Croatian place assimilation in Logical Phonology

Introduction. The goal of this paper is to describe an aspect of an idealized Croatian speaker's phonological competence that governs place assimilation of sibilant fricatives. We approach this goal from the perspective of Logical Phonology (based on Bale & Reiss 2018), with the purpose of empirically testing this newly developed phonological framework and evaluating it against constraint-based accounts of the same phonological pattern.

Data. Croatian sibilant fricatives—alveolars /s, z/ and postalveolars /ʃ, ʒ/—are subject to place assimilation in two different contexts with two different results, as shown in (1) (Težak 2007; Marković 2013; Volenec 2018).

(1)

a.	/**s**-t͡ʃep-a-ti/	→	[**ʃ**t͡ʃepati]	'to grab'
b.	/**s** d͡ʒep-om/	→	[**ʃ**d͡ʒepom]	'with pocket'
c.	/ra**z**-t͡ʃlan-i-ti/	→	[ra**ʒ**t͡ʃlaniti]	'to parse'
d.	/i**z**-ʃar-a-ti/	→	[i**ʒ**ʃarati]	'to mottle'
e.	/ra**z**-ʒar-i-ti/	→	[ra**ʒ**ʒariti]	'to kindle'
f.	/bro**ʃ**-t͡ʃitɕ/	→	[bro**ʃ**t͡ʃitɕ]	'brooch'
g.	/no**s**-ɲ-a/	→	[no**ɕ**ɲa]	'garment'
h.	/pa**z**-ʎiʊ/	→	[pa**ʑ**ʎiʊ]	'careful'
i.	/ʊa**ʃ** t͡ɕe/	→	[ʊa**ɕ**t͡ɕe]	'you$_{(ACC.)}$ will'
j.	/kri**ʒ** t͡ɕe/	→	[kri**ʑ**t͡ɕe]	'cross will'
k.	/bli**z**-ɲ-i/	→	[bli**ʑ**ɲi]	'close'
l.	/**s** d͡ʑak-om/	→	[**ɕ**d͡ʑak-om]	'with student'

Before postalveolars /t͡ʃ, d͡ʒ, ʃ, ʒ/, sibilant fricatives surface as postalveolars [ʃ, ʒ] (1a–f). Before alveolo-palatals /t͡ɕ, d͡ʑ/ and palatals /ʎ, ɲ/, sibilant fricatives surface as alveolo-palatals [ɕ, ʑ] (1g–l). The alternation is fully productive and blind to morphology (Marković 2013: 60).

Analysis. Logical Phonology (LP) is a formal framework for describing phonological competence, grounded in set theory. Phonological segments are taken to be unstructured, unordered sets of valued features; an example of a segment-as-set /s/ is given in (2). Natural classes are, then, sets of segments-as-sets; an example of a natural class of sibilant fricatives (in Croatian) is given in (3).

(2) s = {+CONS, +COR, +ANT, +CONT, –SON, –VOICED ... }

(3) [+COR, +CONT, –SON] = {s, z, ʃ, ʒ}

In LP, phonological computation works by way of logical operations. The two operations that are relevant for the present analysis are defined in (4) and (5).

(4) Subtraction (–): If *A* and *B* are sets, then *A* – *B* results in the set that contains all and only the members of *A* that are not members of *B*.

(5) Unification (⊔): If *A* and *B* are sets, then *A* ⊔ *B* results in the smallest set that contains all the members of *A* and all the members of *B*. The operation is undefined if *A* ⊔ *B* is inconsistent.

Treating place assimilation as a two-step process (Harris 1984, McCarthy 2008), the operation in (6) first subtracts relevant place features from sibilant fricatives. Then, by way of set unification, the

operation in (7) correctly accounts for place assimilation. Natural classes (sets of segments) are enclosed in square brackets, sets of features are enclosed in curly brackets.

(6) [+COR, +CONT, –SON] – {+COR, +ANT} / __ [–ANT, –BACK, +CONS]

(7) [+CONT, –SON] ⊔ {αCOR, – ANT} / __ [αCOR, –ANT, –BACK, +CONS]

Examples (1a–f) are accounted for when α is +, while examples (1g–l) are accounted for when α is –.

Discussion. We have analyzed the data-set in (1) in Classical Optimality Theory, following Jun (2004), and in Harmonic Serialism, following McCarthy (2008). Jun's (2004) *universal* hierarchy PRES(PL([+CONT]_C)) » PRES(PL([STOP]_C)) » PRES(PL([NASAL]_C)), which predicts that if fricatives assimilate in place then so must oral stops, is empirically falsified by the fact that Croatian oral stops never assimilate in place, while fricatives do. Because McCarthy's (2008) approach to place assimilation crucially relies on the highly ranked CODA-COND constraint which drives the alternation, the correct analysis first requires an adoption of Kaye's (1990; 1992) assumption which states that in an *sC* cluster, [s] is always in a coda. However, that assumption is in direct contradiction to studies that show that native Croatian speakers always syllabify VsCV types of words so as to include [s] in an onset of the second syllable: V.sCV, never Vs.CV (Škarić 1991, 2007; Jelaska 2004; Brozović 2007). Furthermore, since the set of segments that *do not* trigger assimilation (these include vowels, some sonorants, plosives, some affricates, and some fricatives) is not a natural class, the Harmonic Serialism approach requires the invention of phonetically and typologically ungrounded versions of positional faithfulness MAX[PLACE] constraints for narrow and arbitrary segment classes in order to prevent overgeneration. In contrast, the LP operations in (6) and (7) explicitly and economically describe the phonological competence of an idealized Croatian speaker with respect to place assimilation of sibilant fricatives, obviating both the empirical shortcomings of Jun (2004) and the need for ungrounded, *ad hoc* constraints. LP provides a simple, logically grounded framework for accounting for the same data while avoiding problems present in corresponding constraint-based analyses.

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