Recursion and GP 2.0

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BRaCeLeT talk series, #11
Budapest, September 12, 2019

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4. Recursion treated as something beyond hierachy.

Two objections

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2. What are the (hidden) assumptions about the workings of phonology? (Incl. what is the inventory of phonological objects.)

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7. Any phrase within any other phrase example of recursion; hidden by labels.
8. By separating labels and structure-building, hierarchy and recursion much closer.

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2. Nevins, Pesetsky & Rodrigues (2009): Pirahã restricts self-embedding, but not recursion.

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4. No syllable, no coda (Kaye, Lowenstamm & Vergnaud 1990; Kaye 1990), no mora (Yoshida 1990, 1996)
5. Power of Jackendoff's quote rests on the reliability of the notions involved.

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2. But there are alternative ways of looking at phonology.
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4. Alternative suggests commonalities between the two modules; the idea of Structural Analogy (Anderson 1992a).

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6. Go further than Jackendoff: no role "even" for hierarchy.

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3. Non-arbitrariness established: link between what happens and where/why.
4. (Uninterpretable features for the sole reason of driving derivations: problematic circularity.)

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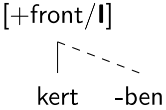
5. Hungarian inessive *ház-ban* ‘in a house INE.’, *kert-ben* ‘in a garden INE.’



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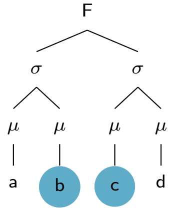

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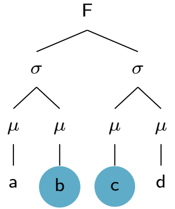

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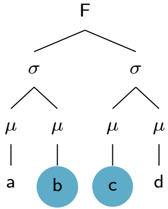

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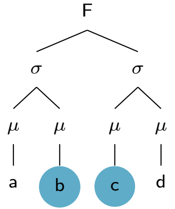

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6. Little worry about hierarchy if phonology arbitrary.

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5. Can only be appreciated if phonology is not simply seen as a system that allows random operations to take place.

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3. Same line of reasoning in Hulst (2006, 2010b,a).
4. Hierarchical structure attested in other particulate systems outside of linguistics as well.

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6. Recursion leads us to expect that same/similar asymmetries repeat themselves at various levels.

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5. Arguably different (Kaye 1995), yet no evidence for hierarchy.

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5. Tree structures not simply convenient but also necessary.

English diphthongs in GP 1.x

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au	{**A**}	{**U**}	*ou*	{**A**, **U**}	{**U**}
oi	{**A**, **U**}	{**I**}			

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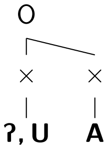
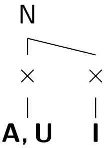
3. Branching onset *br*



Diphthong *oi*



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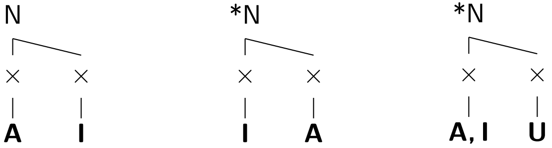

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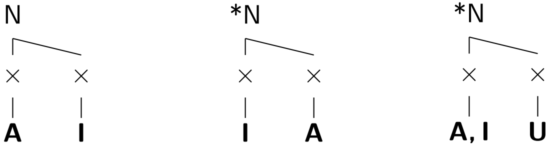

2. Both problems stem from a failure to take into account the individual nature of elements:
   - Equal complexity should allow for mirror images, counter to fact.
   - Complexity differential no guarantee for well-formedness.

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3. Auxiliary assumption #2 (Aux2): No empty expressions in diphthongs. (For head, this follows from P1.)

Logical combinations left

Assuming P1, Aux1, Aux2:

first member	second member: {}	{**A**}	{**I**}	{**U**}	{**A**, **I**}	{**A**, **U**}	{**I**, **U**}	{**A**, **I**, **U**}
{}	*	*	*	*	*	*	*	*
{**A**}	*	*	✓	✓	*	*	*	*
{**I**}	*	*	*	*	*	*	*	*
{**U**}	*	*	*	*	*	*	*	*
{**A**, **I**}	*	*	✓	✓	*	*	*	*
{**A**, **U**}	*	*	✓	✓	*	*	*	*
{**I**, **U**}	*	*	*	*	*	*	*	*
{**A**, **I**, **U**}	*	*	*	*	*	*	*	*

Still 6 combinations remaining, $3 + 1 + 2$

a.			b.		
ai	{**A**}	{**I**}	*ei*	{**A**, **I**}	{**I**}
au	{**A**}	{**U**}	*ou*	{**A**, **U**}	{**U**}
oi	{**A**, **U**}	{**I**}			
**eu*	{**A**, **I**}	{**U**}			

Take stock

1. What is so special about **A** that there are conditions on it?

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2. What about the asymmetry between **I** and **U**?

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4. "Differently": **A** seems to interact with (constituent) structure unlike other elements.

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     Nuclei containing **A** by itself can appear before *s*+C even when one of the final consonants does not contain **A**.
   - Vowel makes up for "insufficiency" of cluster; but there have to be two **A**'s around.

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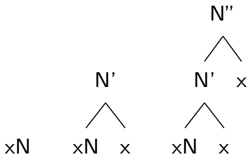
5. In fact, what should replace **A**-ness is **empty structure.**

Two x-bar structures on top of each other

1. Vowel contains head (xN) that can project up to two times in accordance with x-bar theory.



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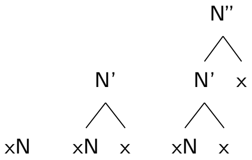
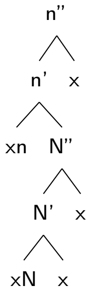


2. Can be embedded by another head (xn), which in turn can project up to twice. Maximal structure:

   Doubled vowel structure also in den Dikken & van der Hulst (2018).

   Meaning of xn, xN: still somewhat unclear.



English vowels

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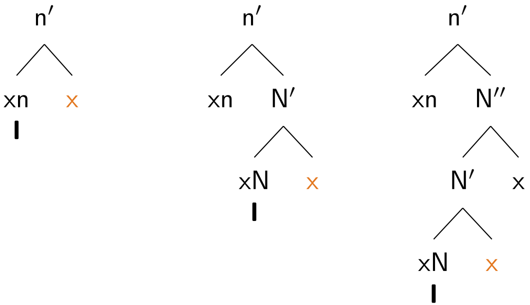

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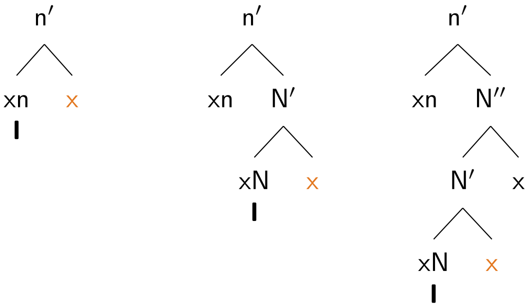

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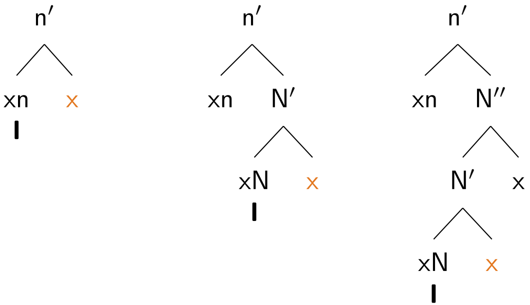

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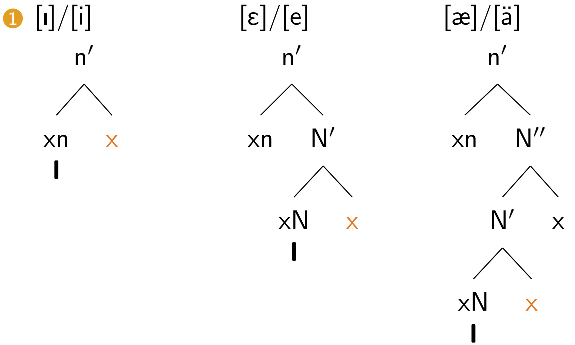

1. Melody associated to lower head, whose complement (orange) is responsible for the tense/lax distinction.
2. Melody in non-heads: offglides (an later: onglides) in diphthongs.
3. Number of empty positions measure of openness.

Binding

1. Asymmetry ɔɪ/*ɛʊ:

ɔ	ɪ
"A"	
U	**I**

*

ɛ	ʊ
"A"	
I	**U**

"A" = structure to replace **A**

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   a. John saw Mary.

   b. Mary saw John.

   c. He saw himself.

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3. **Binding** (P2): **I** can bind **U**, but **U** must not bind **I**.

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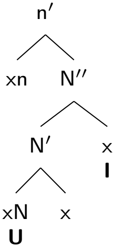
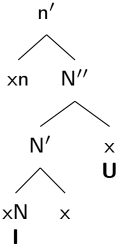
4. Compare the ɔɪ in *void* to *ɛʊ.

ɔɪ

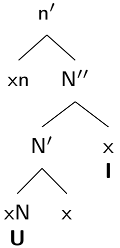


*ɛʊ



Structural asymmetry

ɔɪ



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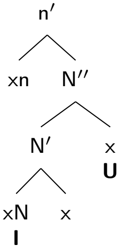
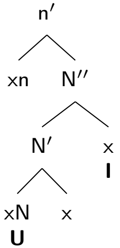


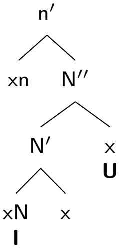
1. C-command requires structural asymmetry: If **I** and **U** were sisters, they would c-command each other; both ɔɪ *and* ɛʊ out.

Structural asymmetry

ɔɪ



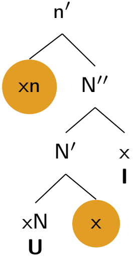
*ɛʊ



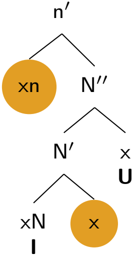
1. C-command requires structural asymmetry: If **I** and **U** were sisters, they would c-command each other; both ɔɪ *and* ɛʊ out.
2. Why is melody in the *lower* head? Melody in the upper head relevant for ATR-distinction.

Structure of diphthongs

ɔɪ



*ɛʊ



1. Two empty positions in each (yellow); head of diphthong thus mid.

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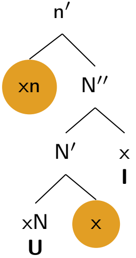
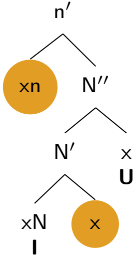
ɔɪ



*ɛʊ



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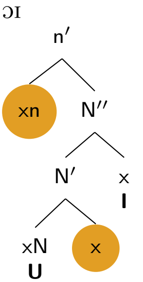

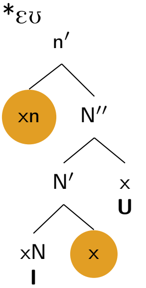

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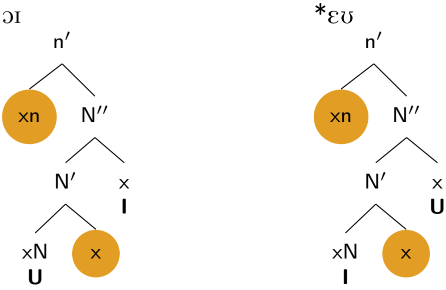

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4. Adequate reinterpretation of "**A** in head, no **A** in complement".

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4. Furthermore: same asymmetries come back at different levels.

Putonghua rhymes

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onglide	head	offglide
i̯	e	
	"mid"	
I	$\rightarrow$	

onglide	head	offglide
u̯	o	
	"mid"	
U	$\rightarrow$	

b.

onglide	head	offglide
i̯	o	u̯
	"mid"	
I	$\leftarrow$	**U**

onglide	head	offglide
u̯	e	i̯
	"mid"	
U	$\leftarrow$	**I**

A1

c.

onglide	head	offglide
i̯	a	u̯
	"low"	
I		**U**

*

onglide	head	offglide
u̯	a	i̯
	"low"	
U		**I**

A2

1. 6 relevant cases: (Živanovič & Pöchtrager 2010; Pöchtrager 2015b)

a.

onglide	head	offglide
i̯	e	
	“mid”	
I	→	

onglide	head	offglide
u̯	o	
	“mid”	
U	→	

b.

onglide	head	offglide
i̯	o	u̯
	“mid”	
I	←	**U**

onglide	head	offglide
u̯	e	i̯
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A1 (a., b.)

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onglide	head	offglide
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A2 (c.)

2. Observations:
   - Head must have a certain minimal size; *cf.* English.
   - Asymmetry with respect to sharing (asymmetry A1)
   - Asymmetry with respect to **I**/**U**; i̯au̯/*u̯ai̯ (asymmetry A2)

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U	→	

b.

onglide	head	offglide
i̯	o	u̯
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A1

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A2

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   - Asymmetry with respect to sharing (asymmetry A1)
   - Asymmetry with respect to **I**/**U**; i̯au̯/*u̯ai̯ (asymmetry A2)
3. (Note: there is the sequence u̯ai̯, but with different constituent structure.)

First asymmetry (A1)

a.

onglide	head	offglide
i̯	e	
	“mid”	
I	→	

1

b.

onglide	head	offglide
i̯	o	u̯
	“mid”	
I	←	**U**

onglide	head	offglide
u̯	o	
	“mid”	
U	→	

onglide	head	offglide
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A1

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I	$\rightarrow$	

onglide	head	offglide
u̯	o	
	"mid"	
U	$\rightarrow$	

b.

onglide	head	offglide
i̯	o	u̯
	"mid"	
I	$\leftarrow$	**U**

onglide	head	offglide
u̯	e	i̯
	"mid"	
U	$\leftarrow$	**I**

A1

2. Sharing the melody: Right (offglide) takes precedence over left (onglide).

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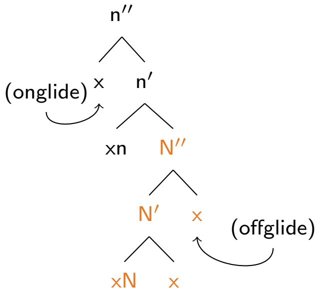
4. Right precedence over left follows from hierarchy.

General structure of the nucleus



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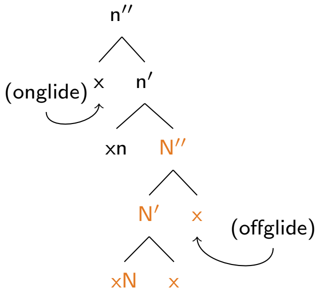

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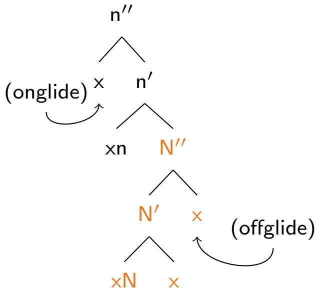

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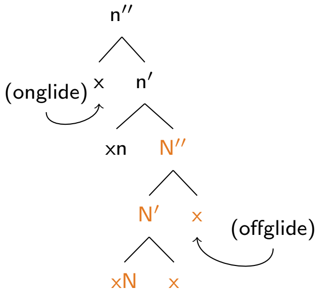

1. Tree structure captures asymmetry/closeness (c-command).
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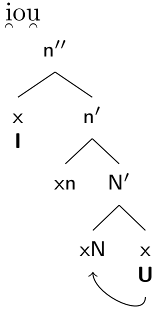
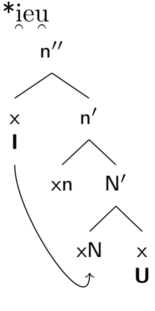
Onglide and offglide:





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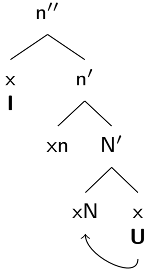
i̯ou̯



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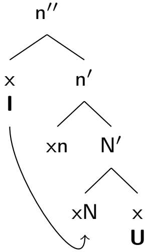

1. **U** closer to xN than **I** is, hence **U** melodically commands (“spreads into”) it.

i̯ou̯ and *i̯eu̯

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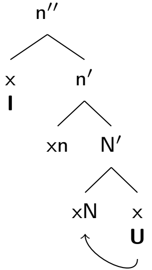

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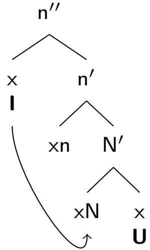

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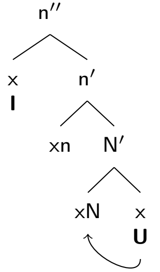

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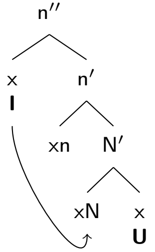

1. **U** closer to xN than **I** is, hence **U** melodically commands ("spreads into") it.
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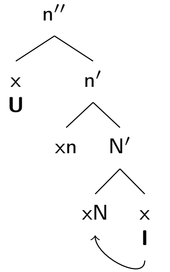
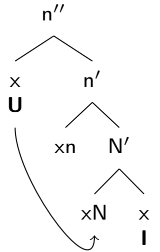
3. *i̯eu̯ impossible because a closer melodic commander (**U**) is skipped. Implies a notion of **minimality.**

u̯ei̯

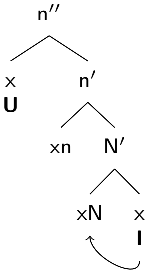


*u̯oi̯



u̯ei̯ and *u̯oi̯

u̯ei̯



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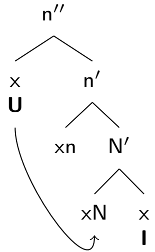

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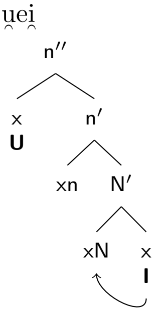
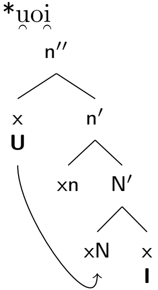
u̯ei̯ and *u̯oi̯

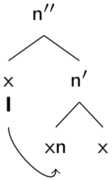




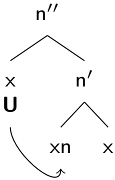
1. This time, **I** is closer.
2. *u̯oi̯ is out for the same reason as *i̯eu̯ was.

i̯e and u̯o

i̯e

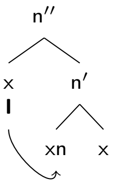


u̯o

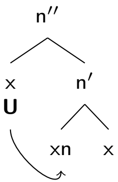


i̯e and u̯o

i̯e



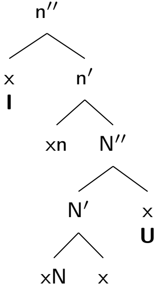
u̯o



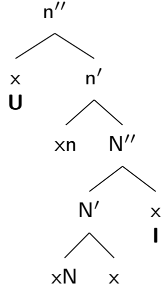
1. Onglide but no offglide, onglide can colour head.

i̯au̯, *u̯ai̯, and the second asymmetry (A2)

i̯au̯



*u̯ai̯



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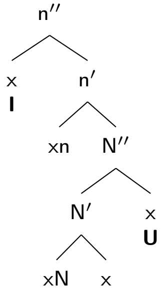
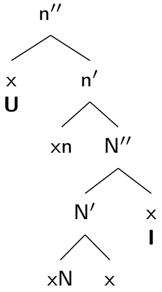
i̯au̯



*u̯ai̯



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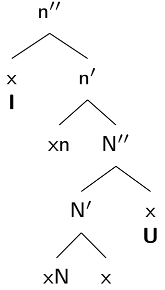
i̯au̯, *u̯ai̯, and the second asymmetry (A2)

i̯au̯



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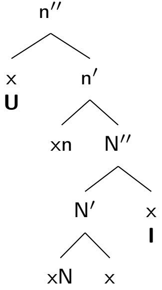

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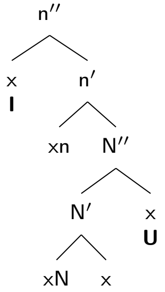
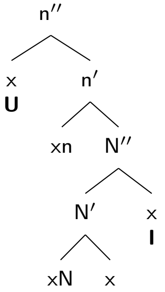
i̯au̯



*u̯ai̯



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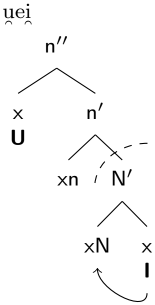
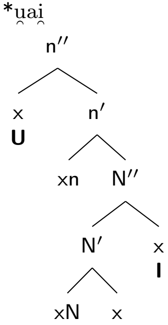
3. Offglide does not make it into xN, due to distance? Gives a in core.

u̯ei̯ and *u̯ai̯





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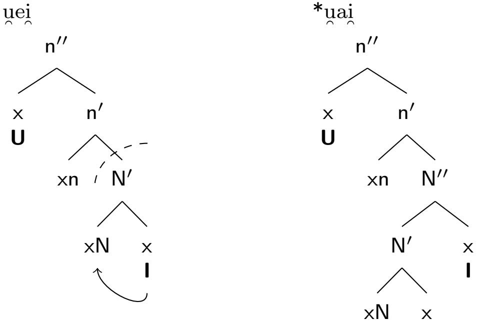

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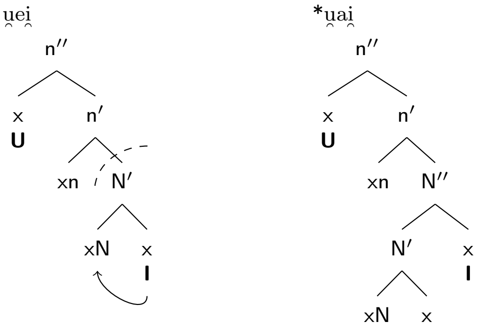

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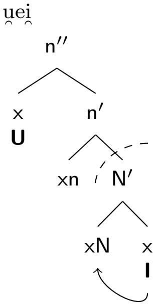

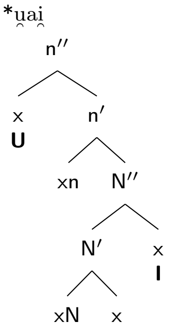

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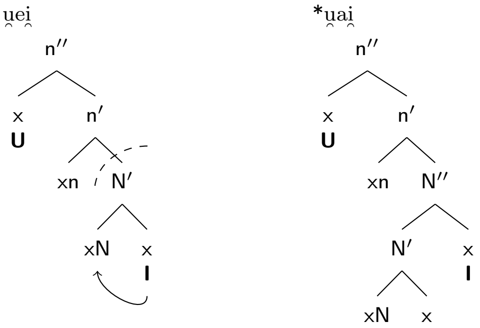

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2. In both cases **U** c-commands **I**.
3. If **U** must not bind **I**, then how could uei ever be possible?
4. In uei the **I** melodically commands ("spreads into") another point and that seems to "immunise" **I** against binding (creates an island).

I/**U** asymmetries widespread

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2. Should allow us to submit the theory of binding to a large-scale scrutiny.

Japanese glide+vowel sequences

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y-series:	$\boxed{*yi \quad *ye}$		*ya*	*yo*	*yu*
w-series:	<u>**wi*</u>	<u>**we*</u>	*wa*	$\boxed{*wo \quad *wu}$	

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2. | | | | | | |
   |---|---|---|---|---|---|
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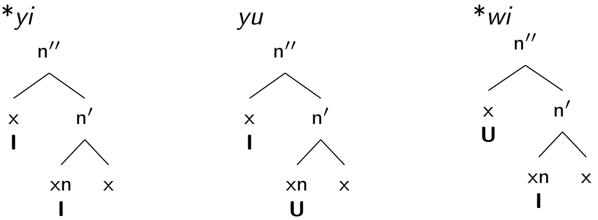
   | *w*-series: | **wi* | **we* | *wa* | **wo* | **wu* |



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4. Can (some of the) asymmetries be derived from Binding?

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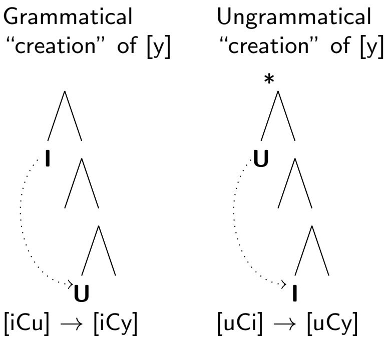
4. Would require **U** to c-command **I**, ruled out by binding.



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4. Only seems possible in hierarchical models, not in purely linear ones.

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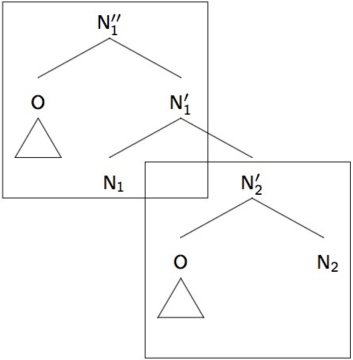

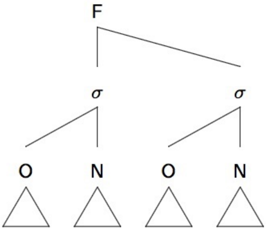

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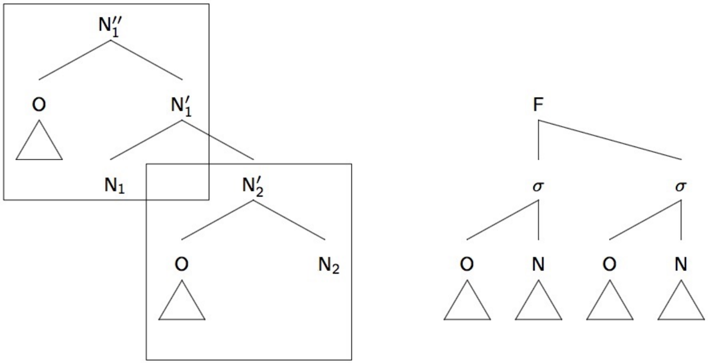

3. (*Cf.* also Hulst 2010b; Smith 1999; García-Bellido 2005; Golston 2016)

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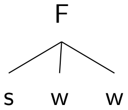
3. Possibly extends to [w], [j].

Different predictions

1. Constituent break between initial onset & rest of the foot. (As opposed to just onset & nucleus.)
2. Good match for distribution of English [h] (initial onset) *vs.* [ŋ] (elsewhere).
3. Possibly extends to [w], [j].
4. Exploited in rhyme schemes:
    1. Alliteration: initial onset (pre-stress).
    2. End rhyme: complement (male and female rhyme).

Metrical structure

1. Usually: Metrical grids or metrical trees (weak/strong branches).



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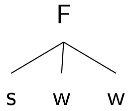

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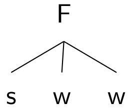

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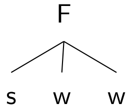

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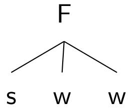

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5. Head of foot: Nucleus which is not itself selected by another nucleus.

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5. Different from onset phrases: selected by N but do not select themselves.

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6. Is there a way to avoid problem in the first place?

Addressing system

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2. Say $10,000$ addresses/morphemes needed: CVCV with 5 vowels and 20 consonants sufficient ($20 \times 5 \times 20 \times 5$).
3. Many phonological systems richer, despite counterbalancing effect of phonotactics.

Comparison to morphology

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5. *Nationalisation*, ?*nationalisationalise*, ??*nationalisationalisationalise*.

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Thank you!
Köszönöm szépen!

References I

Anderson, John (1992a): *Linguistic Representation: Structural Analogy and Stratification*. Berlin: Mouton de Gruyter.

Anderson, John & Ewen, Colin J. (1987): *Principles Of Dependency Phonology*. Cambridge et al.: Cambridge University Press.

Anderson, Stephen R. (1992b): *A-Morphous Morphology*. Cambridge: Cambridge University Press.

Barker, Chris (2012): Quantificational Binding Does Not Require C-Command. *Linguistic Inquiry*, 43, 4, 614–633.

Broadbent, Judith M. (1991): Linking and Intrusive r in English. *UCL Working Papers in Linguistics*, 3, 281–301.

Cecchetto, Carlo & Donati, Caterina (2005): *(Re)labeling*. Cambridge, Mass.: MIT Press.

Charette, Monik & Göksel, Asli (1996): Licensing constraints and vowel harmony in Turkic languages. *SOAS Working Papers in Linguistics & Phonetics*, 6, 1–25.

Chomsky, Noam (1995): *The Minimalist Program*. Cambridge, Mass. & London, UK: MIT Press.

Cobb, Margaret (1995): Vowel Harmony in Zulu and Basque: The Interaction of Licensing Constraints, H-Licensing and Constituent Structure. *SOAS Working Papers in Linguistics & Phonetics*, 5, 23–39.

Cobb, Margaret (1997): *Conditions on Nuclear Expressions in Phonology*. Ph.D. thesis, School of Oriental and African Studies, Department of Linguistics, University of London.

Cyran, Eugeniusz (1997): *Resonance Elements in Phonology. A Study in Munster Irish*. Lublin: Wydawnictwo Folium.

den Dikken, Marcel & van der Hulst, Harry (2018): On Some Deep Structural Analogies between Syntax and Phonology. In: Kuniya Nasukawa (ed.) *Recursion in Phonology*, Berlin, New York: Mouton de Gruyter.

References II

Dressler, Wolfgang U. (1989): Prototypical Differences between Inflection and Derivation. *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung*, 42, 1, 3–10.

Everaert, Martin B. H., Huybregts, Marinus A. C., Chomsky, Noam, Berwick, Robert C. & Bolhuis, Johan J. (2015): Structures, Not Strings: Linguistics as Part of the Cognitive Sciences. *Trends in Cognitive Sciences*, 19, 12, 729–743.

García-Bellido, Paloma (2005): The morphosyntax and syntax of Phonology: The svarabhakti construction in Spanish. *Estudios de Lingüística del Español*, 22.

Golston, Chris (2016): The rhymes they are a changin': Bob Dylan and syllable structure. Paper presented at Phonology Colloquium, Stockholms Universitet.

Harris, John (1990): Segmental complexity and phonological government. *Phonology*, 7, 2, 255–301.

Harris, John (1994): *English Sound Structure*. Oxford et al.: Blackwell.

Hayes, Bruce (1995): *Metrical Stress Theory. Principles and Case Studies*. Chicago and London: The University of Chicago Press.

Hulst, Harry van der (2006): On the parallel organization of linguistic components. *Lingua*, 116, 657–688.

Hulst, Harry van der (2010a): A note on recursion in phonology. In: Hulst (2010c), 301–342.

Hulst, Harry van der (2010b): Re recursion. In: Hulst (2010c), xv–liii.

Hulst, Harry van der (ed.) (2010c): *Recursion and Human Language*. Berlin, New York: Mouton de Gruyter.

Jackendoff, Ray (2007): *Language, Consciousness, Culture. Essays on Mental Structure*. Cambridge & London: The MIT Press.

Jensen, Sean (2000): *A Computational Approach to the Phonology of Connected Speech*. Ph.D. thesis, Department of Linguistics, School of Oriental and African Studies, University of London.

References III

Kaun, Abigail Rhoades (1995): *The Typology of Rounding Harmony: An Optimality Theoretic Approach*. Ph.D. thesis, University of California, Los Angeles.

Kaye, Jonathan (1989): *Phonology: A Cognitive View*. Hillsdale, NJ: Lawrence Erlbaum.

Kaye, Jonathan (1990): 'Coda' Licensing. *Phonology*, 7, 2, 301–330.

Kaye, Jonathan (1995): Derivations and interfaces. In: Jacques Durand & Francis Katamba (eds.) *Frontiers of Phonology: Atoms, Structures, Derivations*, London, New York: Longman. 289–332.

Kaye, Jonathan (2000): A User's Guide to Government Phonology (GP). Ms.

Kaye, Jonathan, Lowenstamm, Jean & Vergnaud, Jean-Roger (1985): The internal structure of phonological elements: a theory of charm and government. *Phonology Yearbook*, 2, 303–328.

Kaye, Jonathan, Lowenstamm, Jean & Vergnaud, Jean-Roger (1990): Constituent structure and government in phonology. *Phonology*, 7, 2, 193–231.

Kaye, Jonathan & Pöchtrager, Markus A. (2009): GP 2.0. Paper presented at the "Government Phonology Round Table", April 25, 2009, Piliscsaba/Hungary.

Kaye, Jonathan & Pöchtrager, Markus A. (2013): GP 2.0. *SOAS Working Papers in Linguistics & Phonetics*, 16, 51–64.

Nasukawa, Kuniya (2015): Recursion in the lexical structure of morphemes. In: Henk van Riemsdijk & Marc van Oostendorp (eds.) *Representing Structure in Phonology and Syntax*, Berlin: Mouton de Gruyter. 211–238.

Neeleman, Ad & van de Koot, J. (2006): On syntactic and phonological representations. *Lingua*, 116, 1524–1552.

Nespor, Marina & Vogel, Irene (1986): *Prosodic Phonology*. Dordrecht: Foris.

Nevins, Andrew, Pesetsky, David & Rodrigues, Cilene (2009): Pirahã Exceptionality: A Reassessment. *Language*, 85, 2, 355–404.

References IV

Newell, Heather (2017): There Is No Word. Implications For The Phonology-Syntax Interface. Paper presented at the "40th GLOW Colloquium", 14 March 2017, Leiden, Netherlands.

Ploch, Stefan (1996): The Role of Parsing. *SOAS Working Papers in Linguistics & Phonetics*, 6, 76–105.

Ploch, Stefan (1999): *Nasals on My Mind. The Phonetic and the Cognitive Approach to the Phonology of Nasality*. Ph.D. thesis, School of Oriental & African Studies, University Of London.

Pöchtrager, Markus A. (2006): *The Structure of Length*. Ph.D. thesis, University of Vienna.

Pöchtrager, Markus A. (2009a): Does Turkish Diss Harmony. Paper presented at the "6th Old World Conference in Phonology (ocp6), January 21–24, 2009, Edinburgh.

Pöchtrager, Markus A. (2009b): Syntaxy Government Phonology. Paper presented at "Generative Approaches to Contrastive Linguistics 3 (GACL 3)", 15–16 May 2009, University of Cyprus, Nicosia.

Pöchtrager, Markus A. (2010a): Does Turkish Diss Harmony? *Acta Linguistica Hungarica*, 57, 4, 458–473.

Pöchtrager, Markus A. (2010b): The Structure of A. Paper presented at the "33rd GLOW Colloquium", 13–16 April 2010, Wrocław, Poland.

Pöchtrager, Markus A. (2012): Deconstructing A. Paper presented at the "MFM Fringe Meeting on Segmental Architecture", 23 May 2012, University of Manchester, Great Britain.

Pöchtrager, Markus A. (2015a): Beyond the Segment. In: Eric Raimy & Charles Cairns (eds.) *The Segment*, Hoboken, NJ: Wiley. 44–64.

Pöchtrager, Markus A. (2015b): Binding in Phonology. In: Henk van Riemsdijk & Marc van Oostendorp (eds.) *Representing Structure in Phonology and Syntax*, Berlin: Mouton de Gruyter. 255–275.

Pöchtrager, Markus A. (2016): It's all about size. In: Péter Szigetvári (ed.) *70 snippets to mark Ádám Nádasdy's 70th birthday*, http://seas3.elte.hu/nadasdy70/pochtrager.html.

References V

Pöchtrager, Markus A. (2018): Sawing off the branch you are sitting on. *Acta Linguistica Academica*, 65, 1, 47–68.

Polgárdi, Krisztina (1998): *Vowel Harmony. An Account in Terms of Government and Optimality*. The Hague: Holland Academic Graphics.

Samuels, Bridget (2009): *The structure of phonological theory*. Ph.D. thesis, Harvard University.

Scalise, Sergio (1992): *Generative Morphology*. Dordrecht: Foris.

Schane, Sanford A. (1984): The fundamentals of particle phonology. *Phonology Yearbook*, 1, 129–155.

Scheer, Tobias (2008): Why the Prosodic Hierarchy is a Diacritic and Why the Interface Must be Direct. In: Jutta Hartmann, Veronika Hegedűs & Henk van Riemsdijk (eds.) *Sounds of Silence: Empty Elements in Syntax and Phonology*, Amsterdam et al.: Elsevier. 145–192.

Smith, Norval (1999): A preliminary account of some aspects of Leurbost Gaelic syllable structure. In: Harry van der Hulst & Nancy Ritter (eds.) *The syllable: views and facts*, Berlin, New York: Mouton de Gruyter. 577–630.

Truckenbrodt, Hubert (1995): *Phonological phrases: Their relation to syntax, focus, and prominence*. Ph.D. thesis, MIT.

Živanovič, Sašo & Pöchtrager, Markus A. (2010): GP 2.0 and Putonghua, too. *Acta Linguistica Hungarica*, 57, 4, 357–380.

Wagner, Michael (2005): *Prosody and Recursion*. Ph.D. thesis, Massachusetts Institute of Technology.

Yoshida, Shohei (1990): A government-based analysis of the 'mora' in Japanese. *Phonology*, 7, 331–351.

Yoshida, Shohei (1996): *Phonological Government in Japanese*. Canberra: The Australian National University.