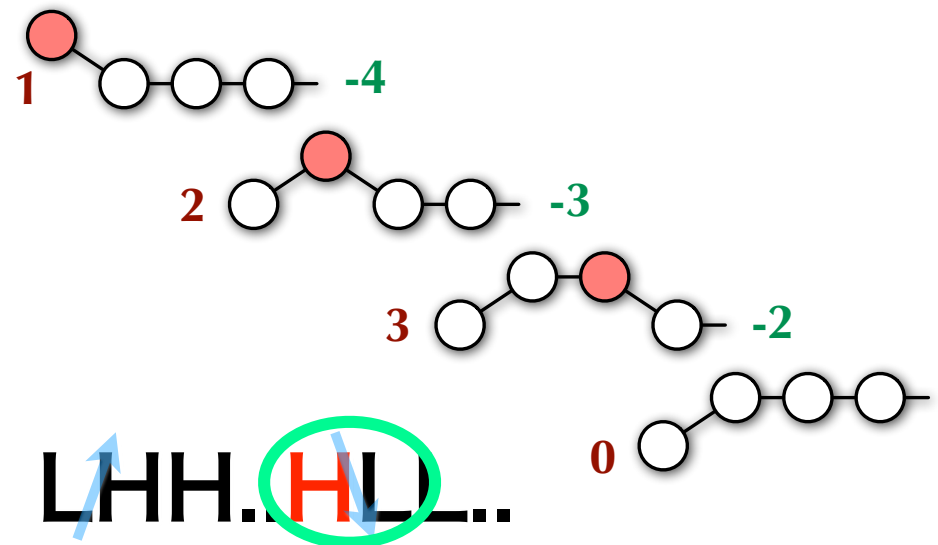
## Word Search = supplementary for textbooks



About 12,700 words of verbs, i-adjectives, na-adjectives, and nouns

## HIROSHIMA with four accent types

Say "HIROSHIMA" with different accent types.



# Accent changes due to conjugations

1グループの動詞	辞書形	～ます形	～て形	～た形	～ない形	～なかった形	～ば形	使役形	～う形
無	ひく	ひきます	ひいて	ひいた	ひかない	ひか <b>な</b> かった	ひ <b>か</b> ば	ひか <b>せ</b> る	ひ <b>こ</b> う
無	あらう	あら <b>い</b> ます	あら <b>っ</b> て	あら <b>っ</b> た	あら <b>わ</b> ない	あら <b>わ</b> な <b>か</b> った	あら <b>え</b> ば	あら <b>わ</b> せる	あら <b>ら</b> う
無	うたう	うた <b>い</b> ます	うた <b>っ</b> て	うた <b>っ</b> た	うた <b>わ</b> ない	うた <b>わ</b> な <b>か</b> った	うた <b>え</b> ば	うた <b>わ</b> せる	うた <b>ら</b> う
有	なる	な <b>り</b> ます	な <b>っ</b> て	な <b>っ</b> た	な <b>ら</b> ない	な <b>ら</b> な <b>か</b> った	な <b>ら</b> ば	な <b>ら</b> せる	な <b>ら</b> う
2グループの動詞	辞書形	～ます形	～て形	～た形	～ない形	～なかった形	～ば形	使役形	～う形
無	かえる	か <b>え</b> ます	か <b>え</b> て	か <b>え</b> た	か <b>え</b> ない	か <b>え</b> な <b>か</b> った	か <b>え</b> ば	か <b>え</b> せる	か <b>え</b> う
無	捨てる	す <b>て</b> る	す <b>て</b> ます	す <b>て</b> て	す <b>て</b> た	す <b>て</b> な <b>い</b>	す <b>て</b> ば	す <b>て</b> せる	す <b>て</b> う
有	出来る	で <b>き</b> る	で <b>き</b> ます	で <b>き</b> て	で <b>き</b> た	で <b>き</b> な <b>い</b>	で <b>き</b> ば	で <b>き</b> せる	で <b>き</b> う
有	集める	あ <b>つ</b> める	あ <b>つ</b> めます	あ <b>つ</b> めて	あ <b>つ</b> めた	あ <b>つ</b> め <b>な</b> い	あ <b>つ</b> めば	あ <b>つ</b> めせる	あ <b>つ</b> めう

# 1-min PV for Suzuki-kun



Only two manners of accent changes. How systematic they are!!

# 1-min PV for Suzuki-kun



# Two modes in Suzuki-kun

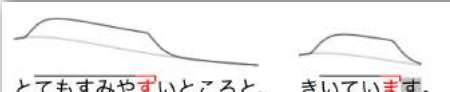
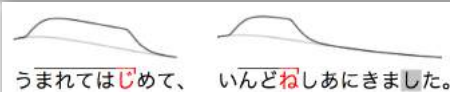
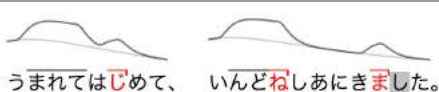
- A sentence = phrase1 + phrase2 + phrase3 + ....
  - 生まれて初めて、インドネシアに来ました。とても住みやすい所と、聞いています。
- A phrase = ac-phrase1 + ac-phrase2 + ...
  - || 生まれて || 初めて || インドネシアに || 来ました ||
  - || とても || 住みやすい || 所と || 聞いています ||
  - || intonational phrase boundary | accentual phrase boundary
- Advanced mode and beginner mode
  - Advanced: an accent nucleus is given to every detected ac-phrase.
  - Beginner: reduces #ac-phrases while keeping the naturalness.
    - The following ac-phrases remain and others de-accented.
    - 1st accentual phrase +
    - type-1 accentual phrase with its length >= 3morae



## Two modes in Suzuki-kun

### Advanced mode and beginner mode

生まれて初めて、インドネシアに来ました。とても住みやすい所と、聞いています。



- Beginner mode: an ac-phrase becomes an intonational phrase.
  - Except for type-1 ac-phrases with their length  $\geq 3$  morae.
- An unvoiced mora is displayed in a gray patch.
  - Accent nuclei can be unvoiced.
- Suzuki-kun can read a text based on the visualized prosody.
  - Note: output voices always correspond to Pitch=Advanced and Accent=Advanced even when you set P=Beginner and A=Beginner.

### He can play the role of multiple speakers!!

#### He is a multi-gender speaker!?

- Female1/2 + Male1/2
- Speaking rate = Fast, Normal, and Slow
- A dialogue manuscript can be read with multiple voices.

// M1 F ← speaker = M1, speaking rate = Fast  
 来週の研究発表の準備は/できてますか？

// F2 F ← speaker = F2, speaking rate = Fast  
 パワーポイントのスライド作成に/時間がかかってます。

// F2 S ← speaker = F2, speaking rate = Slow  
 なので、申し訳ないですが、あと、数時間、

// F2 F ← speaker = F2, speaking rate = Fast  
 えーと、半日はかかりそうです。

// M1 F ← speaker = M1, speaking rate = Fast  
 そうですか。それでは、発表練習はいつ頃できそうですか？

// F2 N ← speaker = F2, speaking rate = Normal  
 あさっての午前中に、会議室を予約しておきました。

// M1 F ← speaker = M1, speaking rate = Fast  
 分かりました。10時に向かいます。しっかり、準備しておくように。

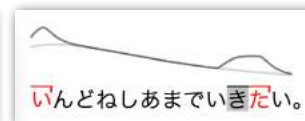
## Several notes for voice output of Suzuki-kun

### He reads text using the pitch pattern of P&A=Advanced.

- “Pitch Contour” and “Accent Above Text”
  - P=Advanced, A=Advanced
  - P=Beginner, A=Beginner
  - In both cases, the synthetic voices correspond to P&A = Advanced.

### You can correct accent errors with the accent editor.

- By clicking each mora, its accent value (H/L) can be edited.
- New values are used for voice output only when P&A = Advanced.
  - When P&A = Beginner, you can edit but voices are not changed.
- Inadequate accents as Tokyo Japanese cannot be realized as audio.
  - Accentual phrases have to be type-0, 1, 2, 3,....



## Weakness of Suzuki-kun

### Let's try OJAD → OJAD Demo for a Tablet

- 4-3: Details of text read-aloud → Suzuki-kun's weakness

#### Suzuki-kun's weaknesses

We are working to improve Suzuki-kun each day, but it still has some weaknesses.

##### 1. Accent type prediction error

###### 1-1) Expressions written in hiragana

If the text is written in hiragana, it becomes difficult to detect word boundaries and identify words due to homonyms. Because of this,

##### 2. Mistakes in reading

###### 2-1) Changes in reading due to contextual effects

Suzuki-kun will sometimes make reading mistakes when there are variations due to context. This is not due to difficulties with

##### 3. Ambiguity in meaning and intonation controls

木のしたで雨宿りをしている女性を眺めた。  
 木のしたで、雨宿りをしている女性を眺めた。  
 木のしたで雨宿りをしている女性を、眺めた。

Depending on what 「木のしたで」 depends on, the intonation may vary slightly. This does not mean that Suzuki-kun has

# Outline of the lecture

## Fundamentals of word accent and phrase intonation

Two levels of prosodic grouping with accent and intonation

## Does unnatural prosody cause miscommunications?

- Word accent variability and regional accents
- Inadequate intonation control and intelligibility



## Brief introduction to OJAD

- Guidebook for learning lexical accent with your textbook
- Prosodic reading tutor, Suzuki-kun

## Summary



# Online materials for OJAD

## Minna No Onsei Site

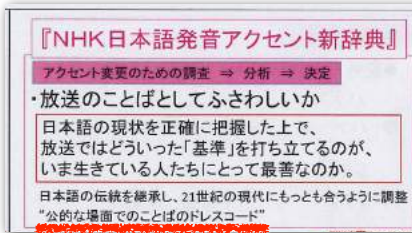
- <http://www.kyorin-u.ac.jp/univ/user/foreign/onsee/>
- Online OJAD manual ver.1.1 (2014/11/10)
- Exercises ver.1 for beginner/intermediate/advanced learners

## Tsutaeru Hatsuon

- <http://www.japanese-pronunciation.com>
- 動画の一覧 → OJAD単語検索/OJADスズキくん



# Word accent and phrase intonation



# UTokyo OJAD tutorial workshop

## A 2.5-hour workshop

- It was held in Japanese for teachers of Japanese.
- [youtu.be/9q44lpGdBjo](https://youtu.be/9q44lpGdBjo)

