SPANISH SECONDARY STRESS WITHOUT GRADIENT ALIGNMENT

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Organization of the talk

- foot construction
  - gradient vs. categorical constraints
- predictions of the rhythmic theory
  - dependence on location of primary stress
- the challenge of Spanish secondary stress
  - a lapse away from the main stress
  - but different in colloquial and “rhetorical” styles
- lexical and phrasal interactions
  - a two-stage solution

Approaches to iterative feet

- directional foot construction
  - stepwise iteration in ordered-rule theories
- gradient alignment in OT
  - approximate modeling of the iterative approach
  - McCarthy & Prince 1993, Gordon 2002, Hyde 2002
- categorical alignment and rhythmic constraints
  - a formally simpler theory
  - distinct typological predictions
  - Kager 2001, 2005, McCarthy 2003, Buckley 2009

Directional trochees

- with ordered operations, feet are constructed one by one in a particular direction
- Warao (Venezuela)
  - right to left: odd-parity 0(20)(20)(10)
  - *(yà pu) (rù ki) (tà ne) (há se)*
  - *e (nà ho) (rò a) (hà ku) (tá i)*
- Pintupi (Australia)
  - left to right: odd-parity (10)(20)(20)0
  - *(ʈá mu) (lìm pa) (ʈùŋ ku)*
  - *(ʈí li) (rì ŋu) (làm pa) ʈu*

Gradient alignment

Pintupi: ALL-FT-LEFT

- count total number of syllables separating every left foot boundary from left edge of word
- use this number to compare candidates

	(ṭí ḷi)	(rì ŋu)	(làm pa)	tʲu
	0	2	4	total = 6
*	ṭi	(ḷí ri)	(ŋù lam)	(pà tʲu)
		1	3	5	total = 9

Relative alignment violations

	Parse Syllable	All–Ft Left	All–Ft Right
(10)00000	**!***		*****
☞ (10)(20)(20)0	*	**,****	*,***,*****
(10)0(20)(20)	*	***,****!*	**,*****
0(10)(20)(20)	*	*,***,***!**	**,****

Categorical alignment

- gradient alignment is massively nonlocal
  - also not finite state
  - Eisner 2000, Bíró 2003, Riggle 2004, Heinz 2009
- “alignment” has been used inconsistently
  - mostly categorically, but gradiently for feet and some other phenomena
  - Zoll 1996, McCarthy 2003
- all OT constraints should be categorical
  - Eisner 1997, McCarthy 2003
- produces a more accurate stress typology
  - Kager 2001, 2005

Rhythmic wellformedness

- categorical alignment of one foot
  - at the left or right edge
  - Kager 2001, 2005
- generate location of other feet from local properties of **lapse** and **clash**
- lapses are preferred in certain positions
  - adjacent to main stress
  - at right edge of domain
- produces fewer patterns than gradient alignment
  - perhaps too few, but assumptions can be modified
  - Buckley 2009

Kager's constraints on lapses

- *LAPSE
  - No two adjacent unstressed syllables.
  - *prefers right-aligned trochees*
- LAPSE-AT-PEAK
  - Lapse must be adjacent to the peak.
  - *penalizes lapses away from primary stress*
- LAPSE-AT-END
  - Lapse must be adjacent to the right edge.
  - *penalizes initial and medial lapses*

Trochaic typology: End Rule L

	*Lapse	At End	At Peak	Align L	Align R
a. (10)(20)(20)0	*		*		*
b. (10)(20)0(20)	*	*	*!		
c. (10)0(20)(20)	*	*			
d. 0(10)(20)(20)				*	

Trochaic typology: End Rule R

	*Lapse	At End	At Peak	Align L	Align R
a. 0(20)(20)(10)				*	
b. (20)0(20)(10)	*	*	*!		
c. (20)(20)0(10)	*	*			
d. (20)(20)(10)0	*				*

The initial dactyl effect

- all feet align rightward except the first
  - apparent dactylic foot (σ́σσ) at left edge
  - actually (σ́σ)σ with an unfooted syllable
- English has this pattern in some placenames
  - *(Wìnne)pe(sáukee)*
  - *(Kàla)ma(zóo)*
- Indonesian has it in certain loanwords
  - *(kònti)nu(ási)* ‘continuation’
  - *(àme)ri(kàni)(sási)* ‘Americanization’
  - *(dèmi)li(tàri)(sási)* ‘demilitarization’
- how do we control position of medial foot?

Initial dactyls and ALL-FT-R

- can't prove gradient ALL-FT-R without a medial foot
  - (20)0(10) can be generated by two categorical constraints
- English has just (20)0(10) in *(Wìnne)pe(sáukee)*
  - most long words have cyclicity, which overrides this pattern
- Indonesian has medial foot in *(àme)ri(kàni)(sási)*
  - but can be explained by cyclicity in Dutch, with listing of secondary stress location (Kager 2001)
    - *Àmerik**á**n : Àmerik**à**nisátie*
  - again, most long words in Indonesian have their own cyclicity (Cohn & McCarthy 1998)
  - not strong evidence for gradient alignment, although fully consistent with that analysis (Gordon 2002, Hyde 2002)

Initial dactyls and stress level

- gradient alignment is indifferent to stress level
  - can generate (10)0(20)(20) and (20)0(20)(10)
  - categorical ALIGN-FT-L >> gradient ALL-FT-R
  - McCarthy & Prince 1993
- Kager predicts this lapse position only if first foot is the primary stress
  - (10)0(20)(20) by LAPSE-AT-PEAK
- for Kager, the alternative is impossible
  - LAPSE-AT-PEAK prefers (20)(20)0(10)
  - LAPSE-AT-END prefers (20)(20)(10)0
  - nothing in his system favors (20)0(20)(10)
  - same is true for mirror-image (10)(20)0(20)

Spanish secondary stress

- Spanish has (20)0(20)(10)
  - a problem for Kager's metrical constraints
  - Hyde & McCord 2012
- mainly cited with a couple of suffixes
  - *(gràma)ti(càli)(dád)* 'grammaticality'
  - *(màte)ma(tìci)(dád)* 'mathematicity'
  - *(nàtu)ra(lìza)(ción)* 'naturalization'
  - *(ràcio)na(lìza)(ción)* 'rationalization'
  - *(bùro)cra(tìza)(ción)* 'bureaucratization'
- but also attested in loanwords
  - *(Tlàtla)u(quìte)(péc)* municipality in Puebla state, Mexico

Cyclicity

- can cyclicity account for the medial stress?
  - by ordering (Kiparsky 2000, Bermúdez-Otero 2011)
  - or by output-output faithfulness (Benua 1997)
- in some cases, yes
  - *(gràma)ti(c**à**li)(dád)* ‘grammaticality’
    < *(gràma)ti(c**á**l)* ‘grammatical’
- in others, no
  - *(màte)m**a**(tìci)(dád)* ‘mathematicity’
    < *(màte)(m**á**ti)co* ‘mathematical’
- and in loanwords, no
  - these have no internal structure in Spanish

Spanish cyclic mismatches

- even considering various related words, the cycle is not a plausible explanation
  - *(bùro)cra(tì**z**a)(ción)* ‘bureaucratization’
    - < *bu(r**ó**cra)ta* ‘bureaucrat’
    - < *(bùro)(cr**á**ti)co* ‘bureaucratic’
    - < *(bùro)(cr**à**ti)(zár)* ‘bureaucratize’
  - *(nàtu)ra(l**ì**za)(ción)* ‘naturalization’
    - < *(nàtu)(r**á**l)* ‘natural’
    - < *(nàtu)(ràli)(z**á**r)* ‘naturalize’
    - < *(nàtu)ra(l**í**za)* ‘he/she naturalizes’
  - the last case, a finite form of the verb, requires odd assumptions about the base of cyclicity or output-output faithfulness

Is gradient alignment necessary?

- Hyde & McCord 2012 claim that these data show the need for gradient directional alignment
- but a more complete account of Spanish stress makes such gradience unnecessary
- in particular, there are actually two patterns of secondary stress
  - Hyde & McCord mention the second pattern but do not analyze it
- the secondary stresses interact with phrasal structure
- we can solve the apparent alignment issue by taking into account the phrasal facts

Right-aligning secondary stress

- careful descriptions report two variants
  - initial dactyl (20)0(20)(10)
  - right-aligned 0(20)(20)(10)
  - Harris 1983, Roca 1986, Hualde 2005, 2007, 2010
- Harris (1983) says the right-aligned pattern:
  - has a rhetorical tinge
  - often heard in newscasting, in lecturing, and in highlighted chunks of otherwise informal speech
- Hualde (2007):
  - very frequent in news broadcasts
  - also found in other types of public discourse, such as lectures and speeches
  - conveys a certain “didactic” tone

The “rhetorical” pattern

- feet are fully aligned to the right, 0(20)(20)(10)
  - *ge(nèra)(tívo)* ‘generative’
  - *gra(màti)(càli)(dád)* ‘grammaticality’
  - *tra(dìcio)(nál)* ‘traditional’
  - *en(càmi)(náda)* ‘directed, aimed’
- some related words (Roca 1986)
  - *(Cònstan)(tíno)* ‘Constantine’
  - *Cons(tànti)(nópla)* ‘Constantinople’
  - *(cònstan)(tìno)(pléño)* ‘Constantinople guy’
  - *cons(tànti)(nòple)(ár)* ‘to hang out in C’
  - *(cònstan)(tìno)(pòli)(táno)* ‘Constantinopolitan’
  - *cons(tànti)(nòpo)(lìza)(ción)* ‘Constantinoplization’

A two-stage analysis

- we need some account of this variation
  - for example, two possible constraint rankings
  - depending the speech style
- why not one-stage variation in ranking of ALIGN-FT-L and *LAPSE, to generate both options?
  - still using gradient alignment, ALL-FT-R
- because we also need to take into account footing at the phrasal level
  - a function word grouped with the following lexical word
- analysis:
  - the right-aligned pattern is basic, and assigned lexically
  - the initial dactyl is (sometimes) later derived from it

Phrasal prosody

- an initial dactyl is often found within a phrase (Navarro Tomás 1977)
  - *(sòbre) la (frénte)* ‘on the front’
  - *(pòr la) ma(ñána)* ‘in the morning’
  - *(èn la) cor(riénte)* ‘in the current’
  - cf. *(gène)ra(tívo)*
- though right-alignment is also attested, in the same “didactic” style as word-internally (Hualde 2007)
  - *la (pòbla)(ción)* ‘the population’
  - *en (èl e)(xílio)* ‘in exile’
  - cf. *ge(nèra)(tívo)*
- the sources mainly discuss only nouns
  - verbs and proclitics are presumably similar

Lexical versus phrasal footing

- lexically, right-aligned feet are created
  - what happens phrasally depends on the style of speech
- in colloquial style, a left-aligned foot overrides faithfulness to the lexical foot structure
  - or a rule inserting a foot depends on speech style
- left-aligned trochee relative to a prosodic phrase that has been constructed over an XP
  - examples include prepositions and articles
  - exact outcome depends on style and interaction of lexical footing with new syllabic material
- but in rhetorical style, faithfulness wins
  - higher faithfulness must hold for the main stress, since it is not shifted phrasally in short words

Adding a new foot

- when sufficient material is added before the noun, a new foot can be created faithfully
  - it need not affect the structure that is already present
- aligns rightward if *LAPSE >> ALIGN-FT-L

  = rhetorical style
  - lexical e(xílio)
  - phrasal en (èl e)(xílio)
- aligns leftward if ALIGN-FT-L >> *LAPSE

  = colloquial style
  - lexical ma(ñána)
  - phrasal (pòr la) ma(ñána)

Phrasal ranking

- a left-aligned foot can be added nondestructively where a new word precedes an unfooted syllable
  - *Cons(tànti)(nópla)* ‘Constantinople’
  - *(èn Cons)(tànti)(nópla)* ‘in Constantinople’
- but there is still variation attested (Roca 1986)
  - *(Cònstan)(tíno)* ‘Constantine’
  - *por (Cònstan)(tíno)* ‘for Constantine’
  - *(pòr Cons)tan(tíno)* ‘for Constantine’
- rhetorical: *LAPSE, FT-FAITH >> ALIGN-FT-L
  - *por (Cònstan)(tíno)* ‘for Constantine’
- colloquial: ALIGN-FT-L >> *LAPSE, FT-FAITH
  - *(pòr Cons)tan(tíno)* ‘for Constantine’

Variation in single words

- if lexical word is initial in the prosodic word
  - as when in isolation or a bare NP
- variation in whether the lexical feet are fully retained
  - lexical 0(20)(20)(10)
  - phrasal (20)0(20)(10) ~ 0(20)(20)(10)
- example of “grammaticality”
  - lexical gra(màti)(càli)(dád)
    - selected by *LAPSE >> ALIGN-FT-L
  - rhetorical at phrasal level: gra(màti)(càli)(dád)
    - faithful to lexical output
  - colloquial at phrasal level: (gràma)ti(càli)(dád)
    - from imposition of new left-aligned foot
    - ALIGN-FT-L >> *LAPSE, FT-FAITH

Against a purely phrasal analysis

- why not do **all** secondary stresses at the phrasal level?
  - this is essentially what Roca and Hualde assume
  - in OT, we would still need gradient alignment
- stress systems assign feet iteratively by default, so it's actually unmarked to have iterative lexical footing
  - and in some theories, that's the only option
  - constraint PARSE-SYL expresses this preference
- since a foot can cross a word boundary, we clearly need phrasal footing
  - but it never changes more than the leftmost foot
- simplest (and most unmarked) approach is two steps
  - iterative footing within the word
  - just one extra foot in the (potentially) larger phrase

Using all parts of the model

- Hyde & McCord are partly correct
  - word-internal faithfulness or cyclicity will not generate all the Spanish data if also assume categorical alignment
- the answer nonetheless lies in a faithfulness that they do not consider
  - that between the lexical and phrasal components, as assumed here
  - or potentially between a word and its realization in a different output context
- any complete theory requires some account of the difference between lexical and phrasal patterns
  - this analysis simply makes use of that architecture

Empirical questions

- the literature has often been vague or conflicting about the status of secondary stresses in Spanish
- Hualde (2010) on secondary stresses:
  - not common in most conversational speech (and typically won't be found in read experimental materials), but can reach a high frequency in certain styles (emphatic or "didactic")
  - lack of explicitness of phonologists regarding the relative abstract character of the stress patterns that they have described
- I assume that feet may be present that are not always (or not saliently) realized phonetically

Non-varying grammars

- could there be grammars of Spanish in which the "rhetorical" stress pattern is completely absent?
- this would mean that for such speakers, phrasal left-alignment is obligatory
  - i.e., ALIGN-FT-L >> *LAPSE, FT-FAITH without variation
- in any model that includes both lexical and phrasal effects, this derivation will be available to the learner
- if the theory also permits gradient directionality, then
  - *(gràma)ti(càli)(dád)* has two possible derivations, and
  - the power of gradient alignment is redundant and excessive

Typological predictions

- taking into account phrasal alignment does change Kager's typological predictions
  - he relies on a single step of metrical evaluation for his claims
- but there is already evidence that these predictions are too restrictive and cannot be sustained
  - e.g. left-edge extrametricality (Buckley 2009)
- I propose that we exploit the already necessary power of the lexical / phrasal distinction
  - independently motivated by decades of research
- the metrical system itself remains more restricted
  - predict no pattern like this at the Stem level
  - and without needing the computational and formal complexity of gradient alignment

Thank you!

References

- Benua, Laura. 1997. *Transderivational identity: phonological relations between words*. PhD dissertation, University of Massachusetts, Amherst. ROA-259.
- Bermúdez-Otero, Ricardo. 2011. Cyclicity. *The Blackwell companion to phonology*, vol. 4, 2019-2048.
- Bíró, Tamás. 2003. Quadratic alignment constraints and finite state Optimality Theory. *Proceedings of the Workshop on Finite-State Methods in Natural Language Processing (FSMNLP)*, 10th Conference of the European Chapter of the ACL, Budapest, 119–126.
- Buckley, Eugene. 2009. Locality in metrical typology. *Phonology* 26, 389-435.
- Cohn, Abigail & John McCarthy. 1998. Alignment and parallelism in Indonesian phonology. *Working Papers of the Cornell Phonetics Laboratory* 12: 53-137.
- Eisner, Jason. 1997. What constraints should OT allow? Paper presented at the 71st Annual Meeting of the Linguistic Society of America, Chicago. ROA-204.

References

- Eisner, Jason. 2000. Directional constraint evaluation in Optimality Theory. *COLING 2000: Proceedings of the 18th Conference on Computational Linguistics, Saarbrücken*, vol. 1, 257-263. San Francisico: Morgan Kaufmann.
- Gordon, Matthew. 2002. A factorial typology of quantity-insensitive stress. *NLLT* 20, 491-552.
- Harris, James. 1983. *Syllable structure and stress in Spanish: a nonlinear analysis*. Linguistic Inquiry Monograph 8. MIT Press, Cambridge, Massachusetts.
- Heinz, Jeffrey. 2009. On the role of locality in learning stress patterns. *Phonology* 26. 303–351.
- Hualde, José I. 2005. *The sounds of Spanish*. Cambridge University Press.
- Hualde, José I. 2007. Stress removal and stress addition in Spanish. *Journal of Portuguese Linguistics* 5 (2)/6(1), 59-89.
- Hualde, José I. 2010. Secondary Stress and Stress Clash in Spanish. *Selected Proceedings of the 4th Conference on Laboratory Approaches to Spanish Phonology*, ed. Marta Ortega-Llebaria, 11-19. Somerville, MA: Cascadilla Proceedings Project.

References

- Hyde, Brett. 2002. A restrictive theory of metrical stress. *Phonology* 19, 313-339.
- Hyde, Brett & Bethany McCord. 2012. The inadequacy of a faithfulness-based approach to Spanish secondary stress. Ms., Washington University. TROA-10.
- Kager, René. 2001. Rhythmic directionality by positional licensing. Handout from the Fifth Holland Institute of Linguistics Phonology Conference, University of Potsdam. ROA-514.
- Kager, René. 2005. Rhythmic licensing theory: an extended typology. *Proceedings of the 3rd Seoul International Conference on Phonology*, 5-31.
- Kiparsky, Paul. 2000. Opacity and cyclicity. *The Linguistic Review* 17, 351-367.
- McCarthy, John. 2003. OT constraints are categorical. *Phonology* 20, 75-138.
- McCarthy, John & Alan Prince. 1993. Generalized alignment. *Yearbook of Morphology 1993*, ed. Geert Booij and Jaap van Marle, 79-153. Kluwer, Dordrecht.

References

- Navarro Tomás, Tomás. 1977. *Manual de pronunciación española*. 19th ed. Consejo Superior de Investigaciones Científicas, Madrid.
- Riggle, Jason. 2004. *Generation, recognition, and learning in finite state Optimality Theory*. PhD dissertation, University of California, Los Angeles.
- Roca, Iggy. 1986. Secondary stress and metrical rhythm. *Phonology Yearbook* 3, 341-370.
- Zoll, Cheryl. 1996. *Parsing below the segment in a constraint-based framework*. PhD dissertation, University of California, Berkeley. Published 1998, Stanford: CSLI.