

Enclitic-triggered stress shift in Catalan*

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Going Romance 29
10 December 2015

1. Introduction

- (Pronominal) clitics: independent grammatical units, but phonologically deficient, that is, prosodically-dependent, unstressed elements (Zwicky 1977, Nespor and Vogel 1986, Selkirk 1995, Anderson 2005)
- But stress-shifting in some varieties of Balearic Catalan
- Claims:

- enclitic-triggered stress shift always optimizes metrical structure
- enclitic-triggered stress shift is a strictly phonological phenomenon (*contra* Ordóñez and Repetti 2006, 2014).

2. Data

(1) Verb-clitic sequences in Barcelona Catalan

(a) <i>2sg.imperative-clitic</i>	(b) <i>infinitive-clitic</i>	
'komprə	kum'pra	'(to) buy'
'komprə#l	kum'prar#lu	3P.ACC.MASC.SG.
'komprə#lə	kum'prar#lə	3P.ACC.FEM.SG.
'komprə#li	kum'prar#li	3P.DAT.SG.
'komprə#lzi	kum'pra#lzi	3P.DAT.PL.
'komprə#n	kum'prar#nə	PARTITIVE
'komprə#w	kum'prar#u	ACC.NEUTER
'komprə#j	kum'prar#i	LOCATIVE
'komprə#mə#l	kum'prar#mə#l	1P.SG.DAT.+3P.ACC.MASC.SG.
'komprə#mə#lə	kum'prar#mə#lə	1P.SG.DAT.+3P.ACC.FEM.SG.
'komprə#nz#u	kum'pra#nz#u	1P.PL.DAT.+ACC.NEUTER

*This work has partially been supported by the projects FFI2013-46987-C3-1-P (Spanish Government) and 2014SGR918 (Catalan Government), and it is inscribed within the research group GEVAD (<http://www.ub.edu/GEVAD/>).

(2) Verb-clitic sequences in Formentera Catalan

(a) <i>2sg.imperative-clitic</i>	(b) <i>infinitive-clitic</i>	
'komprə	kum'pra	'(to) buy'
kum'prə#l	kum'pral#lu	3P.ACC.MASC.SG.
kum'prə#lə	kum'pral#lə	3P.ACC.FEM.SG.
kum'prə#li	kum'pral#li	3P.DAT.SG.
kum'prə#lzi	kum'pra#lzi	3P.DAT.PL.
kum'prə#n	kum'praɾ#nə	PARTITIVE
kum'prə#w	kum'praɾ#u	ACC.NEUTER
kum'prə#j	kum'praɾ#i	LOCATIVE
kumprə#mə#l	kumprəɾ#mə#l	1P.SG.DAT.+3P.ACC.MASC.SG.
kumprə#mə#lə	kumprəɾ#mə#lə	1P.SG.DAT.+3P.ACC.FEM.SG.
kumprə#muz#u	kumprəɾ#muz#u	1P.PL.DAT.+ACC.NEUTER

(3) Verb-clitic sequences in Mallorca Catalan

(a) <i>2sg.imperative-clitic</i>	(b) <i>infinitive-clitic</i>	
'komprə	kom'pra	'(to) buy'
kom'prə#l	komprəl#'lo	3P.ACC.MASC.SG.
komprə#lə	komprəl#lə	3P.ACC.FEM.SG.
komprə#li	komprəl#li	3P.DAT.SG.
komprə#l'zi	komprə#l'zi	3P.DAT.PL.
kom'prə#n	komprən#'nə	PARTITIVE
kom'prə#w	komprə'r#o	ACC.NEUTER
kom'prə#j	komprə'r#i	LOCATIVE
komprə#l#mə	komprə#l#mə	3P.ACC.MASC.SG.+1P.SG.DAT.
komprə#lə#mə	komprəl#lə#mə	3P.ACC.FEM.SG.+1P.SG.DAT.
komprə#mo'z#o	komprəm#mo'z#o	1P.PL.DAT.+ACC.NEUTER

(4) Verb-clitic sequences in Menorca Catalan

(a) <i>2sg.imperative-clitic</i>	(b) <i>infinitive-clitic</i>	
'komprə	kum'pra	'(to) buy'
kum'prə/ε#l	kumprəl#'lo	3P.ACC.MASC.SG.
kum'prə/ε#lə	kumprəl#lə/ε	3P.ACC.FEM.SG.
kumprə#li	kumprəl#li	3P.DAT.SG.
kumprə#l'zi/'lis	kumprə(l)#l'zi/'lis	3P.DAT.PL.
kum'prə/ε#n	kumprən#'nə/ε	PARTITIVE
kum'prə/ε#w	kumprə'r#o	ACC.NEUTER
kum'prə/ε#j	kumprə'r#i	LOCATIVE
kumprə#mə/ε#l	kumprəm#mə/ε#l	1P.SG.DAT.+3P.ACC.MASC.SG.
kumprə#mə/ε#lə	kumprəm#mə/ε#lə	1P.SG.DAT.+3P.ACC.FEM.SG.
kumprə#mu'z#o	kumprəm#mu'z#o	1P.PL.DAT.+ACC.NEUTER

• Research questions:

- How do pronominal enclitics interact phonologically with their verbal hosts? (*i.e.* How do they integrate into the prosodic hierarchy?)
- Is stress shift triggered to conform with an unmarked stress pattern?
- If so, is it possible to maintain a unified analysis for dialects with (apparently) divergent stress patterns in encliticized forms?

3. Stress in Catalan

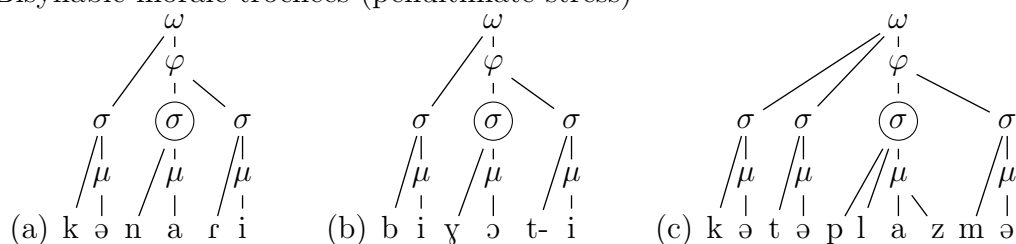
- Right-oriented three-syllable window (*i.e.* *canícula* ‘midsummer heat’ *cf.* **cànicula*)
- No native word with antepenultimate stress if the penultimate syllable is closed (*i.e.* *cataplasma* ‘cataplasm’ *cf.* **catàplasma*)
- Most frequent stress patterns in nominal elements: penultimate for V-final words, and final for C-final words (more than 86% according to Serra 1996)
- Deviations: final for some V-final words, penultimate for some C-final words, and antepenultimate stress

(5) Stress in Catalan nominal forms

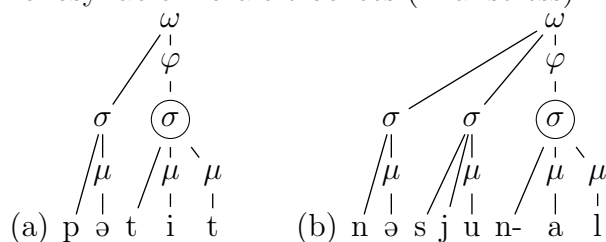
	unmarked	marked	
-V#	<i>penultimate</i>	<i>final</i>	<i>antepenultimate</i>
	... ¹ σσ# <i>negoci</i> ‘business’ <i>canari</i> ‘canary’ <i>muntany-a</i> ‘mountain’ <i>bigot-i</i> ‘mustache’	... ¹ σ# <i>tabú</i> ‘tabu’ <i>ximpanzé</i> ‘chimpanzee’ <i>café</i> ‘coffee’ <i>peroné</i> ‘fibula’	... ¹ σσσ# <i>Trípoli</i> ‘Tripoli’ <i>metròpoli</i> ‘metropolis’ <i>pàgin-a</i> ‘page’ <i>músic-a</i> ‘music’
-C#	<i>final</i>	<i>penultimate</i>	<i>antepenultimate</i>
	... ¹ σ# <i>almanac</i> ‘almanac’ <i>petit</i> ‘small’ <i>nacion-al</i> ‘national’ <i>bond-at</i> ‘goodness’	... ¹ σσσ# <i>capítol</i> ‘chapter’ <i>llapis</i> ‘pencil’ <i>numèr-ic</i> ‘numerical’ <i>telè-fon</i> ‘phone’	... ¹ σσσσ# <i>Júpiter</i> ‘Jupiter’ <i>hàbitat</i> ‘habitat’ <i>currícul-um</i> ‘curriculum’ <i>làudan-um</i> ‘laudanum’

- Moraic trochee as the unmarked foot in Catalan (Cabré 1993, Cabré and Kenstowicz 1995, Vallverdú 1997, Bonet and Lloret 1998, a.o., *cf.* Wheeler 2004)

(6) Bisyllabic moraic trochees (penultimate stress)



(7) Monosyllabic moraic trochees (final stress)



4. Unmarked stress pattern: OT analysis

(8) Foot form constraints (McCarthy 2008)

a. TROCHEE

Assign one violation mark for every foot whose head is not initial.

b. IAMB

Assign one violation mark for every foot whose head is not final.

(9) Foot alignment constraints (McCarthy and Prince 1993)

a. ALL-FEET-RIGHT

Assign one violation mark for every syllable that intervenes between the right edge of the foot and the right edge of the prosodic word.

b. ALL-FEET-LEFT

Assign one violation mark for every syllable that intervenes between the left edge of the foot and the left edge of the prosodic word.

(10) FOOT-BINARITY- μ

Assign one violation mark for every foot that does not contain at least two moras. (McCarthy and Prince 1986/1996, Prince 1983)

(11) Tableau for *canari*

canari	FT-BIN- μ	TROCHEE	ALL-FT-R	IAMB	ALL-FT-L
a. $\text{ca}_\mu(\text{na}_\mu\text{ri}_\mu)$				*	*
b. $(\text{ca}_\mu\text{na}_\mu)\text{ri}_\mu$			*!	*	
c. $\text{ca}_\mu(\text{na}_\mu\text{ri}_\mu)$		*!			*
d. $(\text{ca}_\mu\text{na}_\mu)\text{ri}_\mu$		*(!)	*(!)		
e. $\text{ca}_\mu\text{na}_\mu(\text{ri}_\mu)$	*!				**

(12) a. *C- μ

Assign one violation mark for every mora that is exclusively associated with a coda consonant. (Broselow *et al.* 1997)

b. WEIGHT-BY-POSITION

Assign one violation mark for every coda consonant that does not project a mora. (Prince 1990)

(13) Tableau for *indi*

indi	FT-BIN- μ	ALL-FT-R	*C- μ	WBP
a. $\text{i}_\mu\text{ndi}_\mu$				*
b. $(\text{i}_\mu\text{n}_\mu)\text{di}_\mu$		*(!)	*(!)	
c. $(\text{i}_\mu\text{n}_\mu\text{di}_\mu)$	*(!)		*(!)	

(14) WEIGHT-BY-POSITION] $_\omega$

Assign one violation mark for every coda consonant in word-final position that does not project a mora.

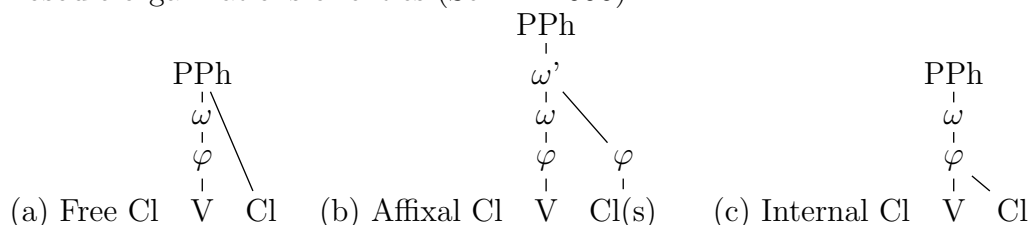
(15) Tableau for *nacional*

nacional	WBP] $_\omega$	*C- μ	WBP
a. $\text{na}_\mu\text{cio}_\mu(\text{na}_\mu\text{l}_\mu)$		*	
b. $\text{na}_\mu(\text{cio}_\mu\text{na}_\mu\text{l})$	*!		*

5. The phonology of cliticization in Catalan

- Prosodic clitic: functional morphosyntactic word that is not a prosodic word (Selkirk 1995)

(16) Prosodic organizations of clitics (Selkirk 1995)



- Enclitics interact phonologically with their verbal hosts as affixes because they interact transparently with word-level phonological processes; encliticization bleeds final consonant cluster simplification and final r-deletion (see also Bermúdez-Otero and Payne 2011).

(17) Final consonant cluster simplification

kum'pran	'buying'	cf.	kum'prant#u	'buying-ACC.NEUTER'
ə'nən	'going'	cf.	ə'nənt#i	'going-LOCATIVE'
ə'nən ə 'kazə	'going home'	cf.	*ə'nən#i	

(18) Final r-deletion

pən'sa	'to think'	cf.	pən'sar#i	'to think-OBLIQUE'
bu'le	'to want'	cf.	bu'lɛr#u	'to want-ACC.NEUTER'
bu'le 'ajɣwə	'to want water'	cf.	*bu'lɛ#w	

- Therefore, enclitics in Catalan must be internal clitics (NON-RECURSIVITY(ω), EXHAUSTIVITY(PPh) \gg ALIGN-Right(V,PWd)); differences in stress location cannot thus be attributed to different incorporation sites (*contra* Peperkamp 1997).

6. Enclitic-triggered stress shift: OT analysis

6.1. Barcelona Catalan

- No stress shift, unfooted enclitics
- Certain morphosyntactically defined elements want to lie outside metrical structure; this situation can be formalized in OT as a morphosyntax-phonology anti-alignment constraint between such elements and the foot (Buckley 1998).

(19) *ALIGN-Right(Clitic, Foot)

Assign one violation mark for every right edge of a clitic that coincides with the right edge of a foot.

(20) Tableau for *compra-li* 'buy.2sg-3P.DAT.SG.'

compra#li	*AL-R(Cl,Ft)	ALL-FT-R
a. $\text{co}_\mu\text{mpra}_\mu\text{\#li}_\mu$		*
b. $\text{co}_\mu\text{m}(\text{pra}_\mu\text{\#li}_\mu)$	*!	

(21) Tableau for *comprar-me-la* ‘to buy-1P.SG.DAT.+ACC.FEM.SG.’

comprar#me#la	*AL-R(Cl,Ft)	ALL-FT-R	*C- μ
a. $\text{co}_\mu\text{m}(\text{'pra}_\mu\text{r}_\mu)\#\text{me}_\mu\#\text{la}_\mu$		**	*
b. $\text{co}_\mu\text{m}(\text{'pra}_\mu\text{r}\#\text{me}_\mu)\#\text{la}_\mu$	*!	*	
c. $\text{co}_\mu\text{mpr}_\mu\text{a}_\mu\text{r}\#(\text{'me}_\mu\#\text{la}_\mu)$	*!		

6.2. Formentera Catalan

- Stress shift, right-aligned moraic trochee to avoid marked stress patterns (Bonet and Torres-Tamarit 2010, 2011)

(22) Tableau for *compra-li* ‘buy.2sg-3P.DAT.SG.’

compra#li	ALL-FT-R	*AL-R(Cl,Ft)
a. $\text{co}_\mu\text{m}(\text{'pra}_\mu\#\text{li}_\mu)$		*
b. $(\text{'co}_\mu\text{mpr}_\mu\text{a}_\mu)\#\text{li}_\mu$	*!	

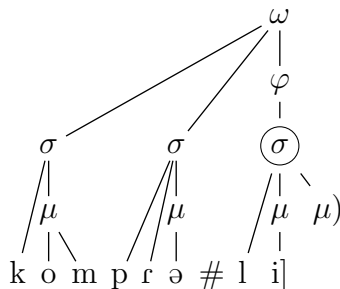
(23) Tableau for *comprar-me-la* ‘to buy-1P.SG.DAT.+ACC.FEM.SG.’

comprar#me#la	ALL-FT-R	*C- μ	*AL-R(Cl,Ft)
a. $\text{co}_\mu\text{mpr}_\mu\text{a}_\mu\text{r}\#(\text{'me}_\mu\#\text{la}_\mu)$			*
b. $\text{co}_\mu\text{m}(\text{'pra}_\mu\text{r}\#\text{me}_\mu)\#\text{la}_\mu$	*!		*
c. $\text{co}_\mu\text{m}(\text{'pra}_\mu\text{r}_\mu)\#\text{me}_\mu\#\text{la}_\mu$	*(!)*	*(!)	

6.3. Mallorca Catalan

- Stress shift, always final stress
- So far, *ALIGN-Right(Clitic,Foot) and ALL-FEET-RIGHT always interact with each other.
- Is it possible to satisfy both constraints?
- Yes, *via* catalexis, the operation of inserting a prosodic constituent that is melodically empty (Kiparsky 1991, Kager 1995, Meinschaefer 2014)

(24) Catalexis in Mallorca Catalan



- (25) *EMPTY- μ
Assign one violation mark for every mora in the output that is not linked to any root node. (Empty mora = superscripted μ)

- (26) Tableau for *compra-li* ‘buy.2sg-3P.DAT.SG.’

compra#li	ALL-FT-R	*AL-R(Cl,Ft)	*EMPTY- μ
a. $\text{co}_\mu\text{mpr}_\mu\text{pra}_\mu\#('li_\mu^\mu)$			*
b. $\text{co}_\mu\text{m}('pra_\mu\#li_\mu)$		*!	
c. $('co_\mu\text{mpr}_\mu)\#li_\mu$	*!		

- (27) Factorial typology for the set of relevant constraints
Barcelona: *EMPTY- μ , *ALIGN-Right(Clitic,Foot) \gg ALL-FEET-RIGHT
Formentera: *EMPTY- μ , ALL-FEET-RIGHT \gg *ALIGN-Right(Clitic,Foot)
Mallorca: ALL-FEET-RIGHT, *ALIGN-Right(Clitic,Foot) \gg *EMPTY- μ

6.4. Menorca Catalan

- Stress shift, final stress except for certain forms with 3P.ACC.FEM. enclitics

- (28) Stress uniformity (imperative)
kum'prə/ε#l ‘buy.2sg-3P.ACC.MASC.SG.’
kum'prə/ε#lə ‘buy.2sg-3P.ACC.FEM.SG.’
kum'prə/ε#ls ‘buy.2sg-3P.ACC.MASC.PL.’
kum'prə/ε#ləs ‘buy.2sg-3P.ACC.FEM.PL.’

- (29) Stress uniformity (infinitive)
kumprəl#'lo ‘to buy-3P.ACC.MASC.SG.’
kumprəl#'lə/ε ‘to buy-3P.ACC.FEM.SG.’
kumprəl#'los ‘to buy-3P.ACC.MASC.PL.’
kumprəl#'lə/εs ‘to buy-3P.ACC.FEM.PL.’

- Optimal Paradigms (McCarthy 2005)
 - “Candidates consist of entire inflectional paradigms, where an inflectional paradigm contains all and only the words based on a single lexeme”.
 - “The stem (output form of the shared lexeme) in each paradigm member is in correspondence relation \mathfrak{R}_{OP} with the stem in every other paradigm member. [...] There is no distinctive base—rather, every member of a paradigm is a base of sorts with respect to every other member”.
 - “There is a set of output-output faithfulness constraints on the \mathfrak{R}_{OP} correspondence relation”.
- Verb-clitic sequences as complex “stems” (recall that enclitics, which interact transparently with word-level phonology, can be seen as “derivational affixes”)

- (30) OP_{V+Cl} -IDENT(stress)
The syllables standing in $\mathfrak{R}_{OP(V+Cl)}$ correspondence must be identical for stress.

(31) Tableau for *compra*-3P.ACC. ‘buy.2sg-3P.ACC.’

	/compra#3P.ACC./	OP _{V+Cl} -IDENT(stress)	*AL-R(Cl,Ft)
a. \mathbb{R}	$\text{co}_\mu\text{m}(\text{'pra}_\mu\#\text{l}^\mu)$ $\text{co}_\mu\text{m}(\text{'pra}_\mu\#\text{la}_\mu)$ $\text{co}_\mu\text{m}(\text{'pra}_\mu\#\text{ls}^\mu)$ $\text{co}_\mu\text{m}(\text{'pra}_\mu\#\text{le}_\mu\text{s})$		**
b.	$\text{co}_\mu\text{m}(\text{'pra}_\mu\#\text{l}^\mu)$ $\text{co}_\mu\text{mpr}_\mu\text{a}_\mu\#(\text{'la}_\mu^\mu)$ $\text{co}_\mu\text{m}(\text{'pra}_\mu\#\text{ls}^\mu)$ $\text{co}_\mu\text{mpr}_\mu\text{a}_\mu\#(\text{'le}_\mu\text{s}^\mu)$	*!*****	

(32) Tableau for *comprar*-3P.ACC. ‘to buy-3P.ACC.’

	/compra#3P.ACC./	OP _{V+Cl} -IDENT(STRESS)	*AL-R(Cl,Ft)
a. \mathbb{R}	$\text{co}_\mu\text{mpr}_\mu\text{a}_\mu\text{r}\#(\text{'lo}_\mu^\mu)$ $\text{co}_\mu\text{mpr}_\mu\text{a}_\mu\text{r}\#(\text{'la}_\mu^\mu)$ $\text{co}_\mu\text{mpr}_\mu\text{a}_\mu\text{r}\#(\text{'lo}_\mu\text{s}^\mu)$ $\text{co}_\mu\text{mpr}_\mu\text{a}_\mu\text{r}\#(\text{'le}_\mu\text{s}^\mu)$		
b.	$\text{co}_\mu\text{m}(\text{'pra}_\mu\text{r}\#\text{lo}_\mu)$ $\text{co}_\mu\text{m}(\text{'pra}_\mu\text{r}\#\text{la}_\mu)$ $\text{co}_\mu\text{m}(\text{'pra}_\mu\text{r}\#\text{lo}_\mu\text{s})$ $\text{co}_\mu\text{m}(\text{'pra}_\mu\text{r}\#\text{le}_\mu\text{s})$		*!***

7. Phonology or syntax?

- Ordóñez and Repetti (2006, 2014) make a distinction between *weak pronouns* and *true clitics* (based on Cardinaletti and Starke 1999).
- Assumption: only weak pronouns, but not true clitics, can bear stress
- They observe that Romance varieties in which enclitics appear in the marked order ACC.+DAT. always display stress shift to the final syllable; this is also true for Mallorca Catalan.
- According to them, only weak pronouns move to an agreement projection that involves crossing paths, giving rise to the marked order ACC.+DAT. Because in these languages enclitics are necessarily weak pronouns, they are stressed.
- Menorca Catalan as a counterexample
 - Menorca Catalan also displays final stress although enclitics appear in the unmarked order DAT.+ACC.

(33) Order of enclitics

Menorca kumprə#mol#'los ‘buy.2sg-1PL.DAT.+3P.ACC.MASC.PL.’
Mallorca komprə#lzə#'mos ‘buy.2sg-3P.ACC.MASC.PL.+1PL.DAT.’

- The unmarked order of enclitics in Menorca Catalan implies that they are true clitics; they should not thus be stressed.

- Furthermore, the same 3P.ACC.FEM.SG. enclitic can be stressed or not depending on whether it attaches to an imperative or an infinitive, showing the influence of phonological paradigm uniformity.

(34) Imperative *vs.* infinitive stress in Menorca Catalan

kum'prə/ε#lə 'buy.2sg-3P.ACC.FEM.SG.'

kumprəl#lə/ε 'to buy-3P.ACC.FEM.SG.'

8. Conclusions

- No need to postulate different prosodic incorporation strategies for different dialects (*contra* Peperkamp 1997); in all Catalan dialects, pronominal enclitics cannot be parsed outside the prosodic word, although in Barcelona Catalan enclitics misalign with the foot right edge (*i.e.* anti-alignment).
- By resorting to catalexis, the hypothesis that stress shift is always driven by the avoidance of marked stress patterns (penultimate stress with C-final verb-clitic sequences and antepenultimate stress) can be maintained for all dialects (*contra* Grimalt 2002, 2004, who resorts to iambic feet to account for final stress in Mallorca and Menorca Catalan).
- Enclitic-triggered stress shift is a purely phonological phenomenon (*contra* Ordóñez and Repetti 2006, 2014).

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