

CONSONANT ALTERNATIONS IN CATALAN*

by

Janet A. DeCesaris

Indiana University

Catalan, a Romance language spoken by approximately 8 million people, has a phonology rich in alternations. The data in this problem is taken from Standard Eastern Catalan, the dialect spoken in Barcelona and throughout northeastern Spain.

The data is divided into six sections, each of which demonstrates one phonological process, and some of the rules do interact with each other. The sections are organized so that the student can progress through the data and clearly see the rule interactions. The data described could either be presented in class or given as homework problems.

1. Obstruent Terminal Devoicing

[lóɸ]	llop	'wolf (m)'
[lóβə]	lloba	'wolf (f)'
[káɸ]	cap	'head'
[kəpét]	capet	'head (diminutive)'
[əník]	amic	'friend (m)'
[əníγə]	amiga	'friend (f)'
[séɸ]	sec	'dry (m)'
[séɸə]	seca	'dry (f)'
[frét]	fred	'cold (m)'
[fréðə]	freda	'cold (f)'
[tót]	tot	'all (m)'
[tótə]	tota	'all (f)'

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1. (Continued)

[ləč̣]	lleig	'ugly (m)'
[ləč̣ə]	lletja	'ugly (f)'
[dəspáč̣]	despatx	'office (m)'
[dəspáč̣us]	despatxos	'offices (m)'
[grís]	gris	'grey (m)'
[grízə]	grisa	'grey (f)'
[grós]	gros	'large (m)'
[grósə]	grossa	'large (f)'
[pěš]	peix	'fish (m)'
[pěšus]	peixos	'fish (pl, m)'

Rule: [-sonorant] → [-voice] / ___ #

Final obstruent devoicing in Catalan is similar to that in many other languages (e.g. Russian, German). It is somewhat different, however, because in intervocalic position, voiced stops do not occur; rather, the corresponding voiced spirants appear (like Spanish). It is clear that an intervocalic voicing rule would not correctly account for the data, because intervocalic voiced and voiceless obstruents occur (cf. *seca* [sekə], *despatxos* [dəspáč̣us], *grossa* [grósə]).

2. Affricate Alternations

There are several alternations which involve affricates:

(a) č̣ ~ č̣ (non-alternating)

[əskič̣á]	esquitxar	'to splash'
[əskič̣]	esquitx	'a water splash'
[dəspáč̣]	despatx	'office (m)'
[dəspáč̣us]	despatxos	'offices (m)'

2. (Continued)

(b) $\check{y} \sim \check{c}$

[mí \check{y} ə]	mitja	'half (f)'
[mí \check{c}]	mig	'half (m)'
[lé \check{y} ə]	lletja	'ugly (f)'
[lé \check{c}]	lleig	'ugly (m)'
[dəzi \check{c}]	desig	'desire (m)'
[dəzi \check{y} us]	desitjos	'desires (m)'

(c) $\check{z} \sim \check{c}$

[pəsə \check{z} á]	passejar	'to take a walk'
[pəsé \check{c}]	passeg	'a walk'
[rró \check{z} ə]	roja	'red (f)'
[rró \check{c}]	roig	'red (m)'
[bá \check{c}]	vaig	'I go (indicative)'
[bá \check{z} i]	vagi	'I go (subjunctive)'
[bé \check{c}]	veig	'I see (indicative)'
[bé \check{z} i]	vegi	'I see (subjunctive)'

(d) fricative alternations $z \sim s$; $\check{z} \sim \check{s}$; $s \sim z$

[bás]	vas	'drinking glass (m)'
[bázus]	basos	'drinking glasses (m)'
[grós]	gros	'large (m)'
[gró \check{s} ə]	grossa	'large (f)'
[nás]	nas	'nose (m)'
[násus]	nassos	'noses (m)'
[grís]	gris	'grey (m)'
[grí \check{z} ə]	grisa	'grey (f)'

2d. (Continued)

[péš̃]	peix	'fish (m)'
[péš̃us]	peixos	'fish (pl, m)'
[mətéš̃]	mateix	'same (m)'
[mətéš̃ə]	mateixa	'same (f)'

The non-alternating stems, as in (a), are best described in terms of an underlying /č̃/ in the absence of any alternation. The data in (b) is similar to that in section (1): the voiced consonant appears intervocally and the voiceless consonant occurs word-finally, and thus the same rule of Terminal Devoicing will account for the data.

The remaining alternation, ž̃/č̃, is unique among other obstruent alternations in Catalan. /ž̃/ is the only voiced obstruent in the language that does not alternate with its voiceless counterpart, /č̃/, in word-final position; rather, medial /ž̃/ alternates with word-final [č̃] (as seen in (2c)). To establish the directionality of the process--does ž̃→č̃ or does č̃→ž̃--it is necessary to consider all the data in (2). Since there are many examples of final [č̃] which do not alternate with medial [ž̃] (e.g. *mig/mitja* [míč̃]/[míjə]; *despatx/despatxos* [dəspáč̃]/[dəspáč̃us]), a rule converting /č̃/ into [ž̃] in medial position would have numerous exceptions and thus items would have to be lexically-marked to undergo the rule. On the other hand, a rule converting ž̃→č̃ in word-final position would be a purely phonological, exceptionless rule. If /ž̃/ → [č̃] word-finally, two changes are effected: /ž̃/ becomes both [-continuant] and [-voice], as shown in rule (2e):

(2) e. Stop-formation ž̃ → č̃

$$\begin{bmatrix} \text{-sonorant} \\ \text{-anterior} \\ \text{+voice} \end{bmatrix} \rightarrow \begin{bmatrix} \text{-continuant} \\ \text{-voice} \end{bmatrix} / _ \#$$

However, it is not necessary to incorporate [-voice] in the structural change of the stop-formation rule. As was seen in (1), Catalan has an independently motivated rule of terminal devoicing. By incorporating [-voice] into rule (2e), information would be repeated and the rule's formulation would be unnecessarily complicated. Accordingly, rule (2e) is revised as follows:

(2) f. Stop-formation ž̃ → j̃ (final version)

$$\begin{bmatrix} \text{-sonorant} \\ \text{-anterior} \\ \text{+voice} \end{bmatrix} \rightarrow \text{-continuant} / _ \#$$

Then the rule of Terminal Devoicing (i) will apply and convert /ʝ/ into [ç]. /ʝ/ is specified in rule (2f) as [-sonorant, -anterior, +voice] so as to distinguish it from /š/ and /z/, which do not become [-continuant] word-finally (cf. *peixos* [péšus] 'fish (pl)', *peix* [péš] 'fish'; *grisa* [grízə] 'grey (f)', *gris* [grís] 'grey (m)'). As formulated, the rule will also apply to voiced velar obstruents. In word-final position, however, /g/ → [k] as part of Terminal Devoicing (cf. Section 1) and thus the structural description of the rule does not need to be further restricted.

3. Strident Voicing

[grís]	gris	'grey (m)'
[grízə]	grisa	'grey (f)'
[bás]	vas	'drinking glass (m)'
[bázus]	vasos	'drinking glasses (m)'
[gós]	gos	'dog (m)'
[gósus]	gossos	'dogs (m)'
[kásə]	caça	'he/she hunts'
[kázə]	casa	'he/she marries'
[péš]	peix	'fish (m)'
[péšus]	peixos	'fish (pl, m)'
[sék]	sec	'dry (m)'
[sékə]	seca	'dry (f)'
[əmík]	amic	'friend (m)'
[əmíγə]	amiga	'friend (f)'
[lóp]	llop	'wolf (m)'
[lóbə]	lloba	'wolf (f)'
[frét]	fred	'cold (m)'
[frédə]	freda	'cold (f)'
[pəséç]	passeig	'a walk (m)'
[pəsəžá]	passejar	'to take a walk'

[grìz i néyrə]	gris i negre	'grey and black'
[gòz əmábblə]	gos amable	'friendly dog'
[gòs pətít]	gos petit	'small dog'
[bàz ənórmə]	vas enorme	'enormous drinking glass'
[lòp ənórmə]	llop enorme	'enormous wolf'
[frèt i néyrə]	fred i negre	'cold and black'
[pèž ənórmə]	peix enorme	'enormous fish'
[pèš pətít]	peix petit	'small fish'
[pèž βuník]	peix bonic	'pretty fish'
[pèž néyrə]	peix negre	'black fish'
[sèk i néyrə]	sec i negre	'dry and black'
[əmìk əmábblə]	amic amable	'nice friend'
[dəspàĵ ənórmə]	despatx enorme	'enormous office'
[dəspàč pətít]	despatx petit	'small office'
[dəspàĵ γrós]	despatx gros	'large office'
[pəsèĵ ənórmə]	passeig enorme	'enormous walk'
[pəsèĵ lárk]	passeig llarg	'long walk'

Rule (3): [+strident] → [+voice] / ___ # [+voice]

From the theoretical standpoint, this process is interesting not only because a contrast is neutralized in favor of the marked member of the opposition (e.g. $\begin{smallmatrix} s \\ z \end{smallmatrix} > z$), but also because the process crucially depends on a word boundary. Given the data, students should arrive at the above rule by noting that:

- voicing by rule only occurs across a word boundary (cf. *caça* [káçə], *gossos* [gósus]);
- only stridents are affected (cf. *amic amable* [əmìkəməábblə], even though the underlying form for 'friend' is /amig/); and,
- strident voicing occurs in the environment of any voiced segment (i.e. vowel or voiced consonant).

4. Regressive Voice Assimilation

All obstruent clusters and all heterosyllabic obstruent-consonant clusters agree in voice; however, voiceless obstruent- $\left\{ \begin{matrix} l \\ r \end{matrix} \right\}$ clusters are permitted syllable-initially. Assimilation occurs across word boundaries as well as within words, as shown below:

[p1é]	ple	'full'
[kláw]	clau	'key'
[fló]	flor	'flower'
[kréšə]	créixer	'to grow'
[bláw]	blau	'blue'
[grós]	gros	'large'
[bósk]	bosc	'forest'
[putsé]	potser	'maybe'
[kápsə]	capça	'pellet'
[kəptá]	captar	'to beg'
[əʃəktíu]	adjectiu	'adjective'
[əʒzámən]	examen	'exam'
[əmík]	amic	'friend (m)'
[əmíʎə]	amiga	'friend (f)'
[əmíks]	amics	'friends (m)'
[káp]	cap	'no, none'
[dínés]	diners	'money'
[kàb dínés]	cap diners	'no money'
[žén]	gent	'people'
[kàb žén]	cap gent	'no people'

4. (Continued)

[səntít]	sentit	'sense'
[kàp səntít]	cap sentit	'no sense'
[butíγə]	botiga	'store'
[kàb butíγə]	cap botiga	'no store'
[góč̣]	goig	'pleasure'
[kàb góč̣]	cap goig	'no pleasure'
[lít]	llit	'bed, couch'
[kàb lít]	cap llit	'no bed'
[mənérə]	manera	'way'
[kàb mənérə]	cap manera	'no way'
[pók]	poc	'little'
[muðérn]	modern	'modern'
[pòg muðérn]	poc modern	'not very modern'
[dəsén]	decent	'decent'
[pòg dəsén]	poc decent	'not very decent'
[téms]	temps	'time'
[pòk téms]	poc temps	'little time'
[lòžik]	lògic	'logical'
[pòg lòžik]	poc lògic	'not very logical'
[léč̣]	lleig	'ugly'
[pòg léč̣]	poc lleig	'not very ugly'

Rule (4): [-sonorant] → [αvoice] / — $\left[\begin{array}{l} +\text{consonant} \\ \alpha\text{voice} \end{array} \right]$

Condition: does not apply to pre-nuclear tautosyllabic clusters (Dinnsen 1978).

The condition allows for voiceless obstruents preceding sonorant consonants in syllable-initial position (e.g. *ple* [plé], *flor* [fló], *clau* [kláw]). In all other positions obstruent/consonant clusters must agree in voice. The assimilation is regressive, as the second consonant in the cluster does not alternate.

As was noted under section (3), stridents voice across a word boundary when followed by a voiced segment. There is some overlap in the environments of strident voicing and regressive voice assimilation, specifically for instances of [+strident] # $\left[\begin{array}{l} +\text{consonant} \\ +\text{voice} \end{array} \right]$. For example, in the phrase

gos bonic [gòz βúnik] 'handsome dog'
 /s/ → [z]

the structural description of both rules is met and the voiced value of /s/ in *gos* could be determined by either rule. As inferred from rules (3) and (4), the [z]'s derived from strident voicing should be identical to the [z]'s derived from regressive voice assimilation. No current phonological theory (to my knowledge) is able to identify which rule applies in cases analogous to *gos bonic*, although an instrumental study is currently underway (DeCesaris and Fourakis 1979) to see if there is phonetic evidence for eliminating the overlap in the two rules' environments.

5. Homorganic Stop Deletion

(a)	<u>masc.</u>	<u>fem.</u>	<u>masc. pl.</u>	<u>fem. pl.</u>	<u>gloss</u>
	[sán]	[sántə]	[sáns]	[sántəs]	'saint'
	[blán]	[blánkə]	[bláns]	[blánkəs]	'white'
	[áɿ]	[áɿtə]	[áɿs]	[áɿtəs]	'tall'
	[əstuðián]	[əstuðiántə]	[əstuðiáns]	[əstuðiántəs]	'student'
	[kúr]	[kúrtə]	[kúrs]	[kúrtəs]	'short'
	[kəlén]	[kələntə]	[kələns]	[kələntəs]	'hot'
	[sór]	[sórðə]	[sórs]	[sórðəs]	'deaf'
	[máɿ]	[máɿə]	[máɿs]	[máɿəs]	'bad'
	[prím]	[prímə]	[príms]	[príməs]	'thin'

5. (Continued)

<u>masc.</u>	<u>fem.</u>	<u>masc. pl.</u>	<u>fem. pl.</u>	<u>gloss</u>
[kuntén]	[kunténtə]	[kunténs]	[kunténtəs]	'content'
[məláɪ̯]	[məláɪ̯tə]	[məláɪ̯s]	[məláɪ̯təs]	'sick'
[fósk]	[fóskə]	[fósks]	[fóskəs]	'dark'
[lárk]	[láryə]	[láarks]	[láryəs]	'long'
	<u>singular</u>	<u>plural</u>	<u>diminutive sg.</u>	
	[kám]	[káms]	[kəmpét]	'field'
	[lám]	[láms]	[ləmpét]	'ray, beam'
	[trén]	[tréns]	[trənét]	'train'
	[kór]	[kórs]	[kurét]	'heart'

Rule (5): $\left[\begin{array}{l} -\text{sonorant} \\ -\text{continuant} \\ \alpha\text{anterior} \\ \beta\text{coronal} \end{array} \right] \rightarrow \emptyset / \left[\begin{array}{l} +\text{consonant} \\ +\text{sonorant} \\ \alpha\text{anterior} \\ \beta\text{coronal} \end{array} \right] _ ([s]) \S$

(Obstruent stops in syllable-implosive position delete when preceded by a homorganic sonorant consonant.)

It should be pointed out that $\left[\begin{array}{l} +\text{consonant} \\ +\text{sonorant} \end{array} \right] \left[+\text{consonant} \right]$ clusters cannot occur in syllable-initial position; if such a cluster occurs word-medially, it is syllabified $\left[\begin{array}{l} +\text{consonant} \\ +\text{sonorant} \end{array} \right] \S \left[+\text{consonant} \right]$, as in:

- (b) sor § ðə 'deaf (f)'
 kun § ten § tə 'content (f)'
 aɪ̯ § tə 'tall (f)'
 kəm § pət 'little field'

I have given the rule with an optional [s] (the plural marker) in the syllable. In fact, [s] is the only consonant which can occur in that position, and thus a more correct formulation of the rule would generalize the environment as

$\left[\begin{array}{l} +\text{consonant} \\ +\text{sonorant} \\ \alpha\text{anterior} \\ \beta\text{coronal} \end{array} \right] _ (C) \S$ (Walsh 1977).

Homorganic Stop Deletion applies to all word classes--nouns ([kám]/[kəmpét]), adjectives ([blán]/[blánkə]), and also verbs ([dién] *dient* 'saying'/[diéntu] *dient-ho* 'saying it')--and thus is a purely phonological process. This will become important for the rule's interaction with the next process, N-deletion.

6. N-Deletion

(a) <u>masculine sg.</u>		<u>feminine sg.</u>		<u>gloss</u>
[sá]	sa	[sánə]	sana	'healthy'
[prím]	prim	[prímə]	prima	'thin'
[plá]	pla	[plánə]	plana	'level'
[səré]	serè	[səréə]	serena	'serene'

<u>singular</u>		<u>plural</u>		<u>gloss</u>
[áñ]	any	[áñs]	anys	'year'
[luñ]	lluny			'far'
[nasió]	nació	[nasións]	nacions	'nation'
[trəðuksió]	traducció	[trəðuksións]	traduccions	'translation'
[kárən]	carn	[kárəns]	carns	'meat'
[funsió]	funció	[funsións]	funcions	'functions'
[muðérən]	modern	[muðérəns]	moderns	'modern'
[sufá]	sofà	[sufás]	sofàs	'sofa'
[rruβí]	robí	[rruβís]	robís	'ruby'
[té]	te	[tés]	tes	'tea'
[əɣzámən]	examen	[əɣzáməns]	exàmens	'exam'

Rule: $\left[\begin{array}{l} +nasal \\ +coronal \end{array} \right] \rightarrow \emptyset / [+stress] _ \#$

All of the words listed above in which final [n] deletes are either nouns or adjectives. In verbs, on the other hand, final [n] does not delete (Walsh 1977):

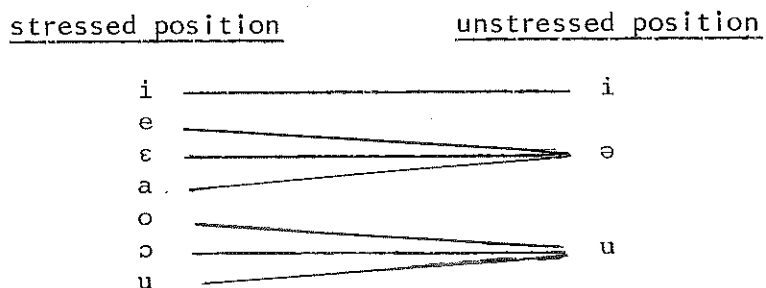
Feeding order (incorrect)

	/sant/ 'saint'	/kuntent/ 'content'	cf. /san/ 'healthy'
Homo. St. Deletion	san	kunten	--
N-deletion	sa	kunte	sa
	*[sá]	*[kunté]	[sá]

If the rules applied in a feeding order, as they would in an unordered rules framework (Koutsoudas, Sanders and Noll 1974), then the incorrect forms *[sá] 'saint' and *[kunté] 'content' would result (as was pointed out by Roca 1976) and would predict that 'healthy' and 'saint' are homophonous. The counter-feeding order is evidently necessary to obtain the correct surface outputs. Walsh (1977) shows, however, that this instance of counter-feeding can be accounted for in the KSN framework. He notes that the rules are of two different types: Homorganic Stop Deletion is purely phonological, whereas N-deletion is morphologically restricted. He formulates a universal principle of Morpholexical Precedence, which states "All rules which are morphologically or lexically conditioned apply before all strictly phonological rules" (1977:7) and further shows that this principle is independently needed within the KSN framework.

APPENDIX - Underlying Forms

Unless otherwise indicated, the forms listed below (by section) are those which can be derived from the data in the problem and do not always reflect the underlying forms which might be proposed in a complete Catalan grammar. For example, I have given the feminine ending as /ə/ because it does not alternate in the Standard dialect, but evidence from other dialects indicates that the underlying form may be /a/. The Standard dialect is characterized by vowel reduction in unstressed position, as outlined below:



For further discussion, see Mascaró (1978:25-30).

Feminine singular /-ə/

Masculine plural /-us/

Feminine plural /-əs/

- | | | |
|----|----------|---------------------|
| 1. | /lób/ | 'wolf' |
| | /káp/ | 'head' |
| | /kapét/ | 'head (diminutive)' |
| | /əmíg/ | 'friend' |
| | /séκ/ | 'dry' |
| | /fréd/ | 'cold' |
| | /tót/ | 'all' |
| | /léʃ/ | 'ugly' |
| | /dəspáč/ | 'office' |
| | /gríz/ | 'grey' |
| | /grós/ | 'large' |
| | /péš/ | 'fish' |

2. /əskičár/	'to splash'*
/əskič/	'a water splash'
/dəspáč/	'office'
/míj/	'half'
/léj/	'ugly'
/dəzíj/	'desire'
/pəsəžár/	'to take a walk'*
/pəséž/	'a walk'
/rróž/	'red'
/báž/	'I go (indicative)'
/báži/	'I go (subjunctive)'
/béž/	'I see (indicative)'
/béži/	'I see (subjunctive)'
/báz/	'drinking glass'
/grós/	'large'
/nás/	'nose'
/gríz/	'grey'
/pěš/	'fish'
/mətěš/	'same'
3. /gríz/	'grey'
/báz/	'drinking glass'
/gós/	'dog'
/kásə/	'he/she hunts'
/kázə/	'he/she marries'
/pěš/	'fish'
/sék/	'dry'
/əmíg/	'friend'
/lób/	'wolf'
/fréd/	'cold'
/pəséž/	'a walk'

3. (Continued)

/pəsəžár/	'to take a walk'*
/grìz i néyrə/	'grey and black'
/gòs əmábble/	'friendly dog'
/gòs pətít/	'small dog'
/bàz ənórmə/	'enormous drinking glass'
/lòb ənórmə/	'enormous wolf'
/frèd i néyrə/	'cold and black'
/pèš ənórmə/	'enormous fish'
/pèš pətít/	'small fish'
/pèš buník/	'pretty fish'
/pèš néyrə/	'black fish'
/sèk i néyrə/	'dry and black'
/əmìg əmábble/	'nice friend'
/dəspàč ənórmə/	'enormous office'
/dəspàč pətít/	'small office'
/dəspàč grós/	'large office'
/pəsèž ənórmə/	'enormous walk'
/pəsèž lárg/	'long walk' (cf. feminine [lárgə])

4. /plén/	'full' (cf. feminine [pléne])
/kláb/	'key' (cf. plural [kláβes])
/flór/	'flower'*
/krəšér/	'to grow'*

4. (Continued)

/bláb/	'blue' (cf. feminine [bláβə])
/grós/	'large'
/bósk/	'forest'
/putsé/	'maybe'
/kápsə/	'pellet'
/kəptár/	'to beg'*
/əʒəktív/	'adjective' (cf. feminine [əʒəktíβə])
/əyzámən/	'exam'
/əmíg/	'friend'
/káp/	'no, none'
/dínés/	'money'
/kàp dínés/	'no money'
/žént/	'people'
/kàp žént/	'no people'
/səntít/	'sense'
/kàp səntít/	'no sense'
/butíγə/	'store'
/kàp butíγə/	'no store'
/góž/	'pleasure' (cf. plural [góžus])
/kàp góž/	'no pleasure'
/lít/	'bed, couch'
/kàp lít/	'no bed'
/mənérə/	'way'
/kàp mənérə/	'no way'

4. (Continued)

/pòk /	'little'
/muðérn/	'modern'
/pòk muðérn/	'not very modern'
/dəsént/	'decent'
/pòk dəsént/	'not very decent'
/téms/	'time'
/pòk téms/	'little time'
/lòžik/	'logical'
/pòk lòžik/	'not very logical'
/ləǵ/	'ugly'
/pòk ləǵ/	'not very ugly'

5. /sánt/	'saint'
/bláŋk/	'white'
/ált/	'tall'
/əstuðiánt/	'student'
/kúrt/	'short'
/kəlént/	'hot'
/sórd/	'deaf'
/mál/	'bad'
/prím/	'thin'
/kuntént/	'content'
/məlál/	'sick'
/fósk/	'dark'

5. (Continued)

/lárg/	'long'
/kámp/	'field'
/lámp/	'ray, beam'
/trén/	'train'
/kór/	'heart'

6. /sán/	'healthy'
/prím/	'thin'
/plán/	'level'
/særén/	'serene'
/áñ/	'year'
/luñ/	'far'
/nasion/	'nation'
/trəduksión/	'translation'
/kárn/	'meat'
/funsión/	'functions'
/muðérn/	'modern'
/sufá/	'sofa'
/rruβí/	'ruby'
/té/	'tea'
/əɣzámən/	'exam'

*Word-final /r/ is deleted in verbs and in many nouns; for discussion see Mascaró (1978:65-68).

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