

Letters to the editor

Underlying voicing recoverability of finally devoiced obstruents in Catalan

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The procedure and the results on the phonetic properties of finally devoiced obstruents in Catalan reported in a recent paper by Dinnsen & Charles-Luce are discussed. The results do not allow the inference that any phonetic distinctions tracing back to underlying voicing distinctions are preserved in Catalan. Moreover, the phonological consequences of preservation of apparently neutralized underlying distinctions do not admit a unique phonological interpretation. One of the many possible alternative analyses is presented.

1. Introduction

In their analysis of final devoicing in Catalan, Dinnsen & Charles-Luce (1984), henceforth D & C, argue that the underlying voiced–voiceless distinction is maintained, at least for some speakers of this language. In particular, the underlying character of the following obstruent is argued to be correlated with closure and preceding vowel duration. They conclude also that a phonetic implementation rule accounting for the length distinction must apply before the phonological devoicing rule. I will address two issues: first I will comment on the experimental procedure and results based on the Catalan data, and then I will discuss the general phonological implications that should follow from experiments of this sort.

2. The Catalan data

Consider the ten test words used in the experiment:

TABLE I. Ten test words from Dinnsen & Charles-Luce (1984)

Phonetic	Underlying representations	Orthographic	Gloss
1. [kap]	/kap/	cap	no(ne)
2. [kap]	/kap/	cap	toward
3. [kap]	/kab/	cap	head
4. [kap]	/kab/	cap	he fits
5. [fat]	/fat/	fat	fate
6. [fat]	/fad/	fat	silly
7. [sek]	/sek/	séc	furrow
8. [sek]	/seg/	cec	blind
9. [sek]	/sek/	sec	dry (masc. sg.)
10. [sek]	/seg/	sec	I sit down

According to D & C, “The underlying voicing of obstruents was determined based on morphophonemic evidence.” The first two examples are non-alternating, in the sense that there exist no alternations that might show the underlying voiced or voiceless character of the obstruent (D & C’s use of “non-alternating” is different; the issue is merely terminological). *Cap* “no(ne)” and *cap* “towards” have no inflection, and no derivatives either. Of course one might entertain the option of considering non-alternating final obstruents underlying voiceless, but this is not uncontroversial; one of the virtues of experimental evidence of the sort discussed here is its phonological relevance: if the underlying character of a given segment can be determined by some phonetic parameter, then it becomes possible to provide experimental evidence for the underlying status of non-alternating segments.

The third item is analyzed as having a final /b/. Lexicalized derivatives show either [p] or [β] ([kəpútʃə] “hood”, [kəβótə] “nail head”), but the more regular, productive ones show up only with [p]: [kəpəró] “head”-diminutive, [kəpét] “head”-dim., [kəpás] “head”-augmentative.

It is probably correct to analyze 4, *cap* “he fits”, with underlying final /b/; a less problematic case would have been a better choice however, since the paradigm of the verb *caber* shows both [β] and [p] before the vowel ([kəβem] 1pl. ind. pres., [káβən] 3pl. ind. pres., [kápiyə] 1sg. subj. pres.). Items 5 and 6 are unknown or very literary in the dialect of Barcelona. In any case *fat* “fate” is probably better analyzed as non-alternating.

Why is *séc* “fold” or “slit (made by a string)” (rather than “furrow”) considered to have final /k/? It has no derivatives, but it is a deverbal noun, from *segar* “to cut (theme = ‘vegetals’)”, or “to slit (instrument = ‘string’)”; the verb has a root final underlying /g/, which shows up phonetically always as [ɣ]; hence morphophonemic evidence favors the choice of underlying /g/.

In sum, there are two cases of non-alternating voiceless obstruents (1, 2), two cases of unfamiliar words (5, 6), and two cases of words whose underlying voicing specification for the final obstruent is the reverse of the one assigned to them by D & C (3, 7). Even if the results are interpreted as regarding underlying voiced obstruents on the one hand, and underlying voiceless and non-alternating obstruents on the other, we are faced with ten items of which two should show no effect of underlying voicing, and two others should show the reverse effect, thus compensating for two of the correctly analyzed items. We are left with only four items whose underlying voicing would correctly affect the phonetic parameters. As the differences in parameter values traced back to voicing are of the order of 15% or less, no consequence as to preservation of underlying voicing can be inferred from the results.

3. Experimental design and results

Final obstruents were analyzed in two environments, namely before a consonant and before a vowel.¹ In absolute final position and before vowels word final obstruents are voiceless, but before consonants they assimilate in voicing (Wheeler, 1979; Mascaró, 1978). Thus the results in the first context should be interpreted as preservation of underlying voicing distinction under assimilation and not under final devoicing only. Also in normal tempo [t] assimilates the place of articulation of following consonants.

¹As they stand, the sentences are ungrammatical: person nouns take the article: *La Maria va dir. . .* . Also, the normal pronunciation is [məriə βa], not [məriə va].

This means that for words 5 and 6 (and 7, 8, 9, 10), the final consonant and the initial [k] of [klarəmén] of the carrier sentence should merge in a long [k:]. It is difficult to imagine how closure duration of the first part of the geminate could be measured in these circumstances. If the two consonants were pronounced separated by a pause, then the distinction between the two contexts becomes useless.

Catalan was chosen by C & D because it has “no orthographic distinctions (. . .) corresponding with underlying phonological voice distinctions”. (One should add “in most cases”). But in order to make sure that the intended lexical item was chosen by the subject, a Spanish gloss was provided in parentheses immediately after the test word. D & C do not cite the glosses, but probable choices would be *cabeza* for *cap* (underlying /b/ for D & C), *ciego* for *cec* (underlying /g/ for D & C) and *seco* for *sec* (underlying /k/ for D & C).² Native speakers are aware of the cognate character of Spanish related words. Hence the Spanish orthographic voicing cue could have influenced some subjects in the direction that the results show. This might have affected some of the subjects and not the others, thus explaining, in these cases, the “richness of individual speaker variation”. It would be interesting to know what the mean values were for each test word across subject and for each subject.

Another striking feature is the fact that longer stop duration is significantly correlated with underlying voicing (speaker 2), whereas in general it is assumed that voiceless, “fortis” stops are longer than their voiced counterparts (e.g. Lisker, 1972).

4. Phonological consequences

Let us now assume that the results, contrary to what I have tried to show, proved that the underlying distinction is maintained. The phonological consequences, which D & C discuss, are worth commenting. For subject 1 they set up a rule of phonetic implementation that shortens vowels, and which is sensitive to the underlying voicing character of the following obstruent. Hence this rule cannot follow the rule of final devoicing. It follows, according to D & C, either that it is not the case that there is a separate phonological component ordered before a phonetic component, or that the shortening rule is phonological, and in this case phonological rules would have “phonetic properties” (gradient character, etc.).

But these are hardly the only possibilities in present-day phonological theory. One alternative would be to allow phonological representations to maintain some of the underlying distinctions. Take one variant of the theory of assimilation and other phenomena like devoicing in Mascaró (1985). Devoicing can be viewed as deassociation of the voicing property from a C slot followed by the assignation of the unmarked value for voicing to the C. Assimilation, on the other hand, would be a case of deassociation followed by spreading of the voicing property of an adjacent segment.³ Thus the relevant consonants in /káz téw/ “your case”, /káz méw/ “my case”, /káz/ “case” are represented as in Table IIa (the final consonant of [kas] is underlying voiced as the plural [kázus] shows).

In *b*, deassociation has operated leaving a floating voicing autosegment; in *c* either spreading or unmarked value assignment has taken place. This leaves a floating voicing autosegment which, if nothing else happens, will be left unassociated and hence will

²Depending on the choice of the gloss, *fat* might have the reverse orthographic voicing cue (*hado*).

³Contrary to Mascaró (1985) where deassociation and deletion are argued to vary parametrically, here I am assuming, for the sake of the argument, a deassociation analysis for Catalan devoicing.

TABLE II. Derivations with respect to devoicing and assimilation

	/káz téw/	/káz méw/	/káz/
a.	[+ voice] [- voice] k á C C é w	[+ voice] [+ voice] k á C C é w	[+ voice] k á C
b.	[+ voice] [- voice] k á C C é w	[+ voice] [+ voice] k á C C é w	[+ voice] k á C
c.	[+ voice] [- voice] k á C C é w [kás téw]	[+ voice] [+ voice] k á C C é w [káz méw]	[+ voice] [- voice] k á C [kás]

receive no phonetic interpretation. If these were the right phonological representations, a claim I am not making here, but which is a quite reasonable possibility with independent motivation, then a few, not all, underlying properties would be carried over the derivation. It would then be possible for phonological rules to refer to the floating voicing autosegment.

Other possibilities are that rules like final devoicing might be phonetic or postlexical rules,⁴ that phonetic implementation rules might refer to more than one representation (e.g. surface phonological and underlying), that more than one feature distinguishing voiced and voiceless obstruents be present at the time devoicing applies, or that in performance phonetic implementation rules might be influenced by factors such as paradigmatic pressure (the existence of other members of the paradigm with voiced obstruent), etc. These are extremely interesting alternatives for a theory of grammar. When designed adequately, experimental evidence might bear not only on the question of whether or not an underlying distinction is preserved despite phonological neutralization, but, even more interestingly, also on which are the right phonological consequences that follow.⁵

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⁴This would be difficult to justify for Catalan where devoicing is really word final, but might be more adequate for languages like German where it is syllable final.

⁵In their reanalysis of Catalan devoicing Charles-Luce and Dinnsen (this volume), while still claiming that there is no neutralization, modify their conclusions in the sense that there is no more underlying voicing influence on vowel duration and closure duration for individual speakers. They claim instead that there is underlying voicing influence on voicing into closure duration for the whole group of subjects. It seems to me that a difference in voicing into closure of 1 ms (mean value) with standard deviations ranging from 3.6 to 4.9 might be significant, but is not clear at all why it should be related to underlying voicing rather to some of the other variables discussed above that were not controlled (differences of stress due to structural differences, influence of the Spanish gloss).