Slide 1

On Matches and Mismatches between Syntactic
Clause and Intonational Phrase boundaries

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Workshop on ellipsis licensing beyond syntax

Slide 2

Prosodic Hierarchy of Japanese
Terminology

AM theory / ToBI		Minor/Major Phrase			Syntax–Prosody Mapping
Pierrehumbert & Beckman	J_ToBI, X-JToBI	McCawley, Poser, Kubozono	Kawahara & Shinya	Ito & Mester, Selkirk, this chapter	
Utterance	Intonation Phrase	(not discussed)	Utterance	ι_{max}	
			Intonational Phrase	PClause or Intonational Phrase (ι)	
Intermediate Phrase		Major Phrase	Major Phrase	Phonological Phrase (φ)	
Accentual Phrase	Accentual Phrase	Minor Phrase	Minor Phrase	φ_{min}	

(Ishihara 2015: 570)

Slide 3

Prosodic Hierarchy of Japanese
Terminology

What earlier analyses of Japanese have in common:

1. Two levels (below Utterance)
   - accentual phrase < intermediate phrase (< utterance)
     (Pierrehumbert and Beckman 1988)
   - accentual phrase < intonation phrase
     (Venditti 2005; Maekawa et al. 2002; Venditti et al. 2008)
   - minor phrase < major phrase
     (McCawley 1968; Poser 1984; Kubozono 1993)
2. No level correponding to intonational phrase proposed for English and other languages. (e.g., Beckman and Pierrehumbert 1986)

Slide 4

Prosodic Hierarchy of Japanese
Recent findings/proposals

Kawahara and Shinya (2008):

- A prosodic level larger than the major phrase and smaller than the utterance—intonation phrase
- minor phrase < major phrase < intonational phrase < utterance

Itô and Mester (2007, 2012, 2013)

- Unification of minor and major phrase—PPhrase
  - Minor phrase as a subcategory of PPhrase
- A level above PPhrase—PClause (ι)
- Cross-linguistically universal prosodic hierarchy:
  PWord (ω) < PPhrase (φ) < PClause (ι)

Clauses at the Syntax–Prosody Interface

Syntax–Prosody Mapping Hypothesis (Itô and Mester 2007, 2012, 2013; Selkirk 2011)

Syntax	Prosody	
Clause	PClause (a.k.a. intonational phrase, ι)	$\{ \dots \}_\iota$
Phrase	PPhrase (φ)	$(\dots)_\varphi$
Word	PWord (ω)	ω

Clauses at the Syntax–Prosody Interface

Match Theory (Selkirk 2011)

(1) Syntax–Prosody Mapping [S–P faithfulness]
   a. $[_{\text{Clause}} \dots]$ $\Longrightarrow$ $\{ \dots \}_\iota$ (PClause)
   b. $[_{\text{Phrase}} \dots]$ $\Longrightarrow$ $(\dots)_\varphi$ (PPhrase)
   c.   word $\Longrightarrow$ ω (PWord)

(2) Prosody–Syntax Mapping [P–S faithfulness]
   a. $[_{\text{Clause}} \dots]$ $\Longleftarrow$ $\{ \dots \}_\iota$ (PClause)
   b. $[_{\text{Phrase}} \dots]$ $\Longleftarrow$ $(\dots)_\varphi$ (PPhrase)
   c.   word $\Longleftarrow$ ω (PWord)

- Mismatches between syntactic and prosodic constituents are explained by Prosodic Wellformedness Constraints (PWCs).

Clauses at the Syntax–Prosody Interface

However,

- Kawahara and Shinya (2008) only examined coordinated matrix clauses.
  - [Clause1][Clause2][Clause3]
- Selkirk (2011): Two notions of clauses
  - Standard clause—"the constituent that is the complement of the functional head Comp⁰"
  - Illocutionary clause—"the highest syntactic projection of the sentence and carries illocutionary force"
  - Only the latter seems to show the correspondence to the PClause universally.
- Question: Prosody of embedded clauses
  - Are embedded clauses mapped to PClauses?
  - If so, what are their phonetic cues?
  - What kind of theoretical implications do PClauses have regarding the syntax–prosody mapping?
  - Is there any interaction between PClauses and word order within each syntactic clause?

Summary and Goals

- Prosodic Hierarchy
  - New level—PClause
- Syntax–Prosody Mapping
  - Syntax–Prosody vs. Prosody–Syntax Mapping
- Question
  - Prosody of embedded clause
- Goals
  - Phonetic evidence of PClauses
    - Production experiment
  - Syntactic evidence of PClauses
    - Clause-mate Condition (Ishihara 2012, 2013)

The Clause-mate Condition (CMC)
Multiple clefts

Japanese allows clefts with multiple focus XPs.

(3) [Naoya-ga Mari-ni ringo-o mit-tu ageta]
    N.-NOM M.-DAT apple-ACC 3-CL gave
    'Naoya gave Mari 3 apples.'

(4) [Naoya-ga e_i e_j ageta no]-wa Mari-ni$_i$ ringo-o$_j$ mit-tu$_j$ da.
    N.-NOM gave C-TOP M.-DAT apple-ACC 3-CL COP
    '(Lit.) It was three apples to Mari that Naoya gave.' (Cleft)

The Clause-mate Condition (CMC)
Multiple clefts

The Clause-mate Condition (CMC):
Multiple foci in clefts must originate from the same clause
(Koizumi 1995).

(5) [Mari-ga Emiri-ni [e_i e_j tabeta to] iituketa no]-wa Naoya-ga$_i$
    M.-NOM E.-DAT ate C told C-TOP N.-NOM
    ringo-o$_j$ da.
    apple-ACC COP
    '(Lit.) It was Naoya, an apple that Mari told to Emiri that
    ate.'

(6) *[Mari-ga e_i [Naoya-ga e_j tabeta to] iituketa no]-wa Emiri-ni$_i$
    M.-NOM N.-NOM ate C told C-TOP E.-DAT
    ringo-o$_j$ da.
    apple-ACC COP
    '(Lit.) It was to Emiri, an apple that Mari told that Naoya
    ate.'

The Clause-mate Condition (CMC)
Multiple clefts

If multiple foci in clefts are *Wh*-phrases, or what is being asked
in a Yes/No-question, the sentences are exempt from the CMC.
(Hiraiwa and Ishihara 2002, 2012)

(7) [Naoya-ga t_i [Mari-ga t_j nonda to] iituketa no]-wa
    N.-NOM M.-NOM drank C told C-TOP
    dare-ni$_i$ nani-o$_j$ na no (desu ka)?
    who-DAT what-ACC COP C COP Q
    '(Lit.) To whom$_i$, what$_j$ is it that Naoya told t_i that Mari
    drank t_j?' (Wh-question)

(8) [Naoya-ga t_i [Mari-ga t_j nonda to] iituketa no]-wa
    N.-NOM M.-NOM drank C told C-TOP
    Yumi-ni$_i$ wain-o$_j$ na no (desu ka)?
    Y.-DAT wine-ACC COP C COP Q
    '(Lit.) Is it to Yumi$_i$, wine$_j$ that Naoya told t_i that Mari drank
    t_j?' (Yes/No-question)

The Clause-mate Condition (CMC)
Multiple Sluicing

Sluicing with multiple foci, which also involves a (multiple)
Wh-question, does not show the CMC effect. (Nishigauchi 1998)

(9) Mary-wa takusan-no hito-ni [Bill-ga nanika-o
    Mary-TOP many person-DAT Bill-NOM something-ACC
    nusunda to] itta kedo, . . .
    stole C said but

    boku-wa [dare-ni nani-o ka] oboeteinai.
    I-TOP who-DAT what-ACC Q remember-NEG
    '(Lit.) Mary told many people that Bill had stolen something,
    but I don't remember to whom what.'

    (Nishigauchi 1998: 135–136)

The Clause-mate Condition (CMC)

Multiple long-distance (LD) scrambling also obeys the CMC.
(Hiraiwa and Ishihara 2002)

(10)   [CP Naoya-ga Emiri-ni [CP Mari-ga nomiya-de wain-o
       N.-NOM   E.-DAT   M.-NOM bar-LOC   wine-ACC
       nonda to] iituketa]
       drank C told
       'Naoya told Emiri that Mari drank wine at the bar.'

(11)   *?[Emiri-ni_i wain-o_j [CP Naoya-ga t_i [CP Mari-ga nomiya-de bar-LOC
       E.-DAT   wine-ACC   N.-NOM   M.-NOM   bar-LOC
       t_j nonda to] iituketa]
           drank C told
       Lit. 'To Emiri_i, wine_j, Naoya told t_i that Mari drank t_j.'

The Clause-mate Condition (CMC)

This CMC effect disappears in *Wh*- and Yes/No-questions:

(12)   ?[dare-ni_i   nani-o_j [CP Naoya-ga t_i [CP Mari-ga nomiya-de
       who-DAT   what-ACC   N.-NOM   M.-NOM   bar-LOC
       t_j nonda to] iituketa no] ?
           drank C told   Q
       Lit. 'To whom, what did Naoya tell that Mari drank?'

(13)   ?[Emiri-ni_i wain-o_j [CP Naoya-ga t_i [CP Mari-ga nomiya-de
       E.-DAT   wine-ACC   N.-NOM   M.-NOM   bar-LOC
       t_j nonda to] iituketa no] ?
           drank C told   Q
   Lit. 'To Emiri, wine, did Naoya tell that Mari drank?'

Relevance of Prosody

Both *Wh*- and Yes/No-questions are always accompanied by a
focus prosody. (Maekawa 1991; Deguchi and Kitagawa 2002; Ishihara 2003, in
press)

(14)   Focus prosody
       a.   Focal F_0-rise (arrow)
       b.   Post-focal reduction (shade)
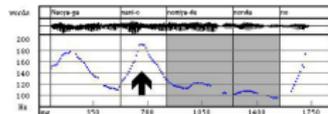
(Wh-question)

[CP ... WH/FOC ... no]?

Relevance of Prosody

Interrogative multiple clefts also exhibit a focus prosody.

(15)   [Naoya-ga t_i [Mari-ga t_j nonda to] iituketa no]-wa
       N.-NOM   M.-NOM   drank C told   C-TOP
       DARE-ni_i NANI-o_j na   no (desu ka) ?
       who-DAT   what-ACC COP C COP Q
       '(Lit.) To whom_i what_j is it that Naoya told t_i that Mari
       drank t_j?'

(16)   [Naoya-ga t_i [Mari-ga t_j nonda to] iituketa no]-wa
       N.-NOM   M.-NOM   drank C told   C-TOP
       EMIRI-ni_i WAIN-o_j na   no (desu ka) ?
       E.-DAT   wine-ACC COP C COP Q
       '(Lit.) Is it to Emiri_i wine_j that Naoya told t_i that Mari
       drank t_j?'

Relevance of Prosody

Some researchers reported that multiple (clausemate) LD-scrambling is slightly degraded. (Saito 1985; Koizumi 2000)

(17) [_CP Naoya-ga Emiri-ni [_CP Mari-ga nomiya-de wain-o
          N.-NOM   E.-DAT   M.-NOM   bar-LOC   wine-ACC
      nonda to] iituketa]
      drank C   told
      'Naoya told Emiri that Mari drank wine at the bar.'

(18) ??nomiya-de_i wain-o_j [_CP Naoya-ga Emiri-ni [_CP Mari-ga t_i
        bar-LOC   wine-ACC   N.-NOM   E.-DAT   M.-NOM
      t_j nonda to] iituketa]
        drank C   told

Relevance of Prosody

Such degraded judgments, however, improve significantly if the scrambled XPs form a *single prosodic constituent*. (Koizumi 2000; Fukui and Sakai 2003; Agbayani et al. 2015)

(19) {_? nomiya-de_i wain-o_j} [_CP Naoya-ga Emiri-ni [_CP Mari-ga
          bar-LOC   wine-ACC   N.-NOM   E.-DAT   M.-NOM
      t_i t_j nonda to] iituketa]
          drank C   told

'Prosodic constituent':

- ▶ Koizumi (2000): intonational phrase (ι)
- ▶ Agbayani et al. (2015): (recursive) phonological phrase (φ)
- ▶ This talk: PClause (ι)

Multiple Clefts: Summary

- ▶ The CMC in Japanese
  - ▶ Multiple clefts
  - ▶ Multiple sluicing
  - ▶ Multiple long-distance scrambling
  - ▶ CMC Obviation: The CMC effect disappears in questions.
- ▶ Relevance of Prosody
  - ▶ Interrogatives obligatorily exhibit a focus prosody.
  - ▶ LD-scrambled elements are included in a single PClause.

Implicit Prosody Hypothesis (IPH)

The Implicit Prosody Hypothesis (IPH) (Fodor 1998, 2002)

- ▶ In silent reading, an abstract prosodic structure of the sentence is projected in the grammatical representation.
- ▶ This "implicit prosody" may influence syntactic ambiguity resolution.
- ▶ All other things being equal, the parser favors the syntactic analysis associated with the most natural (default) prosodic contour for the construction.
- ▶ If this hypothesis is on the right track, it would mean:
  - ▶ that syntactic acceptability judgement of a sentence *always* involves projection of an abstract prosodic structure of the sentence; and
  - ▶ that its influence on acceptability is expected even without an actual phonetic output of the sentence.

Principle of Argument Structure Parsing (PASP)

Clause-level: ι-boundaries as cues for the clausemateness of adjacent XPs

In production, clause boundaries are mapped onto prosody according to the (clause-level) syntax–prosody mapping principle.

(20) Syntax–Prosody Mapping (Clause-level)
(Kawahara and Shinya 2008; Selkirk 2009):
The left/right edge of a syntactic 'clause' coincides with the left/right edge of a PClause (ι).

$$[_{CP} \ldots] \implies \{_\iota \ldots\}$$

Principle of Argument Structure Parsing (PASP)

Clause-level: ι-boundaries as cues for the clausemateness of adjacent XPs

In production, clause boundaries are mapped onto prosody according to the (clause-level) syntax–prosody mapping principle.

(21) Naoya-ga Emiri-ni Mari-ga wain-o   katta   to itta
N.-NOM   E.-DAT   M.-NOM wine-ACC bought C told

a. High-attachment ('told Emiri')
[_{CP} Naoya-ga Emiri-ni [_{CP} Mari-ga wain-o katta to] itta]
$\{_\iota$ $\{_\iota$
'Naoya told Emiri that [Mari bought wine].'

b. Low-attachment ('bought (wine) for Emiri')
[_{CP} Naoya-ga [_{CP} Emiri-ni$_i$ Mari-ga t_i wain-o katta to] itta]
$\{_\iota$ $\{_\iota$
'Naoya told that [Mari bought wine for Emiri].'

Principle of Argument Structure Parsing (PASP)

Clause-level: ι-boundaries as cues for the clausemateness of adjacent XPs

I propose that ι-boundaries are also used as cues in parsing, in particular, *in parsing the argument structure of clauses*.

(22) The Principle of Argument Structure Parsing (PASP):
XPs within a single intonational phrase (ι) are preferably interpreted as clause-mates.

▶ Prediction:
  a. $\{_\iota$ XP YP ... $\}$ $\implies$ clause-mates
  b. XP $\}\{_\iota$ YP ... $\implies$ no preference

Principle of Argument Structure Parsing (PASP)

Clause-level: ι-boundaries as cues for the clausemateness of adjacent XPs

In comprehension of auditory stimuli, ι-boundaries are used as cues for the clausemateness of adjacent XPs.

(21) Naoya-ga Emiri-ni Mari-ga wain-o   katta   to itta
N.-NOM   E.-DAT   M.-NOM wine-ACC bought C told

a. High-attachment ('told Emiri')
[_{CP} Naoya-ga Emiri-ni [_{CP} Mari-ga wain-o katta to] itta]
$\{_\iota$ $\{_\iota$
'Naoya told Emiri that [Mari bought wine].'

b. Low-attachment ('bought (wine) for Emiri')
[_{CP} Naoya-ga [_{CP} Emiri-ni$_i$ Mari-ga t_i wain-o katta to] itta]
$\{_\iota$ $\{_\iota$
'Naoya told that [Mari bought wine for Emiri].'

Principle of Argument Structure Parsing (PASP)

Clause-level: ι-boundaries as cues for the clausateness of adjacent XPs

In silent reading, however, no auditory cues.

- ► According to the IPH, ι-boundaries may be inserted as part of the 'default' prosodic structure, which imposes a bias toward one reading over the other.
- ► How do we predict the 'default' prosody?
  - ► Empirical questions yet to be investigated

Principle of Argument Structure Parsing (PASP)

Clause-level: ι-boundaries as cues for the clausateness of adjacent XPs

Potential cues for ι-boundary insertion as part of "default prosody":

- a. In front of a focused phrase
  - ► ... $\mathbf{XP_{FOC}}$ ... $\implies$ ... $\{_\iota$ $\mathbf{XP_{FOC}}$ ...
- b. After a (sentential) topic phrase
  - ► $[_{CP}$ ... $]$-wa ... $\implies$ ... -wa $\{_\iota$ ...
- c. In front of a nominative subject
  - ► $[_{CP}$ Naoya-ga $]_{CP}$ Mari-ga ...
    $\implies$ $\{_\iota$ Naoya-ga $\{_\iota$ Mari-ga

Principle of Argument Structure Parsing (PASP)

Applying the Mapping Principles and the PASP

If we apply the syntax-prosody mapping principles to a multiple cleft in (23), we obtain the prosodic structure in (24).

(23) $[_{TopP}[_{CP}$ Naoya-ga Emiri-ni $[_{CP}$ Mari-ga t_i t_j tabeta to]
           N.-NOM E.-DAT   M.-NOM   drank c
iituketa no]$_k$-wa $[_{CP}$ nomiya-de$_i$ wain-o$_j$ t_k da]]
told   c -TOP   bar-LOC wine-ACC COP
Lit. 'It is wine at the bar that Naoya told Emiri that Mari drank.'

(24) $\{_\iota(_\varphi$ Naoya-ga $(_\varphi$ Emiri-ni $\{_\iota(_\varphi$ Mari-ga nonda to
no-wa $\{_\iota(_\varphi$ nomiya-de $(_\varphi$ wain-o da

The PASP will impose a parsing preference to the reading in which multiple foci are clause-mates.

Preference: *nomiya-de* and *wain-o* are clause-mates.
$\implies$ Compatible with the intended reading

Principle of Argument Structure Parsing (PASP)

Applying the Mapping Principles and the PASP

Note that a multiple cleft sentence *violating the CMC*, as in (25), would end up with a similar ι-phrasing, as in (26).

(25) *$[_{TopP}[_{CP}$ Naoya-ga t_i $[_{CP}$ Mari-ga nomiya-de t_j nonda to]
           N.-NOM   M.-NOM bar-LOC   drank c
iituketa no]$_k$-wa $[_{CP}$ Emiri-ni$_i$ wain-o$_j$ t_k da]]
told   c -TOP   E.-DAT   wine-ACC COP
Lit. 'It is to Emiri$_i$ wine$_j$ that Naoya told t_i that Mari drank
t_i at the bar.'

(26) $\{_\iota(_\varphi$ Naoya-ga $\{_\iota(_\varphi$ Mari-ga $(_\varphi$ nomiya-de nonda to iituketa
no-wa $\{_\iota(_\varphi$ Emiri-ni $(_\varphi$ wain-o da

If we apply the PASP to this phrasing, however, the multiple foci will be *wrongly* interpreted as clause-mates.

Preference: *Emiri-ni* and *wain-o* are clause-mates.
$\implies$ Incompatible with the intended reading $\implies$ Parsing difficulty!

Principle of Argument Structure Parsing (PASP)
Wh- and Yes/No-multiple clefts

Focus prosody in *Wh-* and Yes/No-multiple cleft *obligatorily* induces additional F_0-rises on the multiple foci, making the sentence look as if there is an ι-boundary between the two foci.

(27) [TopP[CP Naoya-ga t_i [Mari-ga t_j nonda to] iituketa no]-wa
                   N.-NOM   M.-NOM   drank C   told   C-TOP

    DARE-ni$_i$ NANI-o$_j$ *na no (desu ka)* ?
    who-DAT   what-ACC   COP C   COP   Q

    '(Lit.) To whom$_i$ what$_j$ is it that Naoya told t_i that Mari drank t_j?'

(28) $\{_\iota (_\varphi$ Naoya-ga $\{_\iota (_\varphi$ Mari-ga nonda to iituketa no-wa
     $\{_\iota (_\varphi$ DARE-ni $\{_\iota (_\varphi$ NANI-o $na no (desu ka)$?

▶ The PASP **does not** apply to (28), i.e., No CMC.

$\implies$ *DARE-ni* and *NANI-o* may or may not be clause-mates.

Principle of Argument Structure Parsing (PASP)
Nominative subjects

Since nominative subjects appear at the beginning of the clause in the unmarked word order in Japanese, it is plausible that readers tend to project an ι-boundary (in the implicit prosody) in front of each nominative subject.

▶ An ι-boundary in front of a nominative subject
    ▶ [CP Naoya-ga [CP Mari-ga . . .
       $\implies \{_\iota$ Naoya-ga $\{_\iota$ Mari-ga

Principle of Argument Structure Parsing (PASP)
Multiple LD-scrambling

Multiple LD-scrambling obeys the CMC.

(29) *?Emiri-ni$_i$ wain-o$_j$ [CP Naoya-ga t_i [CP Mari-ga nomiya-de t_j
     E.-DAT   wine-ACC   N.-NOM   M.-NOM bar-LOC
     nonda to] iituketa]
     drank C   told
     'Naoya told Emiri that Mari drank wine.'

(30) $\{_\iota (_\varphi$ Emiri-ni $(_\varphi$ wain-o $\{_\iota (_\varphi$ Naoya-ga $\{_\iota (_\varphi$ Mari-ga nonda to iituketa

▶ Scrambled non-clausemate XPs are interpreted as clausemates, according to the PASP. $\implies$ The CMC effect

▶ An additional ι-boundary between *Emiri-ni* and *wain-o* may improve the reading (though still not optimal, as the inserted ι-boundary does not corresponds to a syntactic clause boundary).

Principle of Argument Structure Parsing (PASP)
The CMC Obviation in Questions

The CMC effect disappears in questions due to this obligatory focus prosody.

(31) ?dare-ni$_i$ nani-o$_j$ [CP Naoya-ga t_i [CP Mari-ga nomiya-de
     who-DAT what-ACC   N.-NOM   M.-NOM bar-LOC
     t_j nonda to] iituketa no] ?
      drank C   told   Q
     Lit. 'To whom, what did Naoya tell that Mari drank?'

     $\{_\iota$ dare-ni $\{_\iota$ nani-o $\{_\iota$ Naoya-ga . . .
     'Naoya told Emiri that [Mari bought wine].'

▶ Wh-phrases are obligatorily focused in Japanese, and inserts an ι-boundary in (31).
    ▶ The PASP fails to apply, allowing the non-clausemate interpretation.

Summary

The CMC (Obviation)

- Multiple clefts
- Multiple sluicing
- Multiple LD-scrambling
- Interrogatives are exempt from the CMC.

The Prosodic Account

- Implicit Prosody Hypothesis
  - Implicit prosody affects syntactic acceptability judgements.
- Syntax-prosody mapping
  - No ι-boundary between multiple foci in multiple cleft foci / LD-scrambled XPs
- Principle of Argument Structure Parsing (PASP)
  - Multiple cleft foci / LD-scrambled XPs are interpreted as clause-mates. $\Longrightarrow$ The CMC effect
- CMC obviation caused by additional prosodic effects overriding the default prosody.
  - Focus prosody in interrogatives

Questions

1. Are embedded clauses mapped to PClauses? If so, what are their phonetic cues?
2. What kind of theoretical implications do PClauses have regarding the syntax–prosody mapping?
3. Is there any interaction between PClauses and word order within each syntactic clause?

Stimuli

(32) Matrix, Nominative–Dative–Accusative
Náoya-ga Yúmiko-ni nímotu-o okurimásita
N.-NOM Y.-DAT package-ACC sent
'Naoya sent Yumiko a package.'

(33) Matrix, Dative–Nominative–Accusative
Yúmiko-ni$_i$ Náoya-ga t_i nímotu-o okurimásita
Y.-DAT N.-NOM package-ACC sent

Stimuli

(34) Embedded, Nominative–Dative–Accusative
Yûuzi-ga [Náoya-ga Yúmiko-ni nímotu-o okutta to]
Y.-NOM N.-NOM Y.-DAT package-ACC sent C
omótteiru yóodesu
think seem
'It seems Yuji think that Naoya sent Yumiko a package.'

(35) Embedded, Dative–Nominative–Accusative
Yûuzi-ga [Yúmiko-ni Náoya-ga nímotu-o okutta to]
Y.-NOM Y.-DAT N.-NOM package-ACC sent C
omótteiru yóodesu
think seem

Results

- ► Stimuli
  Word1-Prt | Word2-Prt Word3-Prt Word4-Prt V_{emb} Comp | V_{mat}
- ► Nomalization (duration)
  - ► Reference = (Mean of Word2) / 3
- ► Measurements: Duration of particles/complementizers
  - ► Between Word1 and Word2 (i.e., Word1 particle)
  - ► Between Comp and V_{mat} (i.e., Comp)

Results
ga in different sentence positions
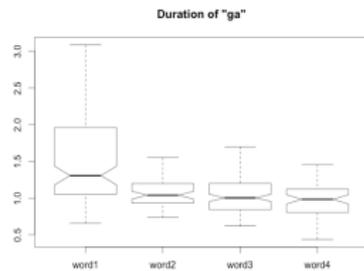
Duration of "ga"

Results
Particles (*ga*/*ni*/*o*) vs. Comp (*to*)
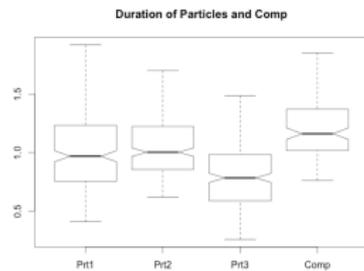
Duration of Particles and Comp

Results
Word2 particle

Matrix clause

Results

Embedded clause

ga.Nom.Dat.Acc   ni.Nom.Dat.Acc   ga.Dat.Nom.Acc   ni.Dat.Nom.Acc
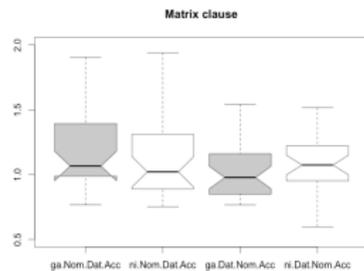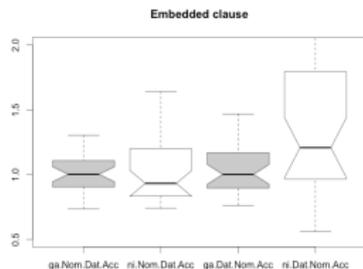
Results

- ▶ Clause boundaries
  - ▶ Left edge: Longer duration of Word1 (matrix subject) particles
  - ▶ Right edge: Longer duration of Comp
- ▶ Word order
  - ▶ Longer duration of particle before embedded clause nominative subject

Summary

- ▶ The PClause
  - ▶ Recent literature suggests the presence of this category in the prosodic hiearachy and its role in the syntax–prosody mapping.
  - ▶ Its presence and effects are not fully tested for embedded clauses.
- ▶ The Clause-mate Condition (CMC)
  - ▶ The Principle of Argument Structure Parsing (PASP) regulates the parsing of "clausemateness" of adjacent XPs, according to the (implicit) prosodic structure.
  - ▶ Additional prosodic factor (such as focus) may override the (implicit) prosody.
- ▶ Experiment
  - ▶ Embedded clauses mapped to PClause
  - ▶ Embedded clause word order affects the prosodic realization

Theoretical Implications

If the IPH is on the right track:

- ▶ Similar prosodic effects in other syntactic configurations
- ▶ Typological variation according to prosodic typology
- ▶ Possibility of reanalysis:
  - ▶ When the parsing based on the 'default' prosody is unsuccessful, prosodic reanalysis may take place.
  - ▶ If the alternative prosodic structure matches with the intended reading, the sentence is perceived as acceptable (but as a dispreferred reading).
  - ▶ If there is no alternative prosodic structure that matches with the intended reading, the sentence will be judged as unacceptable.

Theoretical Implications

If the IPH is on the right track:

- ▶ Purely phonological factors affects acceptability:
  - ▶ Rhythmic effects
  - ▶ Length effects
- ▶ Gradient effects:
  - ▶ Since prosodic patterns tend to show inter- and intra-speaker variation, their influence on the syntactic parsing are also expected to be variable.

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Prosodic Reanalysis
Syntactically ambiguous structure

In a syntactically ambiguous sentence like (36), we would expect the following phrasing shown in (36a).

(36)　Naoya-ga Emiri-ni Mari-ga wain-o　nonda to itta
　　　　N.-NOM　E.-DAT　M.-NOM wine-ACC drank C told

a　{, Naoya-ga Emiri-ni {, Mari-ga wain-o katta to] itta]
　　[CP　　　　　　　[CP
　　⟹ High-attachment ('told Emiri')

- ▶ The PASP predicts that the high-attachment reading ('Naoya told Emiri that [Mari bought wine].') is the preferred reading.

Prosodic Reanalysis
Syntactically ambiguous structure

The other phrasing pattern, (36b), is not expected from the default implicit prosody.

(36)　Naoya-ga Emiri-ni Mari-ga wain-o　nonda to itta
　　　　N.-NOM　E.-DAT　M.-NOM wine-ACC drank C told

b.　{, Naoya-ga {, Emiri-ni, Mari-ga t_i wain-o katta to] itta]
　　[CP　　　　　　[CP
　　? Low-attachment ('bought (wine) for Emiri')

- ▶ As a result, the low-attachment reading ('Naoya told that [Mari bought wine for Emiri].'), which is compatible with the phrasing in (36b), is predicted to be less preferred in silent reading.

Prosodic Reanalysis
Syntactically ambiguous structure

The other phrasing pattern, (36b), is not expected from the default implicit prosody.

(36)　Naoya-ga Emiri-ni Mari-ga wain-o　　nonda to itta
　　　　N.-NOM　E.-DAT　M.-NOM wine-ACC drank C　told

b.　{ᵢ Naoya-ga {ᵢ Emiri-niᵢ Mari-ga tᵢ wain-o katta to} itta}
　　　|CP　　　　　|CP
　　　? Low-attachment ('bought (wine) for Emiri')

▶ Note, however, that this difference in preference between (35a) and (35b) seems rather subtle, much weaker than the CMC effect.

▶ This is because of the availability of reanalysis.

　▸ Since both phrasing patterns have corresponding syntactic structures, they will never be judged as ungrammatical.

Prosodic Reanalysis
Syntactically ambiguous structure

(36)　Naoya-ga Emiri-ni Mari-ga wain-o　　nonda to itta
　　　　N.-NOM　E.-DAT　M.-NOM wine-ACC drank C　told

a.　{ᵢ Naoya-ga Emiri-ni {ᵢ Mari-ga wain-o katta to} itta}
　　　|CP　　　　　　　　　|CP
　　　⟹ High-attachment ('told Emiri')

b.　{ᵢ Naoya-ga {ᵢ Emiri-niᵢ Mari-ga tᵢ wain-o katta to} itta}
　　　|CP　　　　　|CP
　　　? Low-attachment ('bought (wine) for Emiri')

▶ After reanalysis of the implicit prosody, the less preferred reading may have a matching prosodic structure.

▶ If there were no alternative prosodic structure available that corresponds to the intended reading, the sentence would be judged unacceptable (or much more degraded).

More on LD-scrambling
Ban on LD-scrambling to a clause-medial position

LD-scrambling cannot target a clause-medial position.

(37)　[CP Naoya-ga Emiri-ni [CP Mari-ga wain-o　　nonda to] iituketa]
　　　　N.-NOM　E.-DAT　　　M.-NOM wine-ACC　drank C　told
　　　'Naoya told Emiri that Mari drank wine.'

(38)　wain-oᵢ　[CP Naoya-ga Emiri-ni [CP Mari-ga tᵢ nonda to] iituketa]
　　　wine-ACC　N.-NOM　E.-DAT　　　M.-NOM　drank C　told

(39)　*[CP Naoya-ga wain-oᵢ　Emiri-ni [CP Mari-ga tᵢ nonda to] iituketa]
　　　　N.-NOM　wine-ACC E.-DAT　　　M.-NOM　drank C　told

More on LD-scrambling
Ban on LD-scrambling to a clause-medial position

LD-scrambling cannot target a clause-medial position.

(38)　wain-oᵢ　[CP Naoya-ga Emiri-ni [CP Mari-ga tᵢ nonda to]
　　　wine-ACC　N.-NOM　E.-DAT　　　M.-NOM　drank C
　　　iituketa]
　　　told

　　　wain-o {ᵢ Naoya-ga Emiri-ni {ᵢ Mari-ga nonda to iituketa

▶ The PASP does not apply between wain-o and Naoya-ga.

▶ A non-clausemate interpretation is compatible with this implicit prosody.

More on LD-scrambling
Ban on LD-scrambling to a clause-medial position

LD-scrambling cannot target a clause-medial position.

(39)   *[$_{CP}$ Naoya-ga wain-o$_i$ Emiri-ni [$_{CP}$ Mari-ga t_i nonda C
     N.-NOM wine-ACC E.-DAT   M.-NOM drank C
     iituketa]
     told

     {$_i$ Naoya-ga wain-o Emiri-ni {$_i$ Mari-ga nonda to iituketa

- ▶ The PASP applies between *wain-o* and *Naoya-ga/Emiri-ni*.
- ▶ A clausemate interpretation is preferred with this implicit prosody. ⟹ The CMC effect!
- ▶ Note that there is no possibility of syntactic reanalysis.

More on LD-scrambling
'Free ride' effects

Certain XPs cannot undergo LD-scrambling. (Saito 1985; Miyagawa 1989)

(40)   Nominative subjects
     *Mari-ga$_i$ [$_{CP}$ Naoya-ga Emiri-ni [$_{CP}$ t_i wain-o   nonda to] iituketa]
     M.-NOM   N.-NOM   E.-DAT   wine-ACC drank C told

(41)   Floating numeral quantifiers (FNQs)
     *3-tu$_i$ [$_{CP}$ Naoya-ga [$_{CP}$ Mari-ga Emiri-ni ringo-o t_i ageta to]
     3-CL   N.-NOM   M.-NOM E.-DAT apple-ACC gave c
     omotteru]
     think
     Lit. 'three, Naoya thinks that Mari gave apples to Emiri.'

(42)   'True' adjuncts
     *naze$_i$ [$_{CP}$ Naoya-ga [$_{CP}$ Mari-ga Emiri-ni t_i ringo-o   ageta to] itta no?]
     why   N.-NOM   M.-NOM E.-DAT   apple-ACC gave c said Q
     'Why$_i$ did Naoya said [that Mari gave apples Emiri t_i]?

More on LD-scrambling
'Free ride' effects

The sentence improves when it scrambles with another clausemate XP. (Agbayani et al. 2015)

(42)   *Mari-ga$_i$ [$_{CP}$ Naoya-ga Emiri-ni [$_{CP}$ t_i wain-o   nonda to]
     M.-NOM   N.-NOM E.-DAT   wine-ACC drank C
     iituketa]
     told

(43)   Mari-ga$_i$ wain-o [$_{CP}$ Naoya-ga Emiri-ni [$_{CP}$ t_i t_j nonda to]
     M.-NOM wine-ACC   N.-NOM E.-DAT   drank C
     iituketa]
     told

- ▶ This improvement is expected, given that the scrambled subject and its clausemate are immediately interpreted as clausemates, according to the PASP.
- ▶ A potential parsing difficulty between *Emiri-ni* and *nonda*, which can be recovered by insertion of an ι-boundary.