Comment dériver des ” classes majeures ” de la définition des vocoïdes,

et comment mesurer la distance entre elles (une ” échelle de sonorité ”) ?

Phonologie du Français Contemporain

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Abstract

In my talk I shall illustrate and discuss a particular non-circular way to count distances with respect to *sonority* (or *strength*), without introducing any further postulates on feature geometry or the like (cf. Clements & Hume 1995), between different major classes to be introduced (cf.Table 3.4 of the hand-out).

These different major classes are defined using exclusively the formal definition of the feature vocoid:

[vocoid] $=_{DEF}$ [sonorant, –stop, –lateral]

Structure de l'exposé

1) Classes Naturelles (CN)
2) Définition de la vocoïde
3) Classes Majeures (CM)
4) Modéliser les CM dans un plan 2D (métaphorique)
5) Mesurer des distances entre les CM

1) Classes Naturelles (CN)

One of the central issues regarding the Feature is: how can *Major Classes* be defined in a coherent and linguistically significant way?

Behind this question is the notion of ***Natural Classes*** as having both a *formal* sense (a conjunction of features) and a *real* sense (classes of segments that behave in parallel fashion in language change, acquisition, perception and production), and the goal is that the two senses should coalesce (I follow Basbøll 2005: 109-127 here).

1) CN: sens formel vs. sens réel

(i) an NC in the real sense should be specifiable by a conjunction of distinctive features;

(ii) a relatively important NC in the real sense should be specifiable by a relatively simple conjunction of distinctive features;

(iii) the more closely related two NCs are in the real sense, the fewer feature values should differentiate them;

(iv) the distinctive features should characterize the 'Natural phonological processes/rules' in an insightful way.

(from Basbøll 2005: 112)

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2) Définition de la vocoïde

HB: [vocoid] $=_{DEF}$ [sonorant, –stop, –lateral]

The features used here are all strictly binary. The marked (phonetically homogeneous) member of the opposition has no '+' (the '+' may be said to be implied): **Vocoids constitute a phonetically homogeneous class**, their opposite member (contoids according to Pike's terminology) do not, since they include plosives and fricatives as well as sonorant laterals, for example.

Sonorants are defined acoustically (following LADEFOGED (1971: 58): "a comparatively large amount of acoustic energy within a clearly defined formant structure", cf. p. 93: "greater acoustic energy in the formants"); they are – as their complementary class (obstruents), by the way – phonetically homogeneous.

2) Déf. de la vocoïde: traits hiérarch.

1) The point of departure is the prototypical syllabic peak, which is a vocoid (a phonetic – as against ”functional” – vowel; in the latter sense, it would be *circular*!).

2) All vocoids are, necessarily, sonorant: this follows from the definition.

3) But some sonorants are not vocoids, viz. prototypical (sonorant) laterals (which are [sonorant, lateral]) and nasal consonants (which are [sonorant, stop]).

ERGO: [vocoid] IMPLIES [sonorant] (and not the other way round!)

2) Déf. de la vocoïde: traits hiérarch.

1) All sonorants are, *necessarily*, voiced:

2) this follows from the definition used here (LADEFOGED 1971: 58, 93) combined with the phonetic (articulatory and acoustic) fact that in order to get great acoustic energy in the formants (and this particularly concerns F1 due to the diminishing energy for higher formants), the vocal chords must vibrate.

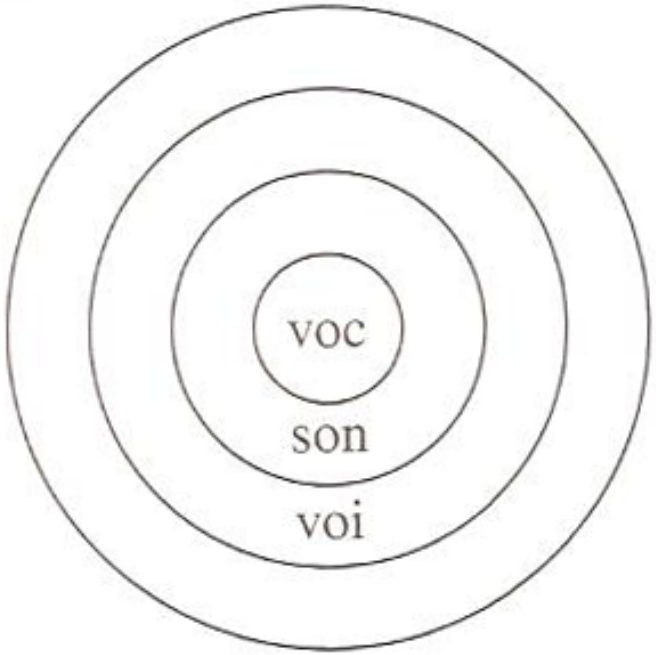
3) On the other hand, there are non-sonorant sounds (called obstruents) that are voiced.

ERGO: [sonorant] IMPLIES [voiced] (and not the other way round!)

2) Déf. de la vocoïde: traits hiérarch.

Universal logic of segment types (general phonetics)

Vocoids as the starting point (peaks universally)



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3) Classes Majeures (CM)

As said, we depart from Basbøll's definition (e.g. 2001):

[vocoid] $=_{DEF}$ [sonorant, –lateral, –stop],

which is inspired by Ladefoged's use of *cover features* (1971: 91, cf. 58, 93) drawing upon Pike's definition of *vocoids* (1943).

Departing from this definition of vocoids *only*, one can derive the five major classes in Table 3.4 by means of only the three features [vocoid], [sonorant] and [stop]. The remaining three logical possibilities (2^3 minus 5) from these three binary features are excluded by the very definition; this is a great advantage according to Occam's razor.

3) Classes Majeures (CM)

TABLE 3.4. Natural Classes defined by the features Vocoid, Sonorant and Stop. Redundant feature values are parenthesized. (From Basbøll 2001*c*: 89.)

	V	L	N	F	P	*	*	*
Vocoid	+	–	(–)	(–)	(–)	+	+	+
Sonorant	(+)	+	+	–	–	+	–	–
Stop	(–)	–	+	–	+	+	–	+

3) Classes Majeures (CM)

Notice that the classes (segment types) L and N only encompass sonorant members (even though voiceless nasals and laterals occur) which are those occupying a well defined position in sonority hierarchies.

The category ”liquids” is particularly ill defined in this respect, cf. the last examples on the second page of the hand-out demonstrating that l-sounds and r-sounds can be widely different with respect to ”sonority”.

3) CM: Liquids wrt sonority

(1) 'V': r-approximants, the final element of 'r-diphthongs';

(2) 'L': voiced lateral approximants;

(3) 'N': sonorant trills;

(4) 'F': lateral fricatives, r-fricatives;

(5) 'P': taps and flaps (presupposing these sounds are not considered sonorants).

(from Basbøll 2005: 125)

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4) Modélisation

Figure 3.3 illustrates that the three features [vocoid], [sonorant] and [stop] define five possible areas for major class segment types

(according to the definition of [vocoid], all vocoids are, necessarily, sonorant, and, likewise, a vocoid cannot be [stop]).

V, L, N, F and P are each placed in their respective area.

The upper left corner is (i.e. must be) empty (a Vocoid cannot be [stop], by definition)

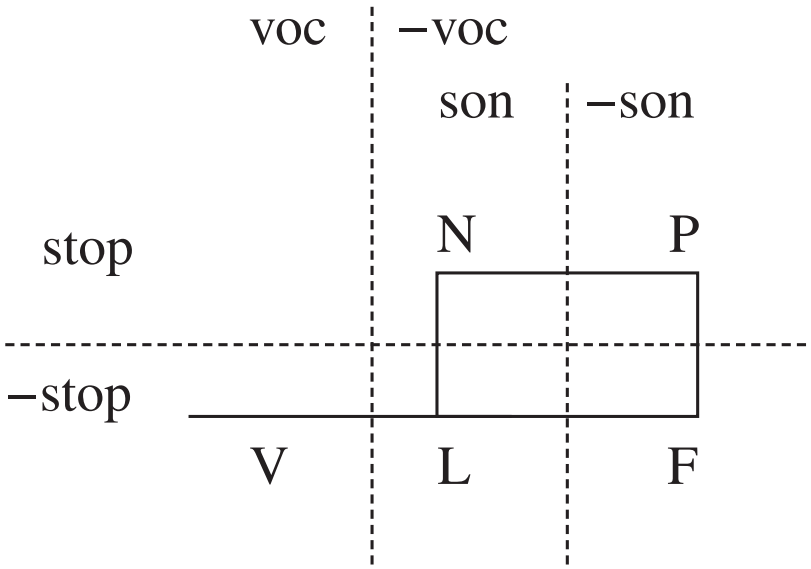
4) Modélisation

Sonority-hierarchical features are Vocoid and Sonorant as used here (the only further sonority-hierarchical features are Voiced and Non-Spread Glottis, not part of this talk).

Sonority-hierarchical features are horizontal, other features are not (here only: [stop]) (I shall not speculate about the possibility of multidimensional spaces!)

The modelisation departs from the Vocoid in the left bottom corner.

4) Modélisation



URE 3.3. Figure depicting the five Natural Classes defined by the three binary featu
oid, Sonorant and Stop. Vocoids occur in the left column, non-vocoid sonorants in t
mn in the middle, and obstruents in the right column. Stops occur in the upper row a
-stop segments in the lower row. (From Basbøll 2001*c*: 91.)

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5) Mesurer distances

Now, with respect to the Sonority Syllable Model (e.g. Basbøll 2005: 180-187), [stop] is different from the two other features in that it cannot enter into any unidirectional implication chain with [vocoid] in the center ([vocoid] implies [sonorant] implies [voiced]) since it is neither true, e.g., that [sonorant] segments are necessarily [stop] (cf. sonorant laterals), nor that [stop] segments are necessarily sonorants (cf. plosives).

Les distances sont mesurées d'une manière " binaire ", c'est-à-dire qu'une CM est ou bien dans un cadre spécifique, ou bien pas, tertium non datur.

5) Mesurer distances

Thus it makes sense to count in two different ways, see Table 3.5: in ***sonority-steps strictly speaking*** (the horizontal dimension on Figure 3.3); or in ***distance from V*** (since nasals and plosives (which are [stop]) are clearly more distant from V than L or F, respectively, are, since V is, by definition, [–stop]).

The sum of these two measures of distance captures an intuitive notion of ”strength” as often used in the literature.

There are important methodological differences between what is here proposed, and proposals involving feature geometry (cf. Clements), I use less structure (Occam).

5) Mesurer distances

TABLE 3.3. Calculations of 'sonority steps and 'distance from V', and of the sum of these, for the Natural Classes depicted in Figure 3.3. (From Basbøll 2001*c*: 91.)

NC in the figure	V	L	N	F	P
Sonority-steps	0	1	1	2	2
Distance from V	0	1	2	2	3
Sum of these	0	2	3	4	5

Une perspective finale

Calculer **les distances CM** en français dans le système OLAM

(Basbøll & Lambertsen, plusieurs exposés à PFC)

pour tester des **modèles de (mor)phonotaxe** actuels

(cf. Dressler & Dziubalska-Kolaczyk 2006, projets en cours (Calderone & Celata, Ritt et al., Dziubalska et al.…):

Une perspective finale

www.lexique.org (ca. 143.000 mots)

-Les segments phonétiques français (= phonologiques dans un sens concret) sont distribués dans ces **Classes Majeures**:

-**[-son, stop]**: plosives **(P** ici**)**

-**[-son, -stop]**: fricatives **(F** ici**)**

-**[son, stop]**: nasal consonants **(N** ici**)**

-**[-voc, son, -stop]**: sonorant laterals (phonetically) **(L** ici**)**

-**[voc]**: glides and vowels (NB: difference in syllabicity, not in sonority!) **(V** ici**)**

Une perspective finale

Calculer **les distances CM** en français dans le système OLAM (Basbøll & Lambertsen PFC) pour tester des modèles de (mor)phonotaxe actuels (cf. Dressler & Dziubalska-Kolaczyk 2006, projets en cours (Calderone & Celata, Ritt et al., Dziubalska et al….)):

Distribution lexicale,

l'acquisition du langage,

réductions,

développement historique

Merci!

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