Brazilian Portuguese coda allophony and vowel epenthesis are driven by melodic complexity in obstruents

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Introduction This talk argues that theories which make good use of representations have an advantage over theories which dispense with them, in that they can explain certain phonological phenomena which sparse representations can only describe.

Data In Brazilian Portuguese as spoken in the city of Rio de Janeiro (henceforth Carioca) the distribution of coda consonants is severely restricted: only /r/, /l/, and /s/ can surface in coda position. This distributional tendency is reinforced by a process of [i]-epenthesis triggered by obstruents–including the fricatives /v/ and /f/ but not the sibilant /s/–that would otherwise be realized as codas, which are instead realized as the onset of open syllables (1):

(1) o[p].cional   →   o.[pi].cio.nal   'optional'

a[d].vogado   →   a.[ʤi].vo.ga.do   'lawyer'

pa[c].to   →   pa.[ki].to   'pact'

a[f].ta   →   a.[fi].ta   'cold sore'

Interestingly, even when phonetically absent, epenthetic [i] participates in phonological processes, as noted by Collischonn & Wetzels (2016: 93). The epenthetic vowel blocks assimilatory voicing in words such as *observa* 'observe-3sg.pr.ind.', which can be realized as *o*[bis]*erva* or *o*[bs]*erva*, but never *o*[p]*serva*, where assimilatory devoicing would be expected otherwise. Further, the coronal stop in *étnico* is subject to palatalization and realized as *é*[ʧ]*nico*, even when the epenthetic vowel does not surface.

In contrast to the obstruents, but like /s/, the sonorants /r l/ do not trigger [i]-epenthesis and are permissible codas. However, the sibilant and sonorants cannot be said to form a natural class, exhibiting different behavior in a pattern of allomorphy of the prefix *in-,* which surfaces as [ĩ] when preceding obstruents and /s/, but as [i] when preceding sonorants and nasals (Wetzels 1997: 213). The sibilant, then, is capricious in its patterning, sharing behaviors with both obstruents and sonorants.

A further striking aspect of these licit sonorant and sibilant codas is that they cannot appear as codas without consequences, and are subject to positional allophony (2):

(2) ma[ɾ]es   'seas'   →   ma[x]   'sea'

brasi[l]eiro   'Brazilian'   →   brasi[w]   'Brazil'

lu[z]is   'lights'   →   lu[jʃ]   'light'

The distribution of codas and their pattern of allophony in Carioca presents two challenges for any theory of phonology: 1) Explain why only obstruents are subject to a phonological process–epenthesis– which ensures their position as syllabic onsets while /ɾ l s/ do not. 2) Bring out any generalizations present in the alternations in (2). A unified account of the alternations is not immediately obvious, given the disparate nature of the underlying segments themselves and of their outcomes.

Analysis This analysis proposes a representational account for the pattern of coda distribution and allophony that reveals a surprising connection: both effects are responses to the interaction between licensing scales (Cyran 2010) and melodic complexity (Harris 1990; Cyran 2010). In Element Theory (ET) (Kaye et al. 1985; Harris & Lindsey1993, 1995; Backley 2011), segments can be more or less complex depending on the amount of melodic material they contain. As such, the phonological patterning of sibilant obstruents, non-sibilant obstruents, and sonorants shows that they are not alike in terms of the amount of melodic content of each class. Obstruents that cannot be codas have more melodic material in their representations than permitted codas.

Complexity is shown in this analysis to have a direct effect on the lateral relations between segments that build higher-order prosodic structure (Scheer 2004, 2012). The more complex a segment is in melodic terms, the more demanding it is of lateral relations. That is, a melodically complex object such as /p/ demands lateral relationships in order to be associated to the prosodic structure. The required lateral relationships are provided by an empty skeletal position being filled by [i]-epenthesis, which endows it

with the power to license a preceding obstruent. Epenthetic [i] is not associated to its skeletal position, but is phonologically active, triggering palatalization in appropriate targets and providing the necessary lateral relationships for obstruents. This accounts for the restricted set of possible codas relative to onsets: /ɾ l s/ are melodically more simple than obstruents and so demand less from the prosodic structure, and can surface without contracting any lateral relationship.

Sonorants and /s/ must nevertheless satisfy a licensing restriction, shedding melodic material in order to appear as codas. This is the cause of the pattern of allophony in (2). The phonetically disparate outcomes in (2) can be given a unified account within ET. Here, the melodic content of segments is determines by phonological behavior (Kaye 2005). To wit, the palatalizing nature of /s/ (as in *lu*[iʃ]) suggests that it contains the element |I|, as well as the noise element |H|. This Element is also present in /r/, since /r/ is in an allophonic relationship with the noisy fricative [x]. Similarly, /l/ contains the Element |U|, which accounts for its realization as labio-velar [w] when in coda position. Following Backley (2011), all sonorants also contain |A|, an Element missing from /s/. The presence or absence of |A| accounts for the natural class behavior of sonorants and the nonsonorancy of /s/.

When realized in codas, prosodic requirements strip away one element, since only a single element can be realized in that position. An examination of the facts of allophony in Carioca shows that in the case of /s/, |H| is stripped away leaving only a palatal object attached to a consonantal position, resulting in [ʃ]. In turn, |A| is stripped from sonorants, resulting in the pattern of allophony in (2): |H| in the case of [x]; |U| in the case of [w]. The result is an account that shows how both [i]-epenthesis and coda allophony emerge from well-formedness requirements imposed by the prosodic structure; two phenomena which do not otherwise seem related.

Consequences This representational account has advantages over theories which do not have a representational wing since it provides an explanation for the observed distributions and alternations. OT and other constraint-based theories are able to describe the empirical situation by making an appropriate ranking of NoCoda and faithfulness constraints, resulting in a repair by epenthesis. In turn, that sonorants and sibilants constitute possible codas can be accounted for by the constraints NoCoda(Son) and NoCoda(Sib) being ranked higher than NoCoda(Glide) and the appropriate faithfulness constraints.

An additional challenge is to make sense of the disparate outcomes of coda allophony which OT can provide a unified account of by a similar ranking of NoCoda constraints and faithfulness constraints that preserve manner realizations for liquids, and delete nasals. Such solutions, however, merely recapitulate the empirical situation–they have nothing to say about why things are as they are. Worse, they make no predictions about what is possible and what is impossible in language, since anything can be described. A different constraint ordering could generate a language where obstruents are possible codas but sonorants are not, an unattested pattern. The representational account provided here makes firm predictions about what is possible and what is not.

References

Backley, Phillip. 2011. An introduction to Element Theory. Edinburgh: Edinburgh University Press.

Collischonn, Gisela & W. Leo Wetzels. 2016. Syllable structure. In W. Leo Wetzels, Sergio Menuzzi & João Costa (eds.), The handbook of Portuguese linguistics, 86–106. Oxford: Wiley-Blackwell.

Cyran, Eugeniusz. 2010. Complexity scales and licensing in phonology. Berlin, New York: De Gruyter Mouton.

Kaye, Jonathan, Jean Lowenstamm & Jean-Roger Vergnaud. 1985. The internal structure of phonological elements: A theory of charm and government. Phonology Yearbook 2. 305–328.

Harris, John & Geoff Lindsey. 1995. The elements of phonological representation. In Jacques Durand & Francis Katamba (eds.), Frontiers of phonology, 34–79. London & New York: Routledge.

Scheer, Tobias. 2004. A lateral theory of phonology: What is CVCV, and what should it be? Berlin & New York: De Gruyter Mouton.

Scheer, Tobias. 2012. Direct interface and one-channel translation: A nondiacritic theory of the morphosyntax-phonology interface. Berlin & New York: De Gruyter Mouton.

Wetzels, W. Leo. 1997. The lexical representation of nasality in Brazilian Portuguese. Probus 9(2). 203–232.