



The sonority scale: categorical or gradient?
Clàudia Pons (claudia.pons@uab.cat)
 Dep. de Filologia Catalana, Centre de Lingüística Teòrica
 Universitat Autònoma de Barcelona

1. State of the affairs
 The sonority scale has proven to be a decisive parameter to account for syntagmatic relations between segments, such as their organization within the syllable and across syllables. But, whereas there is tacit agreement about the relative sonority of some classes of segments (cf. **vowels > glides > liquids > nasals > obstruents**, after Clements 1990), there is a pervasive controversy about the relative sonority of the specific sounds which belong to these classes.

2. The controversy
2.1 This controversy mainly concerns the pairs **laterals vs. rhotics, fricatives vs. stops, voiced obstruents vs. voiceless obstruents**, and also **stops vs. affricates vs. fricatives**, and **glottals**. Indeed, the relative sonority of each of these sounds varies from one study to another, basically depending on language-specific patterns. This procedure often derives on **circular** argumentations, since particular versions of the sonority scale are invoked to account for specific language patterns, and these specific language patterns are added to justify the selection of these particular versions of the sonority scale (see Ohala 1990 for discussion on this direction).

2.2 Another object of traditional debate is whether it is a licit resort or not to appeal to sonority confluences and reversals to justify differences across languages. Those who disagree with this view argue that the sonority scale is universal, categorical (composed by discrete units) and impermutable, and that discrepancies across languages must exclusively be derived from constraint reranking.

3. Goal
 The purpose of this paper is to discuss whether it is a licit resort or not to appeal to sonority confluences and reversals to justify differences across languages and, provided that it is, which sonority confluences and reversals should be possible and which should not. In other words, we will attempt to determine to which extend the organization of sounds in the sonority scale should be **categorical**, as assumed in most studies, **gradient**, or **both**, categorical for the organization of some sounds, and gradient, for that of others. On the one hand, we are going to investigate how these language-specific details could be formalized and be accessible to the mechanism of evaluation of candidates within Optimality Theory.

4. Discussion. The sonority scale: categorical or gradient?
 There are different arguments which advocate a *flexible* and *gradient* approach to the sonority scale and which make evident that any attempt to obtain a categorical and universal sonority hierarchy indefinitely fails into arbitrariness:

- 4.1.** The specific phonetic features of each sound and each class of sounds can fluctuate from one language to another, although the given label coincides.
- 4.2** The relative sonority of each sound can slightly vary depending on the structural position that they occupy: the study of Parker (2002), for instance, illustrates that the relative sonority of sounds varies depending on the syllabic position that they occupy.
- 4.3.** The relative sonority of sounds can diverge depending on the phonetic context: Larson (1993) proposes a model in which sonority is considered not absolute, but the result of a mutual (bidirectional) excitation between adjacent segments.
- 4.4** The relative sonority of sounds can oscillate depending on the physiological properties of the speakers: in Parker (2002), slight sound sonority differences are detected in males and females.
- 4.5** Languages do not share the same segment inventories, so that the relative sonority distances between sounds across languages may be different.
- 4.6** Languages can make an equal or a different phonological use of the same physical properties of speech sounds (see Morén 2007).

5. Phonetically grounded sonority scale (Parker 2002: 236)
low vowels > mid vowels > high vowels > [ɹ] > glides > laterals & ɹ > flaps > trills > nasals > /h/ > voiced fricatives > voiced stops > voiceless fricatives > voiceless stops & affricates. ** «Most languages in fact conflate the scale in the sense that they do not systematically exploit all the intervals. This is because they either lack the respective phoneme(s) entirely, or else they collapse together two or more adjacent ranks and thus do not distinguish them in terms of their phonological processes».

7. Proposal
 1. Each specific sound covers a range of values in the sonority scale, and this range can be shared with that of another sound.
 2. In these cases, a different interpretation of the relative sonority of the sounds across languages (i.e. a different sonority hierarchy) is allowed and expected.
 3. The consequence of this is that the hierarchy of some sounds is more fixed than that of others in the sonority scale. Cf. [l], [r]

Language X: [r] > [l] > [ɹ] Language Y: [l] > [r] > [ɹ]

4. This account, on the other hand, allows to make typological predictions about the cross-linguistic frequency of each hierarchy.
Cross-linguistic frequency of each hierarchy
 [r] > [l] > [ɹ] (most likely) [l] > [r] > [ɹ] (less likely) [r] > [ɹ] > [l] (less likely) [l] > [ɹ] > [r] (less likely) [r] > [ɹ] > [l] (less likely) [l] > [ɹ] > [r] (least likely)

6. Illustration: liquids
 a. vowels > glides > **liquids** > nasals > obstruents (Clements 1990)
 b. liquids: **rhotics** > **laterals** (Jespersen 1904, Alderete 1995, Boersma 1998, Gouskova 2005)

1. Hungarian manner assimilation
 var+lak [varlak] 'I wait for you'
 bal+ra [barra] 'to the left'
 (see Vago 1980, Rice 2005)

2. Italian manner assimilation
 or(u)lu → [orlo] 'boundary'
 dol+ rà [dorra] '(s/he) will feel pain'
 (Vennemann 1988)

c. liquids: **flaps, laterals > trills**
1. Phonetic results in Parker (2002)
 «Specifically, /l/ patterns as more sonorous than the flap /r/ 10 times, as equivalent 7 times, and as less sonorous in 3 cases. The flap /r/ in turn outranks the trill 9 times and ties with it only once. There is not a single instance in which the mean value for /r/ is significantly more "sonorous" than that of /l/». (Parker 2002)

2. Distribution of rhotics in Romance

	Spanish	Portuguese	Catalan	
a) word-initial position → trill	[rjézɣo]	[rĩ[ku]	[rísk]	'risk'
b) onset position, after a C → trill	[onrádo]	[unráðu]	[unrát]	'honest'
c) second position of an onset → flap	[frío]	[fríu]	[frét]	'cold'
d) coda position → flap ~ trill	[már/r]	[már/r]	[már/r]	'sea'

(depending on the variety; free variation)
 0 Obstruents >> 1 Nasals >> 2 Laterals >> 3 Glides >> 4 Vowels (Bonet & Mascaró 1997)

3. Manner assimilation patterns in a variety of languages
3.1 Balearic Catalan assimilation
 un llum /un#lum/ [u.ɫ.úm] 'one light'
 un riu /un#riw/ [u.n.ríw] 'one river'
 (Pons 2004, 2005)

3.2 Selayarese assimilation
 roŋgan-roŋgan 'rather loose' (cf. roŋgaŋ 'loose')
 lamuŋ lamuŋ 'plantation' (cf. lamuŋ 'grow')
 (Rice 2005)

3.3 Toba Batak assimilation
 /marlaŋe/ _ [maɫáŋe] 'to swim'
 /tarsungul##rohakku/ _ [tarsungulrohakku] 'my spirit awoke'
 (see Shin 1997)

d. Liquids: **flaps > laterals** OR **laterals > flaps?**

1. Phonetic results in Parker (2002) _ laterals > flaps «Specifically, /l/ patterns as more sonorous than the flap /r/ 10 times, as equivalent 7 times, and as less sonorous in 3 cases». (Parker 2002)

2. Diachronic & synchronic processes in Romance _ flaps > laterals
 a) Word-initial flaps are proscribed in most Romance varieties whereas word-initial laterals are not.
 b) Onset initial flaps preceded by a heterosyllabic consonant are generally not found, while laterals are.
 c) The evolution of Latin Cl clusters to Cr in some Romance varieties (Italian, Sardinian, Alguerese Catalan, Portuguese), as an onset sonority maximization strategy.
 d) The process of rhotacism of the intervocalic /l/ and /d/ in Alguerese Catalan (cf. *servidora* [salviróra] 'servant fem.'; *vol* [vól] '(s)he wants' ~ *volia* [vuríva] '(s)he wanted'), as a strategy to minimize the sonority slope between vowels, along the lines of Uffmann (2005).

