Spanish voiced obstruent alternation and underspecification in OT
Sonia Colina
The University of Arizona

Introduction. Despite much stylistic and dialectal variation, Spanish voiced plosives have been traditionally described as having a continuant and a non-continuant realization. In the standard varieties that are the object of this study, the [-continuant] allophones appear after homorganic nasals and laterals, and in word-initial position, e.g., [dóṇde] 'where', [tóḷdo] 'awning' (1), and [+continuant] ones in the remaining contexts, [náða], [álɣo] (2). The same distribution applies across words. Recent phonetic studies (Cole, Iskarous, & Hualde 1999; Ortega Llebaria 2004) reveal a great deal of phonetic variability among continuant realizations that is not captured by traditional generative accounts. This paper proposes an analysis that accounts for the variability in the phonetic implementation of these phones. In addition, it reexamines the role of underspecification within an optimality-theoretic (OT) framework.

Previous generative accounts. Existing analyses differ with regard to: (i) the directionality of the process: fortition (Hammond 1976; Bakovic 1994) or lenition (Harris 1969); (ii) the feature that spreads, in autosegmental analyses ([αcontinuant], Mascaró 1984; [-continuant] in homorganic clusters, Hualde 1989); and (iii) the nature of the underlying representation: stop (Harris 1969), continuant (Hammond, 1976, Bakovic 1994), and underspecified (Lozano 1979; Harris 1984; Mascaró 1984; Hualde 1989). Proponents of the underspecification account, the most numerous, justify an underspecified input because of the lack of solid evidence for any of the specified forms. ***Analysis:*** I also argue for an underspecified input, but I show that there is solid evidence for it, with regard to: (i) voiceless obstruents in homorganic clusters, and (ii) phonetic variation. (i) In homorganic clusters, voiceless fricatives retain their underlying specification [-cont], rather than agreeing in continuancy with the preceding nasals, as voiced obstruents do: *un bobo* [um.bó.βo] 'a silly person-masc.', *una boba* [u.na.βó.βa] 'a silly person-fem.' vs. *un solo* [un.só.lo] 'only one-adj-masc.', *una sola* [u.na.só.la] 'only one-adj-fem.'. I claim that this is so because voiceless fricatives are underlyingly specified as [+cont], while voiced obstruents are underspecified. Thus, obstruents in Spanish show a three-way contrast in continuancy: [+continuant] (voiceless fricative), [-continuant] (voiceless stops) and underspecified [continuant] (voiced obstruents). In OT terms, voiceless fricatives result from ID-[cont] >> NC[cont], where ID-[cont] says that the output matches the input with respect to [cont.] and NC[cont] that a nasal/lateral agrees in [cont] with the following obstruent (3). Underspecification does not go against *Richness of the Base*, as long as underspecified forms are determined by the learner through *Lexicon Optimization* and not by any constraints holding directly on underlying forms (Inkelas 95: 289). In fact, *Richness of the Base* requires that unspecified forms be considered as there are no restrictions on inputs. Various authors have shown the need for input underspecification in OT (Inkelas 95, Ito, Mester, & Padgett 1995, Inkelas Orgun & Zoll 1997, Harrison and Kaun [2001], Inkelas 2006). (ii) In addition to input underspecification, OT proposes output or phonetic underspecification (Hale and Kissock 2007, originally from Keating 1988). This is underspecification that persists from underlying representation through phonetic representation, resulting in forms which are never fully featurally specified and that are realized variably according to the surrounding segments, i.e., in the phonetic component. I propose that the continuant outputs of voiced obstruents are phonetically underspecified (output underspecification) for continuancy, thus accounting for the great degree of variation in aperture in continuant allophones, which are generally dependent on the adjacent sounds (cf., Bradley & Delforge 2006a, Bradley & Delforge 2006b, Bradley 2007, Colina 2009b for output underspecification in Judeo-Spanish and in Ecuadoran Spanish). An underspecified output constitutes additional evidence for the proposal that the input for voiced obstruents is underspecified because the best input for an underspecified output is the underspecified input (7). This in turn justifies the selection of the underspecified input (4) for the homorganic context, vs. the equally harmonious stop [5] (a fricative, as in (6) makes the wrong selections for the output). In absolute word-initial position, the stop in the output is the result of insertion of the unmarked candidate.

(1) bomba [bomba] 'bomb'; donde [doṇde] 'where'; tango [taŋgo] 'tango'; toldo [toḷdo] 'awning'

(2) haba [aβa] 'bean'; nada [naða] 'nothing'; hago [aɣo] 'I do'; árbol [arβol] 'tree'; algo [alɣo] 'something'; calvo [kalβo] 'bald'

(3) /tenso/ [tenso]	ID-[cont]	NC-[cont]	ID-[voi]
☞ tenso		*	
tenzo		*	*!
tendo	*!		
tento	*!		

(4) /tanGo/ [taŋgo]	ID-[cont]	NC-[cont]	ID-[voi]
taŋGo		*!	
taŋɣo		*!	
☞ taŋgo			
taŋko			*

(5) /tango/ [taŋgo]	ID-[cont]	NC-[cont]	ID-[voi]
taŋGo		*!	
taŋɣo	*!	*	
☞ taŋgo			
taŋko			*

(6) /tanɣo/ [taŋgo]	ID-[cont]	NC-[cont]	ID-[voi]
✗ taŋGo		*	
✗ taŋɣo		*	
taŋgo	*!		
taŋko	*!		*

✗= candidate mistakenly selected as the output

(7) /aGo / [aɣo]	ID-[cont]	NC-[cont]	ID-[voi]	DEP-[cont]
☞ aGo				
aɣo				*!
ago				*!
ako			*!	*

Selected references:

BAKOVIC, E. 1997. Strong onsets and Spanish fortition. *MIT Working Papers in Linguistics* 23: 21-39; COLE J, ET AL. 1999. Spanish spirantization. *Proceedings of the Linguistics and Phonetics Conference*. Ed: Osamu Fujimura; HARRIS, J. W. 1984. La espirantización en castellano y la representación fonológica autosegmental. *Estudis Gramaticals* 1: 149-67; HUALDE, J.I. 1989. Procesos consonánticos y estructuras geométricas en español. *Lingüística* 1: 7-44; HALE, M., KISSOCK, M., 2007. The phonetics-phonology interface and the acquisition of perseverant underspecification. In Ramchand, G., Reiss, Ch. Eds., *The Oxford Handbook of Linguistic Interfaces*. Oxford UP, Oxford, UK, pp. 81-101; INKELAS, S., 1995. The consequences of optimization for underspecification. *Proceedings of NELS*, pp. 287-302; MASCARÓ, J. 1984. "Continuant spreading in Basque, Catalan and Spanish language sound structure." In Aronoff M. & R. T. Oerhle, Eds. *Language sound structure: Studies in phonology*. Cambridge, MA: MIT Press, pp. 287-98. ORTEGA-LLEBARIA, M. 2004. "Interplay between phonetic and inventory constraints in the degree of spirantization of voiced stops: Comparing intervocalic /b/ and intervocalic /g/ in Spanish and English." In Face, T. Ed. *Laboratory Approaches to Spanish Phonology*, Mouton de Gruyter, pp. 237-255.