Phonological variation in voicing across word boundaries

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I. Introduction

- **In the OT literature, the debate on obstruent voice neutralization has mainly focused on:**
  1. Voice assimilation in C clusters (/k,g+g/: [g.g]) and word-final devoicing (-/k,g/: -[k]) as instances of **Licensing by cue** or **Positional Faithfulness**.
  2. 'Derivational' effects (/k,g # a/: [.ka]) as instances of **OO** relations or **stratal** OT.

- **A somehow less studied issue:**

3. Obstruent voicing in pre-V position across words (/k,g # a/: [.ga]), derived from:

   - **Specific 'assimilation'** (vV: Voice a fricative before a vowel, van Oostendorp 2003) &

     Ambisyllabicity (van Oostendorp 2003, Hinskens 2007)

   - **Specific spreading** (*ContVoiceLag: *$[_{[+cont]}$ … $[_{[+vc]}$ which promotes leftward spreading of [+vc] to a preceding [+cont] segment, Bermúdez-Otero 2001, 2006)

   - **Specific Laziness** (LazySibilant, Wheeler 2005)

   - **General agreement** (limited by No-VC-Link, Jiménez&Lloret 2008, Lloret&Jiménez 2008)

Our goals today:

- To provide an interpretation of **obstruent voicing in pre-V position across words** in terms of **general agreement** induced by **prominence** & constrained by the degree of **dissimilarity** between segments.
- **Parallel** OT (with OO relations) & **Positional Faithfulness**.

  (Jiménez&Lloret 2008, Lloret&Jiménez 2008)
- Main case to study: Varieties of Catalan.

  Extend the analysis to var. of Dutch & Polish.

II. Basic Data on Voice Neutralization in Catalan

Basic obstruent inventory

	p b	t d		k g
f (v)		s z	ʃ ʒ	
		ts dz	tʃ dʒ	

Some observations:

1. **b, d, g** are realized as spirant **β, ð, ɣ** in certain contexts in some dialects, but behave phonologically as obstruents (Wheeler 2005: §10.1.2).
2. **Affricates** are usually lengthened between vowels (in many dialects).
3. **/v/** in some dialects only, but **[v]** as a result of assimilation in all dialects.

Phenomena at word level

- **Obstruent voice contrast in onsets:**

casos	[ká.zus]	‘cases’
passa	[pá.sə]	‘he passes’
desitja	[də.zíd.dʒə]	‘he desires’
despatxa	[dəs.pát.tʃə]	‘he dispatches’
passada	[pə.sá.ðə]	‘past.F’
petita	[pə.tí.tə]	‘small.F’
begut	[bə.ɣút]	‘drunk.M’

And onset maximization:

tecla	[té.klə]	‘key (music)’
sigla	[sí.ɣlə]	‘acronym’

- **Obstruent word-final devoicing:**

cas	[kás]	‘case’	Cf.	[ká.zus]
pas	[pás]	‘step’		[pá.sə]
desig	[də.zítʃ]	‘desire’		[də.zíd.dʒə]
despatx	[dəs.pátʃ]	‘office’		[dəs.pát.tʃə]
passat	[pə.sát]	‘past.M’		[pə.sá.ðə]
petit	[pə.tít]	‘small.M’		[pə.tí.tə]
bec	[bɛ́k]	‘I drink’		[bə.ɣút]

- **Coda obstruents agree in voice with the following consonant:**

examen	[əg.zá.mən]	‘exam’
advertir	[əd.bər.tí]	‘to notice’
capsa	[káp.sə]	‘box’
acte	[ák.tə]	‘action’
pasta	[pás.tə]	‘pasta’
Islàndia	[iz.lán.djə]	‘Iceland’

Phenomena at phrase level

- **Coda obstruents agree in voice with the following consonant** (= word level):

cap dia	[kab. dí.ə]	‘no day’
cap tarda	[kap. tár.ðə]	‘no afternoon’
és bo	[ez. βɔ́]	‘it’s good’
és pa	[es. pá]	‘it’s bread’
és mel	[ez. mɛ́l]	‘it’s honey’

- **But onset satisfaction** (≠ word level):

cap límit	[kab. lí.mit]	‘no limit’

- **Voicing of word-final obstruents* in pre-vocalic position** (which appear as onsets due to resyllabification, i.e. as an effect of onset satisfaction).

  * Dialectal differences in the scope of this phenomenon.

  - Central (standard) Catalan:
    Pre-V sibilant (and *f*) voicing across words

Central (standard) Catalan

- **Sibilant pre-V voicing across words**:

pas enrere 'step behind'	[pà.z ən.ré.ɾə]	Cf. [pás]
peix adobat 'pickled fish'	[pè.ʒ ə.ðu.βát]	Cf. [péʃ]
vaig a casa 'I'm going home'	[bàd.dʒ ə. ká.zə]	Cf. [bátʃ]
plats i culleres 'dishes and spoons'	[plàd.dz i. ku.ʎé.ɾəs]	Cf. [pláts]

- **Word-final [f] varies wrt voicing pre-vocalically** (Recasens 1991):

  xef únic [ʃɛ.f ú.nik] ~ [ʃɛ.v ú.nik]
  'unique chef'

  fotògraf alemany [fu.tɔ̀.ɣrə.v ə.lə.máɲ] ~ [.f ə.]
  'German photographer.M'

- **Word-final devoiced stops are retained pre-vocalically**:

  bec aigua [bɛ.k áj.ɣwə] Cf. [bə.ɣút]
  'I drink water' 'drunk.M'

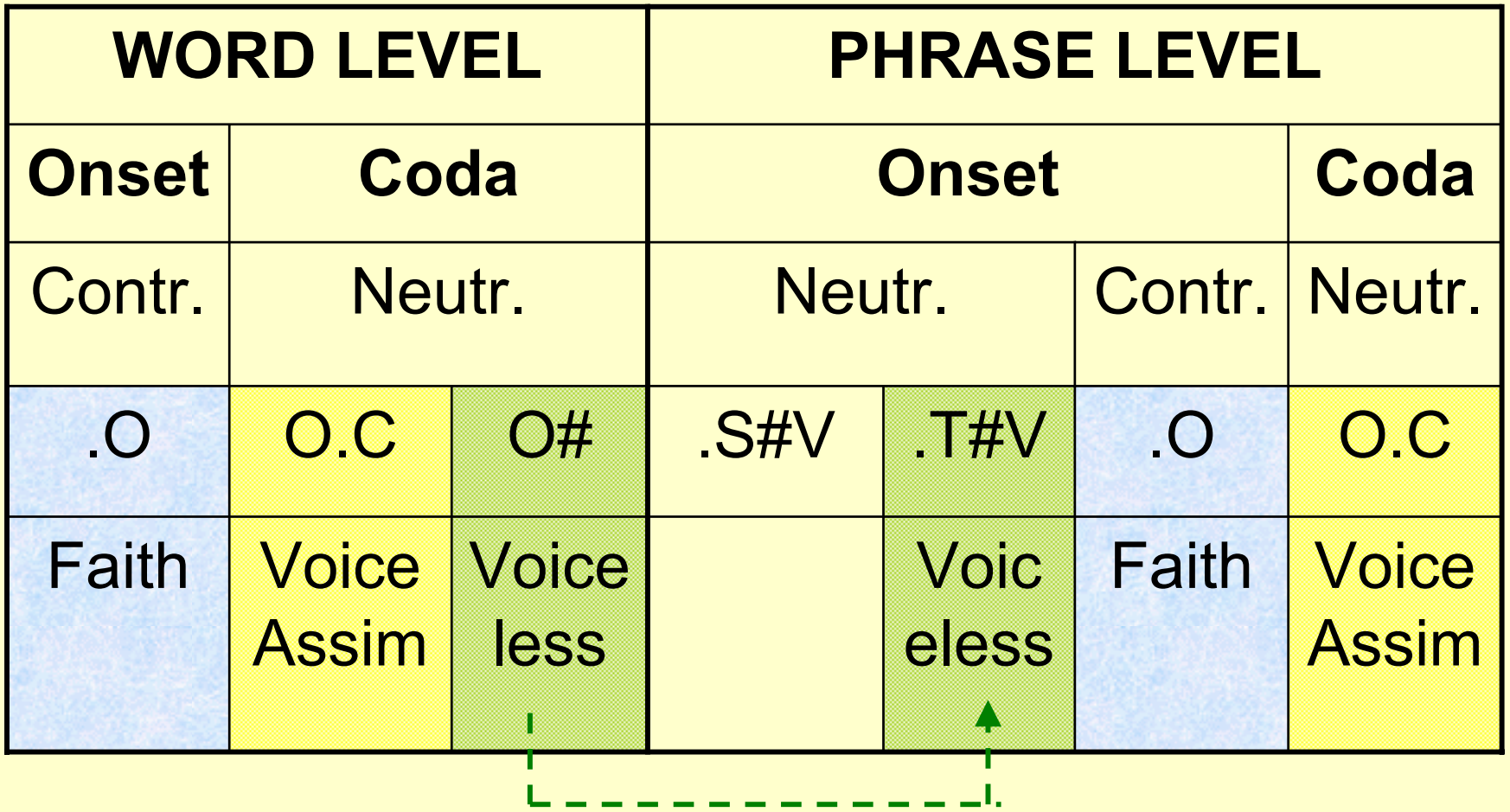
Summary

WORD LEVEL			PHRASE LEVEL			
Onset	**Coda**		**Onset**			**Coda**
Contr.	Neutr.		Neutr.		Contr.	Neutr.
.O	O.C	O#	.S#V	.T#V	.O	O.C

(where: O = obstruent, S = sibilant, T = stop)

WORD LEVEL			PHRASE LEVEL			
Onset	**Coda**		**Onset**			**Coda**
Contr.	Neutr.		Neutr.		Contr.	Neutr.
.O	O.C	O#	.S#V	.T#V	.O	O.C
Faith					Faith	

WORD LEVEL			PHRASE LEVEL			
Onset	**Coda**		**Onset**			**Coda**
Contr.	Neutr.		Neutr.		Contr.	Neutr.
.O	O.C	O#	.S#V	.T#V	.O	O.C
Faith	Voice Assim				Faith	Voice Assim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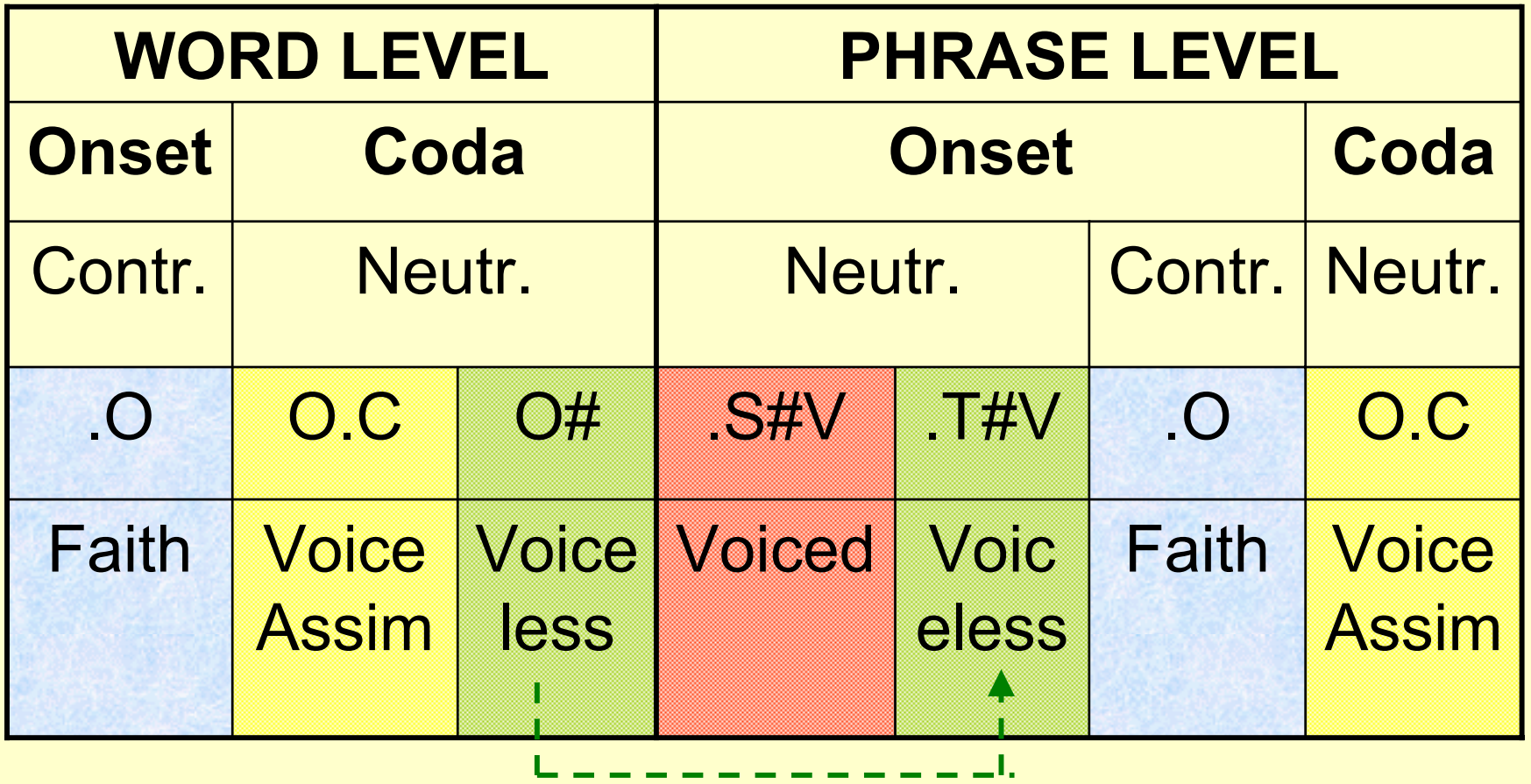
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III. Positional Faithfulness approach

(Cf. Lombardi 1991, 1999; Beckman 1998; Jiménez 1999; Wheeler 2005; Beckman&Ringen 2007, 2008; Jiménez&Lloret 2008; Lloret&Jiménez 2008)

Onset contrast & final devoicing

- ***[+voice, –son]**: Obstruents are not voiced.
- **Ident[±voice]**: The value for [±voice] in the I is the same as its correspondent in the O.
- **Ident[±voice]$_{Onset}$**: …, if it is syllabified as an onset.

- **Ranking:**

  Id[±vc]$_{Ons}$ » *[+vc, –son] » Id[±vc]

/pasá**d**/ ‘past.M’	Id[±vc]$_{Ons}$	*[+vc,–son]	Id[±vc]
a. pə.sá**d**		*!	
☞b. pə.sá**t**			*

/pasá**d**ə/ ‘past.F’	Id[±vc]$_{Ons}$	*[+vc, –son]	Id[±vc]
☞a. pə.sá.**ð**ə		*	
b. pə.sá.**t**ə	*!		*

Coda voice assimilation

- **Agree[±voice]**: An obstruent and a following *segment* must agree in voicing.

  (Onset obstruents are always protected by Ident[±voice]$_{Onset}$ ranked higher.

  Onset maximization, when OK onsets, enforced by *Coda » *Complex$_{Onset}$.)

- **Ranking:**

  Id[±vc]$_{Ons}$ » **Agr[±vc]** » *[+vc, –son] » Id[±vc]

/əsmusád/ ‘softed.M’	Id [±vc]$_{Ons}$	Agr [±vc]	*[+vc, –son]	Id [±vc]
☞a. əz.mu.sát		*	*	**
b. əz.mu.zát	*!		**	***
c. əs.mu.sát		**!		*
d. əz.mu.sád		*	**!	*

/téklə/ ‘key (music)’	Id [±vc]$_{Ons}$	Agr [±vc]	*[+vc, –son]	Id [±vc]
☞a. té.klə		**		
b. té.ɣlə	*!	*	*	*

Word-final voiceless stop maintenance across words

- **OO-Ident[±voice]:** The value for [±voice] in a prosodic word is the same as its correspondent in the phonological phrase.

  (Cf. Wheeler 2005, ≠ Beckman&Ringen 2007, 2008)

- **Ranking:**

  OO-Id[±vc] » $Id[\pm vc]_{Ons}$ » Agr[±vc] »*[+vc,–son] » Id[±vc]

/bé**g** árə/ 'I'm drinking now' *Bases*: [bé**k**], [á.ɾə]	OO-Id[±vc]	Id [±vc]$_{Ons}$	Agr [±vc]	*[+vc, –son]	Id [±vc]
a. bɛ.**ɣ** á.ɾə	*!			**	
☞b. bɛ.**k** á.ɾə		*	*	*	*

BUT if the ranking is:

OO-Id[±vc] » $Id[±vc]_{Ons}$ » Agr[±vc] ...

PROBLEMS FOR:

- **Coda voice agreement across words:**

  pas gran [paz. ɣrán] ‘big step’

  Base: [pás]

- **Sibilant pre-V voicing across words:**

  pas enrere [pà.z ən.ré.rə] ‘step behind’

  Base: [pás]

Analysis of voicing of pre-vocalic *sibilants* across words

1. Wheeler (parallel OT):

- Coda voice agreement:

  Agree[±voice]: A *coda* obstruent and a following *segment* must agree in voicing.

- Word-final voiceless stop maintenance across words:

  OO-Ident[±voice]

- Sibilant voicing across words:

  LazySibilant: Word-final sibilants are voiced before a vowel.

- Onset satisfaction across words:

  AlignL(PW,σ) (Colina 1995, Jiménez 1999, Bonet&Lloret 2005).

2. Beckman & Ringen (stratal OT):

- Coda voice agreement:

  Agree[±voice]: An obstruent agrees in voicing with a following *consonant.*

- Sibilant voicing across words:

  Not dealt with.

- Onset satisfaction & word-final voiceless stop maintenance across words:

  Word level:

  *Coda, Id[±vc]$_{Ons}$ » Agr[±vc] » *[+vc,–son] » *Compl$_{Ons}$ » Id[±vc]

  Phrase level:

  *Compl$_{Ons}$ » *Coda, Id[±vc]$_{Ons}$ » Agr[±vc] » *[+vc,–son] » Id[±vc]

3. Bermúdez-Otero (stratal OT, Licensing, and underspecification):

- Coda voice agreement:

  License(Laryngeal)

- Sibilant voicing & word-final voiceless stop maintenance across words:

  - Obstruents that resyllabify have lost their laryngeal node at word level (cf. Mascaró 1987).

  - **No-VC-Link**: A *laryngeal* node must not be simultaneously dominated by a V and a C (prevents voice spreading between V & C) (apud Itô et al. 1995, also applied to Catalan by Jiménez 1999).

  - Sibilants assimilate to the following vowel through ***ContVoiceLag**: *$[_{[+cont]}$ ... $[_{[+vc]}$ (promotes leftward spreading of [+vc] to a preceeding [+cont] segment).

- Onset satisfaction across words:

  Re-ranking of constraints.

4. Our proposal (paralell OT, gral. agree):

- **Trigger of coda voice agreement:**

  Agree[±voice]: An obstruent and a following *segment* must agree in voicing.

- **Trigger of sibilant voicing across words:**

  Agree[±voice]$_{WIn}$: An obstruent and a word-initial segment must agree in voicing.

  (On the prominence of word-initial position, cf., e.g., Nooteboom 1981, Hawkins&Cutler 1988, Byrd 1996, Barnes 2002, Chitoran et al. 2002, van Oostendorp 2003.)

- **Ranking: Agr[±vc]$_{WIn}$ » Agr[±vc]**

- **Trigger of word-final voiceless stop maintenance across words:**

  - **OO-Ident[±voice]** (Wheeler 2005)

  - *Gradual* **No-VC-Link** prevents stops from voicing (as a result of $Agr[\pm vc]_{Wln}$) due to the degree of dissimilarity between segments.

  (Cf. Jiménez 1999; also in Bermúdez-Otero 2001, 2006)

- **No-VC-Link** according to the degree of dissimilarity between segments (*apud* Itô et al. 1995):

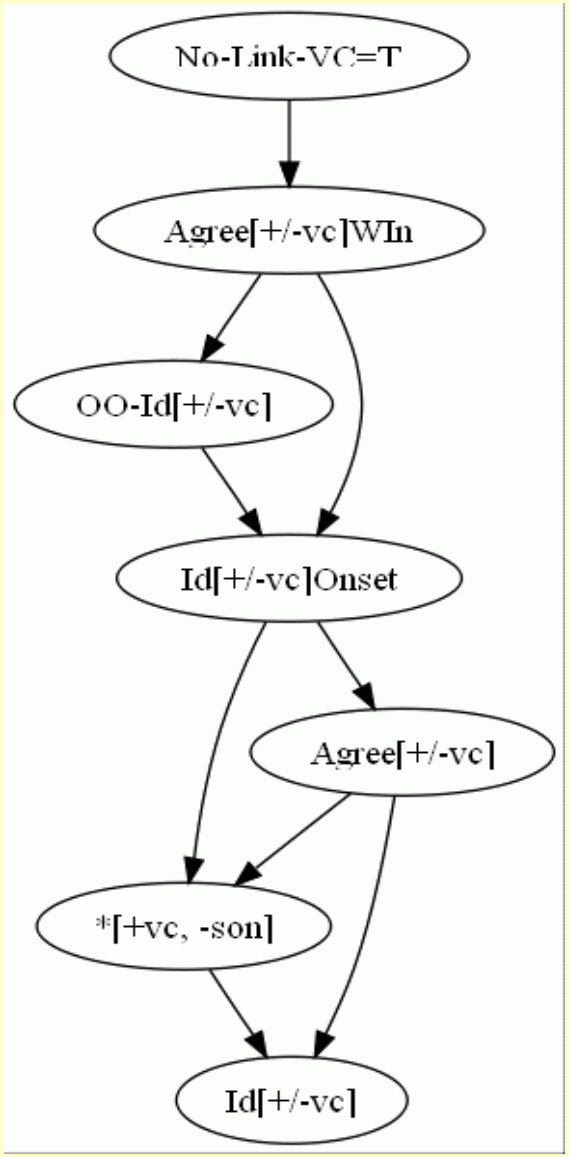
  A link between a V and a sonorant C better than a link between a V and a fricative C; a link between a V and a fricative C better than a link between a V and a stop C...

- **For our purposes (for Central Catalan):**
  No-VC-Link$_{\geq T}$
  (T = stops, spirant obstruents, *f*)

- **Ranking for voice effects** (Central Catalan)**:**
  No-VC-Link$_{\geq T}$ » Agr[±vc]$_{WIn}$ » OO-Id[±vc] » Id[±vc]$_{Ons}$ » **Agr[±vc]** » *[+vc, –son] » Id[±vc]

/pás ənréɾə/ 'step behind' *Bases*: [pás], [ən.ré.ɾə]	NO-LINK-VC$_{\geq T}$	AGR [±vc]$_{WIn}$	OO-ID[±vc]	ID [±vc]$_{Ons}$	AGR [±vc]	*[+vc, –son]	ID [±vc]
☞a. pà.**z** ən.ré.ɾə			*	*	*	*	*
b. pà.**s** ən.ré.ɾə		*!			**		

/bɛ́**g** áɾə/ 'I'm drinking now' *Bases*: [bɛ́**k**], [á.ɾə]	NO-LINK-VC$_{\geq T}$	AGR [±vc]$_{WIn}$	OO-ID[±vc]	ID [±vc]$_{Ons}$	AGR [±vc]	*[+vc, –son]	ID [±vc]
a. bɛ.**ɣ** á.ɾə	*!		*			**	
☞b. bɛ.**k** á.ɾə		*		*	*	*	*


No-Link-VC=T
Agree[+/-vc]WIn
OO-Id[+/-vc]
Id[+/-vc]Onset
Agree[+/-vc]
*[+vc, -son]
Id[+/-vc]

- **Ranking for voice effects** (Central Catalan)**:**

  No-VC-Link$_{\geq T}$ » **Agr[±vc]$_{WIn}$** » OO-Id[±vc] » Id[±vc]$_{Ons}$ » **Agr[±vc]** » *[+vc, –son] » Id[±vc]

- Onset satisfaction across words:

  AlignL(PW,σ) (Colina 1995, Jiménez 1999, Bonet & Lloret 2005, Wheeler 2005):

  Onset » AlignL(PW,σ)

- **Ranking for syllabification:**

  Onset » AlignL(PW,σ) » *Coda » *Compl$_{Ons}$

Other OO effects:

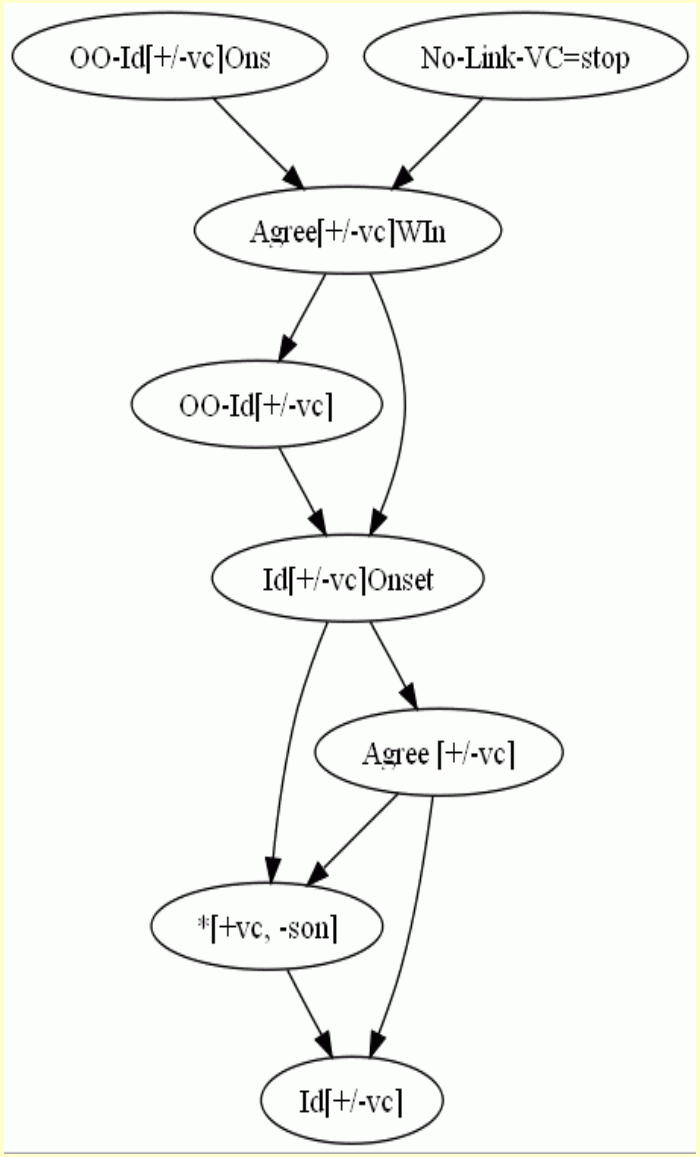
- passa /pásə/ [pá.sə] ‘he passes’
  ara /árə/ [á.ɾə] ‘now’
  passa ara /pásə árə/ [pa.s á.ɾə]

- To protect these onset sibilants:

  OO-Ident[±voice]$_{Onset}$: The value for [±voice] of a segment in onset position in a prosodic word is the same of its correspodent in the phonological phrase.

- **Ranking: OO-Id[±vc]$_{Ons}$ » OO-Id[±vc]**

/pásə árə/ *Bases*: [pá.sə], [á.ɾə]	OO-ID [±vc]$_{Ons}$	NO-LINK-VC$_{\geq T}$	AGR [±vc] WIn	OO-ID [±vc]	ID [±vc] Ons	AGR [±vc]	*[+vc, –son]	ID [±vc]
a. pa.z á.ɾə	*!			*	*	*	*	*
☞b. pa.s á.ɾə			*			**		


OO-Id[+/-vc]Ons
No-Link-VC=stop
Agree[+/-vc]WIn
OO-Id[+/-vc]
Id[+/-vc]Onset
Agree [+/-vc]
*[+vc, -son]
Id[+/-vc]

IV. Dialectal variation: Segmental dissimilarity and obstruent pre-vocalic voicing across words

Obstruent voicing across words:

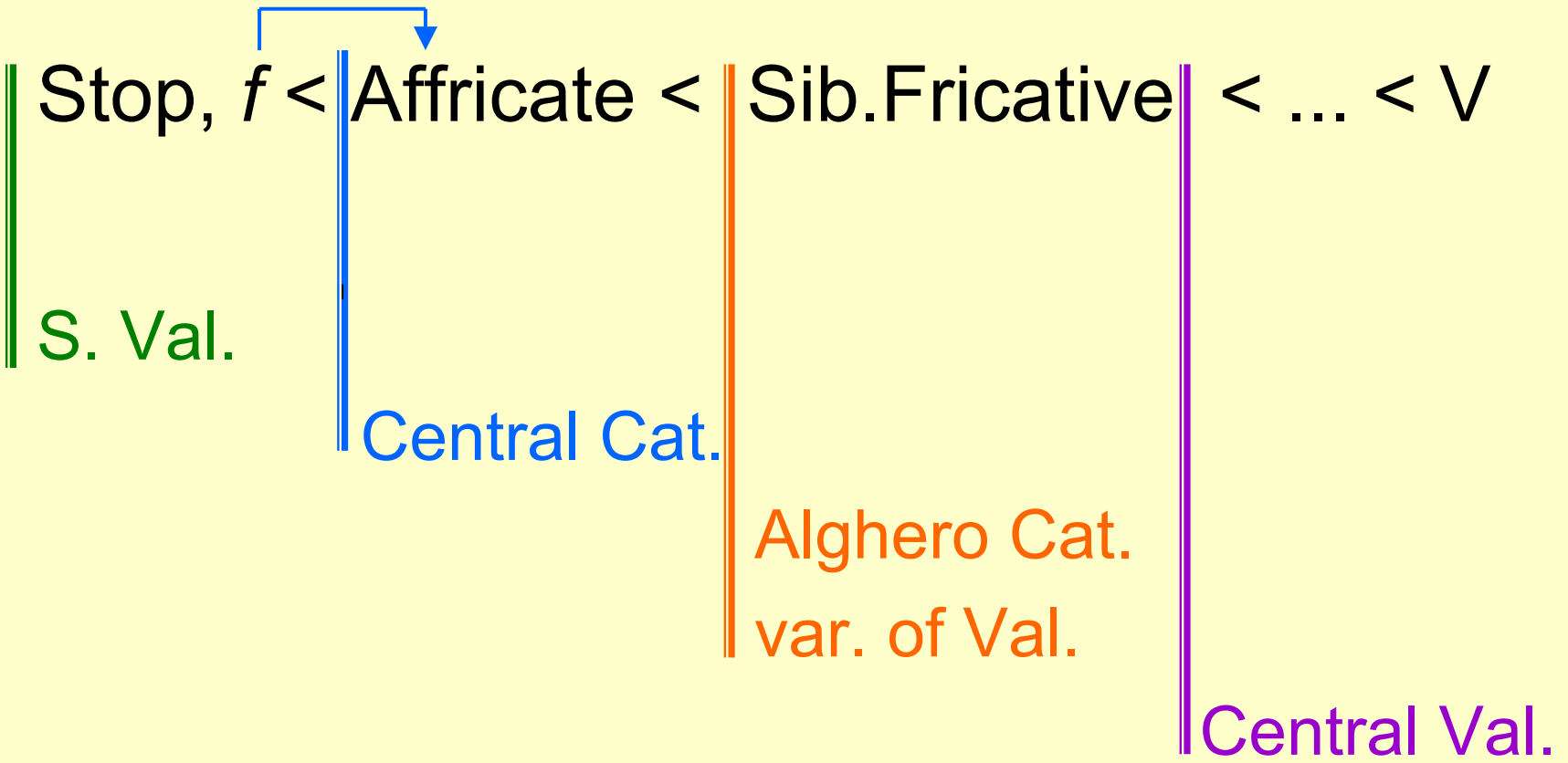
	Stop#V	f#V	Affr#V	SibFric#V	Obs#C
Southern Val.	√	√	√	√	√
Central Cat.	No	Var.	√	√	√
Alghero Cat. & var. of Val.	No	No	No	√	√
Central Val.	No	No	No	No	√

- *Gradual* **No-VC-Link** according to the degree of dissimilarity between segments (more dissimilar is worse for simultaneous linking).

- **Scale:**

  Stop, *f* < Affricate < Sib.Fricative < ... < V

Limits to No-VC-Link:



Southern Valencian

• bec ara	[be.**ɣ** á.ɾa]	‘I’m drinking now’
• xef únic	[tʃe.**v** ú.nik]	‘unique chef’
• vaig a casa	[và.**dʒ** a. ká.za]	‘I’m going home’
• pas arrere	[pà.**z** a.ré.ɾe]	‘step behind’

- **Basic ranking:** All obstruents voice

  Agr[±vc]$_{Wln}$ » No-VC-Link …

Central Catalan

• bec ara	[bɛ.**k** á.ɾə]	‘I’m drinking now’
• xef únic	[ʃɛ.**f/v** ú.nik]	‘unique chef’
• vaig a casa	[bà**d.dʒ** ə. ká.zə]	‘I’m going home’
• pas enrere	[pà.**z** ən.ré.ɾə]	‘step behind’

- **Basic ranking:** Stops(& f) don’t voice

  No-VC-Link$_{\geq T}$ » Agr[±vc]$_{WIn}$ » No-VC-Link$_{<T}$ …

Alghero Cat. & var. of Val.

Valencian (la Costera):

• bec ara	[be.**k** á.ɾa]	'I'm drinking now'
• xef únic	[tʃe.**f** ú.nik]	'unique chef'
• vaig a casa	[và.**tʃ** a. ká.za]	'I'm going home'
• pas arrere	[pà.**z** a.ré.ɾe]	'step behind'

- **Basic ranking:** Stops, f & affr don't voice

  No-VC-Link$_{\geq Af}$ » Agr[±vc]$_{Wln}$ » No-VC-Link$_{<Af}$ ..

Central Valencian

• bec ara	[be.**k** á.ɾa]	‘I’m drinking now’
• xef únic	[tʃe.**f** ú.nik]	‘unique chef’
• vaig a casa	[bà.**tʃ** a. ká.sa]	‘I’m going home’
• pas arrere	[pà.**s** a.ré.ɾe]	‘step behind’

- **Basic ranking:** No obstruent voices

  No-VC-Link » Agr[±vc]$_{\text{WIn}}$ …

Overall dialectal comparison

- Southern Valencian (all obstruents voice):
  Agr[±vc]$_{Wln}$ » No-VC-Link …
- Central Catalan (stops don't voice):
  No-VC-Link$_{\geq T}$ » Agr[±vc]$_{Wln}$ » No-VC-Link$_{<T}$ …
- Alghero Catalan and var. of Valencian (stops, *f*, and affricates don't voice):
  No-VC-Link$_{\geq Af}$ » Agr[±vc]$_{Wln}$ » No-VC-Link$_{<Af}$ ..
- Central Valencian (no obstruent voices):
  No-VC-Link » Agr[±vc]$_{Wln}$ …

V. Obstruent pre-vocalic voicing across words in other languages

Obstruent voicing across words (Dutch and Polish):

	Stop#V	Fric#V	Obs#Obs
Limburg dialects of Dutch, Cracow & Poznań Polish	√	√	√
Standard Dutch	No	√	√
Warsaw Polish	No	No	√

Limits to No-VC-Link:

Stop	<	Fricative	< ...	<	V
Limburg dial. of Dutch, Cracow & Poznań Polish		Standard Dutch			Warsaw Polish

Limburg dialects of Dutch

- [dɑ**d**ɔx] ‘that also’ Cf. [dɑ**t**] ‘that’
- [kɪʀə**g**yl] ‘church owl’ Cf. [kɪʀə**k**] ‘church’
- [ɪ**z**ət] ‘is it’ Cf. [ɪ**s**] ‘is’

(Hinskens 2007)

- [doːəzɪdɪŋkɑ**dz**ɪndəʀʃtaːl] Cf. [kɑ**ts**] ‘cat’
  ‘there is a cat in the barn’
- [ʔətxeːdopmeːə**dz**aː] Cf. [meːə**ts**] ‘March’
  ‘we are approaching March’

(Hinskens p.c.)

Standard Dutch

- da**t** ik [dɑtɪk] Cf. [dɑ**t**]
  ‘that I’ ‘that’

  ker**k** uil [kɛʀ(ə)**k**œyl] Cf. [kɛʀ(ə)**k**]
  ‘church owl’ ‘church’

  een hoe**d** opzetten [ənhu**t**ɔpsɛtən] Cf. [hu**t**]
  ‘to put on a hat’ ‘hat’

- wa**s** u [ʋɑ**z**y] Cf. [ʋɑ**s**]
  ‘were you (*polite*)’ ‘were’

  twaal**f** uur [tʋal**v**yːr] Cf. [tʋal**f**]
  ‘twelve o’clock’ ‘twelve’

(Booij&Rubach 1987, Booij 1995, Hinskens p.c.)

Cracow & Poznań Polish

- bra[**d** ojca] ‘father’s brother’
- rosmo[**v** o]statnych ‘last conversations’
- zró[**b** i]nwentarz ‘do inventory!’

Warsaw Polish

- bra[**t** ojca] ‘father’s brother’
- rosmo[**f** o]statnych ‘last conversations’
- zró[**p** i]nwentarz ‘do inventory!’

(Gussmann 1992, Mascaró 1995)

Obstruent voicing across words:

	Stop#V	f#V	Affr#V	SibFric#V	O#O
Southern Val., Limburg dialects, Cracow & P. Pol.	√	√	√	√	√
Standard Dutch	No	√	--	√	√
Central Cat.	No	Var.	√	√	√
Alghero Cat. & var. of Val.	No	No	No	√	√
Central Val., Warsaw Pol.	No	No	No	No	√

VI. Conclusions

- Voicing across words is an effect of assimilation by prominence (Agr[±vc]$_{WIn}$).
- Voicing across words is limited by the degree of dissimilarity between segments (gradual No-VC-Link).
- Voicing across words interferes with other voice neutralization phenomena (word-final devoicing, voiceless maintenance across words, voicing of pre-V obstruents within words, etc.).

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