**Linearizing Structure
with Silence:
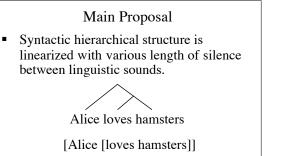A Minimalist Theory of
Syntax-Phonology Interface**

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Main Proposal

- Syntactic hierarchical structure is linearized with various length of silence between linguistic sounds.

Alice loves hamsters

[Alice [loves hamsters]]

[Alice [loves hamsters]]

2

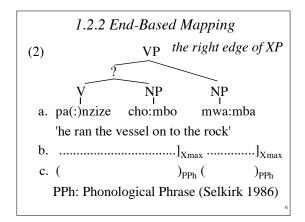## Outline of the Thesis
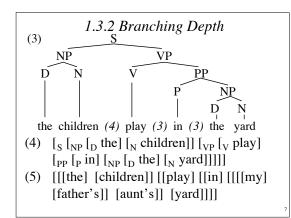
1 Introduction
1' Overview of the theory
2 Prosodic phrasing in the minimalist framework
3 An alternative to the end-based prosodic theory
4 Optional phrasing and speech rates
5 Mapping and the length of constituents
6 Prosody in discourse
7 Topic/focus and phrasing
8 Semantics and phrasing
9 Derivation and parsing

3

---

1 Introduction

1.1 Architecture of Grammar:
     Components and their Interface

1.2 Previous Proposals: Overview of their
     Differences

1.3 Previous Ideas of Syntactic Depth

4

1.1 Architecture of Grammar:
Components and their Interface

(1)   LF1   LF2
                               ↑   ↑
Numeration → Phase1 → Phase2 → …
                               ↓   ↓
                              PF1   PF2

5

1.2.2 End-Based Mapping

(2)   VP   *the right edge of XP*
                            ╱?╲
                    V   NP   NP
                    | | |
a. pa(:)nzize   cho:mbo   mwa:mba
    'he ran the vessel on to the rock'
b. ....]$_{Xmax}$ ....]$_{Xmax}$
c. (   )$_{PPh}$ (   )$_{PPh}$
    PPh: Phonological Phrase (Selkirk 1986)

6

1

1.3.2 Branching Depth

(3)

the children *(4)* play *(3)* in *(3)* the yard

(4) $[_S [_{NP} [_D$ the] $[_N$ children]] $[_{VP} [_V$ play]
$[_{PP} [_P$ in] $[_{NP} [_D$ the] $[_N$ yard]]]]]]

(5) [[[the] [children]] [[play] [[in] [[[[my]
[father's]] [aunt's]] [yard]]]]]

1' Overview of the Theory

1'.1 Bare Syntax-Phonology Mapping

1'.2 Boundary Deletion

1'.3 A Constraint on Boundary Deletion

1'.4 Avoid Pause

1'.5 Consequences

1'.6 Thetic/Categorical Judgment

Proposals

1. Syntax-Phonology Mapping

(6) Interpret boundaries of syntactic constituents [...] as prosodic boundaries / ... /.   *Linearization*

[[Alice] [[loves] [hamsters]]]

// Alice /// loves // hamsters ///

---

2. Boundary Deletion

(7) Delete *n* boundaries between words.
(*n*: a natural number)   *Zoom-Out*

[[Alice] [[loves] [hamsters]]]
// Alice /// loves // hamsters ///
/ Alice // loves / hamsters //   (*n*=1)
Alice / loves hamsters /   (*n*=2)
Alice loves hamsters   (*n*=3)

---

3. A Constraint on Boundary Deletion

(8) In a sentence (or paragraph), the number of boundaries to be deleted (*n*) should be as constant as possible.
          Consistency

[[Alice] [[loves] [hamsters]]]
// Alice /// loves // hamsters ///
?Alice loves / hamsters //
<- *n*=3 -> <- *n*=1 --->

---

4. Avoid Pause

(9) A long pause in a clause should be avoided.   *Continuity*

[Ken [gave [[a [book [about [small hamsters]]]][to Alice]]]]

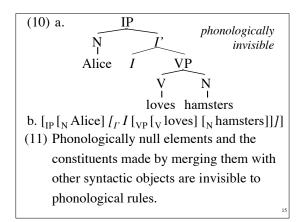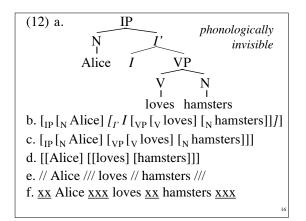[Ken [[gave [to Alice]] [a [book [about [small hamsters]]]]]]

Slide 13:

5. Consequences
   - Bare phrase structure
   - Speed of utterance
   - Length/heaviness of constituents
   - Prosodically motivated movement
   - Given/new information
   - Discourse structure
   - Derivation and parsing

6. Thetic/Categorical Judgment   *Cognition*

13

Slide 14:

2 Prosodic Phrasing in the Minimalist Framework

2.1 Bare Syntax-Phonology Mapping

2.2 Branching and Prosodic Phrasing

2.3 Bare Phrase Structure

2.4 Readjustment with Multiple Spell Out

14

Slide 15:

(10) a.

phonologically invisible

b. [$_{IP}$ [$_N$ Alice] $_{I'}$ I [$_{VP}$ [$_V$ loves] [$_N$ hamsters]]]]

(11) Phonologically null elements and the constituents made by merging them with other syntactic objects are invisible to phonological rules.

15

Slide 16:

(12) a.

phonologically invisible

b. [$_{IP}$ [$_N$ Alice] $_{I'}$ I [$_{VP}$ [$_V$ loves] [$_N$ hamsters]]]]
c. [$_{IP}$ [$_N$ Alice] [$_{VP}$ [$_V$ loves] [$_N$ hamsters]]]]
d. [[Alice] [[loves] [hamsters]]]
e. // Alice /// loves // hamsters ///
f. <u>xx</u> Alice <u>xxx</u> loves <u>xx</u> hamsters <u>xxx</u>

16

Slide 17:

Boundary Deletion
(13) Delete *n* boundaries between words.
   (*n*: a natural number)
(14) // Alice /// loves // hamsters ///
(15) a. /Alice // loves / hamsters // (*n*=1)
   b. Alice / loves hamsters / (*n*=2)
   c. Alice loves hamsters (*n*=3)
(16) a. (Alice) (loves) (hamsters)   prosodic
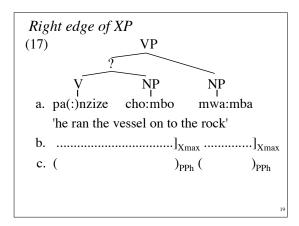   b. (Alice) (loves hamsters)   phrases
   c. (Alice loves hamsters)

17

Slide 18:

3 An Alternative to End-based Prosodic Theory

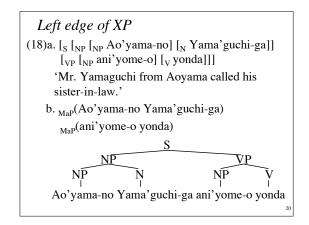3.1 Deriving the Edge Parameter from the Head Parameter
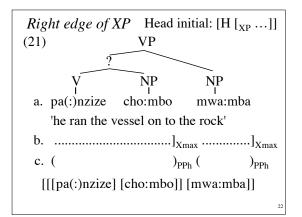
3.2 Deconstructing Prosodic Hierarchy
   …
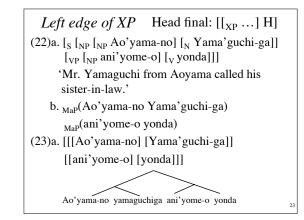   *3.2.3 Deriving the Effects of the Strict Layer Hypothesis*

18

3

Slide 19

Right edge of XP

(17)
```
              VP
            /  ?  \
          /    |    \
         V     NP     NP
```
a. pa(:)nzize   cho:mbo   mwa:mba

'he ran the vessel on to the rock'

b. ....]Xmax ....]Xmax

c. (   )PPh (   )PPh

Slide 20

Left edge of XP

(18)a. [S [NP [NP Ao'yama-no] [N Yama'guchi-ga]]
        [VP [NP ani'yome-o] [V yonda]]]

'Mr. Yamaguchi from Aoyama called his sister-in-law.'

b. MaP(Ao'yama-no Yama'guchi-ga)
   MaP(ani'yome-o yonda)

```
                    S
          /                   \
        NP                     VP
       /  \                   /  \
      NP    N               NP     V
```
Ao'yama-no Yama'guchi-ga ani'yome-o yonda
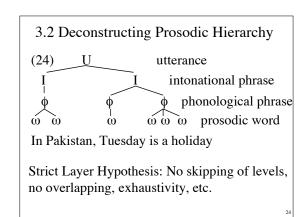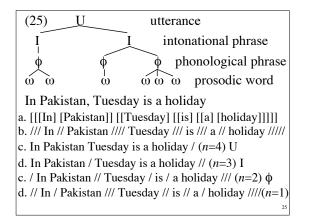
Slide 21

Deriving the Edge Parameter from the Head Parameter

(19) Right edges of lexically headed XPs: Head initial
  Chi Mwi:ni (Kisseberth and Abasheikh 1974, Selkirk 1986)
  Kimatuumbi (Odden 1987)
  Xiamen (Chen 1987)
  Papago (Hale and Selkirk 1987)

(20) Left edges of lexically headed XPs: Head final
  Ewe (Clements 1978)
  Japanese (Selkirk and Tateishi 1991)
  Korean (Cho 1990)
  Northern Kyungsang Korean (Kenstowicz and Sohn 1997)
  # Shanghai Chinese (Selkirk and Shen 1990)

Slide 22

Right edge of XP   Head initial: [H [XP …]]

(21)
```
              VP
            /  ?  \
          /    |    \
         V     NP     NP
```
a. pa(:)nzize   cho:mbo   mwa:mba

'he ran the vessel on to the rock'

b. ....]Xmax ....]Xmax

c. (   )PPh (   )PPh

[[[pa(:)nzize] [cho:mbo]] [mwa:mba]]

Slide 23

Left edge of XP   Head final: [[XP …] H]

(22)a. [S [NP [NP Ao'yama-no] [N Yama'guchi-ga]]
        [VP [NP ani'yome-o] [V yonda]]]

'Mr. Yamaguchi from Aoyama called his sister-in-law.'

b. MaP(Ao'yama-no Yama'guchi-ga)
   MaP(ani'yome-o yonda)

(23)a. [[[Ao'yama-no] [Yama'guchi-ga]]
        [[ani'yome-o] [yonda]]]

```
              /    \
           /    \     \
```
Ao'yama-no yamaguchiga ani'yome-o yonda

Slide 24

3.2 Deconstructing Prosodic Hierarchy

(24)
```
        U              utterance
      /    \
     I       I         intonational phrase
     |     /   \
     φ    φ     φ      phonological phrase
    / \   |    / | \
   ω   ω  ω   ω  ω  ω  prosodic word
```

In Pakistan, Tuesday is a holiday

Strict Layer Hypothesis: No skipping of levels, no overlapping, exhaustivity, etc.

(25)   U   utterance
      I   I   intonational phrase
      |
      φ   φ   φ   phonological phrase
     ω ω   ω   ω ω ω   prosodic word

  In Pakistan, Tuesday is a holiday
a. [[[In] [Pakistan]] [[Tuesday] [[is] [[a] [holiday]]]]]
b. /// In // Pakistan //// Tuesday /// is /// a // holiday /////
c. In Pakistan Tuesday is a holiday / (*n*=4) U
d. In Pakistan / Tuesday is a holiday // (*n*=3) I
c. / In Pakistan // Tuesday / is / a holiday /// (*n*=2) φ
d. // In / Pakistan /// Tuesday // is // a / holiday ////(*n*=1)

25

---

4 Optional Phrasing and Speech Rates

4.1 Raddoppiamento Sintattico in
      Italian

4.2 Third Tone Sandhi in Mandarin
      Chinese

4.3 Variable Intonational Phrasing
      in English

26

4.3 Variable Intonational Phrasing
in English

(26)a. (The boys you met) (are all members)
        (of the same fraternity)
    b. (The boys you met) (are all members of
        the same fraternity)
    c.*(The boys you met are all members) (of
        the same fraternity)
    d. (The boys you met are all members of
        the same fraternity).

27

---

(27) [[The [boys [you met]]] [are [all [members [of
      [the [same fraternity]]]]]]]

(28) // The / boys / you met //// are / all / members /
      of / the / same fraternity ////////

(29) a. / The boys you met /// are all members of the
         same fraternity //////   (*n*=1) (24b)

      b. The boys you met are all members of the
         same fraternity //   (*n*=4) (24d)

28

---

(30) [[The [boys [you met]]] [are [all [members [of
      [the [same fraternity]]]]]]]

(31) // The / boys / you met //// are / all / members /
      of / the / same fraternity ////////

(32)a. The boys you met /// are all members / of the …
       <-------------- *n*=1 ------------><- *n*=0 -><- *n*=1 .

   b.*The boys you met are all members / of the …
       <---------------- *n*=4 -------><- *n*=0 -><- *n*=1 --

29

Cf. Taglicht (1998)

(33)* On [Monday % morning] they left %
(34)* [Danish % beer] is better %

(35)[[[On] [[Monday] [morning]]] [[they] [left]]]
(36)[[[Danish] [beer]] [[is] [better]]]

(37)*The boys you met are [all members % of
     the same fraternity] %
     Cf. Jackendoff (1987)

30

5

5 Mapping and the Length of Constituents

5.1 Secondary Stress in English

5.2 Phonological Phrasing in Korean and Japanese

5.3 Heavy NP Shift

5.4 An Alternative to Early Immediate Constituents Analysis

5.5 Prosody and Punctuation in Japanese Processing

Length and Information

(38) a. φ   (zero)

    b. [them]   (stressed/independent pronoun)

    c. [a [book]]   (DP)

    d. [a [new [book]]]   (modified DP)

    e. [a [book [on [French]]]]   (modified DP)

    f. [a [book [on [the [desk]]]]]   (modified DP)

(39) a. [Ken [gave [[a [book [about [small hamsters]]]] [to Alice]]]]

    b. [Ken [[gave [to Alice]] [a [book [about [small hamsters]]]]]]   (cf. EIC by Hawkins 1994)

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6 Prosody in Discourse

6.1 Phonological Rules Operating across Sentences

6.2 Hierarchical Structure in Discourse

Discourse Structure

(40) a. It's la<u>te</u>. I'm leaving. -> ... la*[R]* I'm ...

    b. It's very late. Irene and I are leaving.

(41) a. The two sentences must be relatively short.

    b. There must not be a pause between the two sentences.

    c. … positive relation between two Ss.

                        (Nespor and Vogel 1986)

(42) a. [[It's la<u>te</u>] [I'm leaving]] -> ... la*[R]* I'm ...

    b. [[It's [very late]] [[Irene [and I]] [are leaving]]]

(43)   [[It's late] [[I'm [not leaving]] though]

---

7 Topic/Focus and Phrasing

7.1 Focus and Phrasing

7.2 When do Topic and Focus Make a Prosodic Phrase?

7.3 Topicalization in Serbo-Croatian

7.4 Topic in Italian

7.5 Preposed/Postposed Focus

Focus and Phrasing

(44) a.* Ya [$_{VP}$ [$_V$ sayi] <u>fa</u> [$_{NP}$ teburin]]

    he   bought   table-DEF

    'He bought the table.'

    b. Ya [$_{VP}$ [$_V$ sayi] <u>fa</u> [$_{NP}$ [$_A$ babban] [$_N$ tebur]]]

    he   bought   big   table

    'He bought a big table.'

(45) a. [$_S$ [$_{NP}$ Ya] [$_{VP}$ [$_V$ sayi] <u>fa</u> [$_{NP}$ *teburin*]]]

        he   bought   tabel-DEF (emph.)

    'He bought the table.'

    b. ⟦$_S$ [$_{NP}$ Ya] [$_{VP}$ [$_V$ sayi] <u>fa</u> [$_{NP}$ *teburin*]]]

    c. Ya sayi <u>fa</u> / *teburin* /

(46) * Who did you destroy [a picture of]?

(47) A: Right after Chairman Mao died, they started taking [pictures of the Central Committee members] off the wall.

   B: Who did they destroy [more pictures of], Chairman Mao or Jiang Qing?

(48) a. Dr. Svenson only rejected [the proposal that [John]$_F$ submitted]

   b. Dr. Svenson only complain [if [Bill]$_F$ doesn't finish his job]

---

8 Semantics and Phrasing

8.1 An Overview of Zubizarreta (1998)

8.2 Problems with Zubizarreta (1998)

8.3 An Alternative Account
   8.3.1 Thetic/Categorical Judgment
   8.3.2 Prominence and Phrasing

Stress and Intransitive Verbs

Selkirk (1984, 1995)

(49) a. The SUN's shining. (unaccusative)
   b. The SUN is SHINing.

(50) a. *JOHN was dancing. (unergative)
   b. JOHN was DANCing.

Zubizarreta (1998)

(51) a. The sún came out. (unaccusative)
   b.*?The sun came óut.

(52) a. A bóy has danced. (unergative)
   b. A boy has dánced.

Thetic/Categorical Judgment

(53) a. *Thetic* judgments: … simply express recognition of the existence of an entity or a situation. … a simple form of a judgment, a unitary cognitive act. … a simple judgment.

   b. *Categorical* judgments: … conform to the Subject-Predicate form … two distinct cognitive acts, one the recognition of the Subject, …, and another the act of acknowledging or disavowing a Predicate of a Subject. … a double judgment.
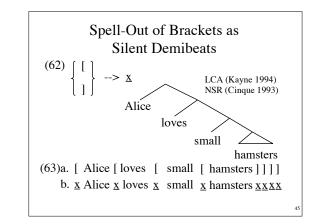
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(54) a. [The SUN's shining]   (thetic)
   b. [The SUN] [is SHINing] (categorical)

(55) a. *[JOHN was dancing]   (thetic)
   b. [JOHN] [was DANCing] (categorical)

(56) a. [The sún came out]   (thetic)
   b.*?[The sùn] [came óut]   (categorical)

(57) a. [A bóy has danced]   (thetic)
   b. [A bòy] [has dánced]   (categorical)

---

(58) a. A thetic clause contains one conceptual unit and a categorical clause two conceptual units.

   b. In a conceptual unit, the most informative word has prominence.

   c. In a sentence, the last prominent word which is not defocalized is heard as most prominent.
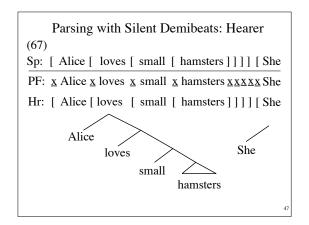
9 Derivation and Parsing

43

A Paradox in Interface: Parse Right and Merge Left

(59) Alice loves small hamsters.

▪ Syntax: Merge Left, right to left

(60)

Alice

loves

small   hamsters

❊ PF: Parse Right, left to right

(61) Alice loves small hamsters.

44

Spell-Out of Brackets as Silent Demibeats

$$(62) \left\{ \begin{array}{c} [\\ ] \end{array} \right\} \;\text{-->}\; \underline{x}$$

LCA (Kayne 1994)
NSR (Cinque 1993)

Alice

loves

small

hamsters

(63)a. [Alice [loves [small [hamsters]]]]

   b. x Alice x loves x   small   x hamsters xxxx

45

Parsing of Pause and Tree Building

$$(64) \quad \underline{x} \quad \text{-->} \left\{ \begin{array}{c} [\\ ] \end{array} \right\}$$

❊ The item following a silent demibeat
determines the direction of bracket.

(65)   xx   -->   ]x

(66)   x α   -->   [α   (α: lexical word)

46

Parsing with Silent Demibeats: Hearer

(67)

Sp: [Alice [loves [small [hamsters]]]] [She

PF: x Alice x loves x small   x hamsters xxxxx She

Hr: [Alice [loves   [small [hamsters]]]] [She

Alice

loves   She

small

hamsters

47

Conclusion

▪ Linearization: Speakers map
hierarchical syntactic structure onto
PF with brackets and silence.

▪ Parsing: Hearers build hierarchical
strcture from PF including silence.

▪ Speakers can zoom out sentences
by skipping boundaries between
linguistic elements.

48

8

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