

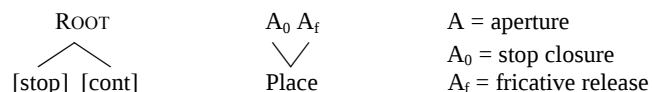
The Mismatch between Phonetics and Phonology in Affricates

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Introduction

(1) The phonetic representation of affricates

- Phonetically, affricates are stops with a fricative release.
- Lombardi (1990) Steriade (1993)



(2) The phonological representation of affricates

- Phonologically, the representation of affricates has been a much debated issue (Clements & Hume 1995:256; Kehrein 2002:11-15; Kim 1997:23-38).
- [-cont, +delay released] (Chomsky & Halle 1968: 329)
- Affricates as contour segments (with internal ordering)
Clements & Keyser (1983)

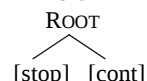


- Affricates as complex segments (no internal ordering)

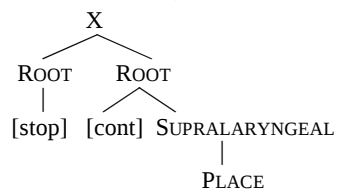
Lombardi (1990)



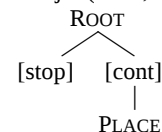
Sagey (1986)



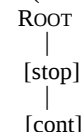
Hualde (1991)



van de Weijer (1992, 1996)



Shafer (1995)



e. Affricates as underlying/phonological stops

- Strident stop: [stop, +strid] → [ts] [tʃ] [tɕ]
(Jakobson, Fant & Halle 1951; Rubach 1994, Kim 1997)
- Laminal stop: [stop, +dist] → [tʃ] [tɕ]
(Steriade 1989, 1993, 1994; Kim 1997:39, Shaw 1991:146)
- Labiodental stop: → [pf] (in contrast to bilabial stop [p])
(Kehrein 2002:§2.4; cf. Clements 1999)
- Lateral stop: [-son, stop, +lat] → [tɬ]
Nasal stop: [-son, stop, +nas] → [pm] [tn] (Kehrein 2002:9)

(3) The match and mismatch between phonetics and phonology

- The phonetics and phonology of affricates may be considered to be matched in proposals like (2bc).
- In all proposals, the [stop] or [-cont] property is consistent between the phonological and phonetic representations of affricates.
- The unordered stricture features, [stop] and [cont], in (2d) need to become ordered in the phonetic component: A mismatch in feature ordering.
- The lack of [cont] in treating affricates as phonological stops in (2e) requires affricates to project a fricative release phonetically: A mismatch in the fricative feature or release.
- The “incompatible” or “less compatible” feature such as [+strid], [+lat], [+nas], [+dist], or [labiodental] on an obstruent stop in (2e) leads to the need to project a fricative release for phonetic enhancement of phonological contrasts since a stop closure is ill suited to manifest these features: A mismatch in feature manifestation and fricative release.

(4) This talk (cf. Lin under review)

- examines sample data and crucial arguments for various phonological representations of the affricate;

- b. presents cases that seem to pose problems for the commonly accepted view;
- c. discusses why the mismatch between phonetics and phonology occurs in affricates.

The contour segment approach

(5) Edge effects

- a. If affricates have [stop] at the left edge and [cont] at the right as represented in (2c), they are predicted to show **EDGE EFFECTS**, which refer to cases where affricates pattern with stops with regard to rules sensitive to their left edges and with fricatives with regard to rules sensitive to their right edges.
- b. Edge effects on the left edge: affricates pattern with stops
Zoque postnasal voicing of stops and affricates but not of fricatives (Sagey 1986: 93-94)

nasal + stop	min + pa	→	minba	‘he comes’
	N + tatah	→	ndatah	‘my father’
	N + kayu	→	ngayu	‘my horse’
nasal + affricate	N + tsima	→	ndzima	‘my calabash’
	pʌn + tʃʌki	→	pʌndʒʌki	‘figure of a man’
nasal + fricative	win + saʔu	→	winsaʔu	‘he received’
- c. Edge effects on the right edge: affricates pattern with fricatives
 - (i) Sierra Popoluca aspiration (Sagey 1986:95-96, data from Foster and Foster 1948): Stops are aspirated at the end of a syllable (e.g. [mæk^h] ‘fog’), but affricates and fricatives are not (e.g. [ʔapitʃ] ‘thorn’ [wəsten] ‘two’).
 - (ii) Kutep labialization (Sagey 1986: 95, data from Ladefoged 1968:31,62): Labiodentals occur after fricatives and affricates (e.g. [basfa] ‘they kneel’, [batsfap] ‘they chose’), but a bilabial occurs after a stop (e.g. [bapwa] ‘they grind’).

The complex segment approach

(6) Anti-edge effects: Affricates pattern with stops at the right edge

- a. Basque Stop Deletion (Archangeli and Pulleyblank 1987; Hualde 1987, 1988, 1991; Lombardi 1990)

stop + stop	bat paratu	→	ba_paratu	‘put one’
	bat kurri	→	ba_kurri	‘run one’
	oroit + men	→	oro_i_men	‘remembrance’

	guk piztu	→	gu_piztu	‘we light’
affricate + stop	harits + mendi	→	harismendi	‘oak mountain’
	hits + tegi	→	histegi	‘dictionary’
	harits + ki	→	hariski	‘oak wood’

- b. Turkish syllable final devoicing (Lombardi 1990:384-385; Kim 1997:28-29)

sebe p (nominative)	sebe p ler (plural)	sebe bi (possessive)	‘reason’
sepet (nominative)	sepe di (accusative)		‘basket’
pabut f (nominative)	pabut f lar (plural)	pabud ʒ u (possessive)	‘slipper’
deniz (nominative)	denizler (plural)	deniz i (possessive)	‘see’

(7) Affricates must have the [cont] feature since they can pattern with fricatives

- a. Affricates cannot be phonological stops.
- b. Modern Yucatec Maya morpheme structure constraint on [cont] (Lombardi 1990:388-398)

Permissible:	sVs	fVf	tsVts	tʃVtʃ
Nonpermissible:	*sVf	*fVs	*tsVtʃ	*tʃVts
	*sVts	*sVtʃ	*fVts	*fVtʃ
	*tsVs	*tsVf	*tʃVs	*tʃVf
- c. OCP-based analysis of Modern Yucatec Maya morpheme structure (Lombardi 1990: 389-390)

[stop]	[stop]	[stop]		[stop]
*ts	V	tʃ		*s
[cont]	[cont]	[cont]	[cont]	[cont]

← OCP violation

sVs:	C	V	C
		s	
		[cont]	

tsVts:	C	V	C
		ts	
		[stop]	[cont]

(8) The mismatch between phonology and phonetics

- a. The contour segment approach, where there is no mismatch between phonology and phonetics, fails.
- b. Phonologically, the stricture features, [stop] and [cont], must be unordered on different tiers so that both features can be seen from either edge.

- c. Phonetically, the two features become ordered, and that is when edge effects occur.
- d. Sierra Popoluca aspiration and Kutep labialization in (5c) are then cases of phonetic edge effects.

The stop approach

- (9) Affricates as phonological strident stops
 - a. Affricates pattern with stops but never with fricatives.
 - b. Affricates pattern with fricatives only when both are strident.
 - c. Both the contour segment approach and the complex segment approach fail.
- (10) Affricates do not pattern with fricatives

Polish Fricative Assimilation (Rubash 1994:134-137)

 - a. Dental fricatives /s z/ assimilate in place to the following noncontinuant to become [ʃ ʒ] and [ç ʒ].

pań+ <u>s</u> k+i	‘sir’ (adj.)	pań <u>sz</u> cz+yzn+a	[ʃtʃ]	‘serfdom’
o <u>s</u> et	‘thistle’	o <u>s</u> ć+ie	[çtç]	(loc.sg)
<u>s</u> en	‘dream’ (N)	<u>s</u> ni+i+ć	[çń]	‘to dream’
mo <u>z</u> g	‘brain’	mo <u>z</u> d <u>z</u> ek	[ʒdʒ]	(dimin.)
ja <u>z</u> d+a	‘travel’	je <u>z</u> d <u>z</u> ie	[ʒdʒ]	(dat.sg.)
bla <u>z</u> en	‘fool’	bla <u>z</u> ni+e	[ʒń]	(voc.sg)
 - b. But, dental affricates are not targets of the assimilation.

Płock	(city name)	płoc <u>cz</u> +anin	[tʃtʃ]	‘inhabitants of Płock’
ocet	‘vinegar’	oc <u>cz</u> +ie	[tʃtç]	(loc.sg)
<u>c</u> n+y	‘worthy’	<u>c</u> n+i+ć	[tʃń]	‘hanker’
 - c. [-son, cont, COR, +ant] → [-ant] / __ [stop, -ant]
 - d. Since the rule refers to [cont] at the right-edge context, under the contour segment and complex segment approaches, dental affricates are predicted to pattern with dental fricatives and assimilated to the following noncontinuants. The fact that dental affricates do not undergo the rule constitutes a counterexample to an approach in which affricates are specified with [cont] and predicted to pattern with fricatives.

- (11) Affricates pattern with fricatives only when both are strident.

Polish Strident Assimilation (Rubach 1994:138)

- a. [-son, COR, +ant] → [αPLACE] / __ [+strid, αPLACE]
An optional postlexical rule that assimilates dental obstruents in place with following strident fricatives and affricates
- b. rozszerzyć [sʃ] ~ [ʃʃ] ‘broaden’
rozsiekać [sç] ~ [çç] ‘cut up’
bez czekania [s tʃ] ~ [ʃ tʃ] ‘without waiting’
okaz cierpliwości [s tç] ~ [ç tç] ‘example of patience’
prezez żyto [z ʒ] ~ [ʒ ʒ] ‘across the ryefield’
podczas działań [z dʒ] ~ [ʒ dʒ] ‘during the action’
- c. chłopiec szukał [ts ʃ] ~ [tʃ ʃ] ‘the boy was seeking’
occie [ts tç] ~ [tç tç] ‘vinegar’ (loc.sg.)
grobowiec zołnierza [dz ʒ] ~ [dʒ ʒ] ‘tomb of the soldier’
- d. twardszy [t ʃ] ~ [tʃ ʃ] ‘harder’
od czasu do czasu [t tʃ] ~ [tʃ tʃ] ‘from time to time’
oddzielić [d dʒ] ~ [dʒ dʒ] ‘separate’

- (12) Reanalyses of cases where affricates are claimed to be specified with [cont]
 - a. One major obstacle for the STOP APPROACH is the presence of cases where affricates are claimed to be specified with [cont].
 - b. Modern Yucatec Maya morpheme structure restrictions in (7):
 - Kehrein (2002:46-51; cf. Rubach 1994:141:footnote 24) suggests that the feature [strident] or CORONAL (if coronal stops are unspecified for place) can be used instead to replace [cont] for the analysis.
 - c. Basque Stop deletion in (6a):
 - Before a stop, a stop deletes, but an affricate loses the [stop] feature and becomes a fricative.
 - Kehrein (2002:51-55; cf. Rubach 1994:141:footnote 24) proposes to treat the situation with two independent rules: simple stops delete (or debuccalize) but strident stops (i.e. affricates) spirantize.
 - d. Affrication of stops before high vowels:
 - This is typically analyzed as spreading [cont] from the vowel to the preceding stop, creating an affricate with both [stop] and [cont]: e.g. /tat+i+mas+u/ → [tatʃimasu] ‘to stand’ (polite)

present), /tat+u/ → [tatsu] ‘to stand’ (present) in Japanese (Clements 1999:287, Kim 2001:90, data from Shibatani 1990).

- Under the stop approach, processes of affrication are argued to be feature insertion of [+strident] or addition of fricative noise between the stop and the vowel due to a phonology-phonetics mismatch (Kim 1997:39, 2001:102; Clements 199:289).
- This reanalysis is based on the observation that the release transition from a simple stop to a high vowel has the turbulence and spectral properties similar to the noise of a strident fricative and can be interpreted as the release of a strident affricate (Kim 1997:chapters 3-4, 2001, Clements 1999:287-289, and references therein).

(13) What about non-strident affricates?

- a. One common argument against treating affricates as strident stops is the fact that not all affricates are strident (e.g. Chomsky and Halle 1968, Lombardi 1990:409), e.g. [tθ] in Tahltan (Shaw 1991), and [pf] in German.
- b. Under the stop approach, typically place features such as [distributed], [laminal], or LABIAL are used to specify nonstrident stops (e.g. Shaw 1991:146, Kim 1997:39, Kehrein 2002:9-10). Sometimes, a labiodental affricate like [pf] is proposed to be a [+strident] stop in contrast to a bilabial stop (Kim 1997:106-108).

Additional arguments in support of the stop approach

(14) Phonological contrasts

- a. Through examinations of cross-linguistic phonological contrasts among affricates and stops, Clements (1999) and Kehrein (2002) argue that (i) affricates are phonological stops, which bear no [cont] feature and are distinguished from non-affricated stops by place features or manner features such as [strident], [lateral], [nasal], and (ii) affrication or fricative release is best accounted for at the phonetic level when the phonological feature combinations are spelled out as sequential acoustic events, which Kehrein (2002) proposes to be a phonetic strategy for increasing the perceptibility of phonological contrasts.
- b. The main finding is that strident, lateral and nasal affricates contrast with stops but non-strident affricates do not.
- c. Strident affricates contrast with stops and strident fricatives (Kehrein 2002:17; cf. Clements 1999:278-279)

simple stop vs. strident affricate vs. strident fricative

alveolar:	/t/	/ts/	/s/	e.g. Hamar
postalveolar:	/t/	/tʃ/	/ʃ/	e.g. Capaya
retroflex:	/ʈ/	/ʈʂ/	/ʂ/	e.g. Burushaski

d. Lateral affricates contrast with stops and laterals (Kehrein 2002:18-19)

simple stop vs. lateral affricate vs. lateral sonorant

alveolar:	/t/	/tʎ/	/ʎ/	e.g. Navaho
retroflex:	/ʈ/	/ʈʎ/	/ʎ/	e.g. Adynyamathanha
palatal:	/c/	/cʎ/	/ʎ/	e.g. Archi

Nasal affricates contrast with stops and nasals (Kehrein 2002:18-19)

simple stop vs. nasal affricate vs. nasal sonorant in Zing Mumuye

labial:	/p b/	/pm bm/	/m/
coronal:	/t d/	/tn dn/	/n/
velar:	/k g/	/kŋ gŋ/	/ŋ/

- e. Non-strident affricates occur as allophones of stops, or as phonetic realizations of one laryngeal series or of stops with small place contrasts (Kehrein 2002:21). That is, languages do not contrast stops and non-strident affricates.
- f. Free variation of [k] and [kx] for some speakers of Thai, and allophonic derivation of bilabial affricates from bilabial stops before [u] (e.g. /p/ → [pφ] / __ /u/) in Lahu (Kehrein 2002:22).
- g. The aspirated stops in those languages with laryngeal contrasts are likely to show affrication; e.g. in Navaho, the three way contrast of /k k' k^h/ are realized phonetically as [k k' kx^h].
- h. The apparent contrasts between stops and non-strident stops (e.g. /p/ vs. /pf/ in German, and /t/ vs. /tθ/ in Chipewyan) are contrasts at small places of articulation such as bilabial vs. labiodental within the major category of LABIAL in German, and apical [t] vs. lamial [tθ] in Chipewyan within the primary category of CORONAL (Kehrein 2002:23,25; cf. Clements 1999:275). Additional examples include palatal /cç/ vs. /k/ in Irish and /k/ vs. uvular /qx/ in Wolof within the DORSAL category (Kehrein 2002:25; cf. Clements 1999:283-285).
- i. In some cases, what were claimed to be palatal non-strident affricates in contrast with palatal stops are actually alveo-palatal strident affricates, e.g. /cç/ should be /tç/ in Komi (Kehrein 2002:28-29, Clements 1999:281-282).
- j. Kehrein (2002:29-30) thus concludes that (i) a stop and its homorganic non-strident affricate are never in contrast, (ii) non-

strident affricates are phonetic realizations of their corresponding stops, and (iii) a stop is often realized as an affricate when it is in contrast with another stop within the same primary articulator with small place differences.

(15) Natural classes

- a. Affricates form a natural class with stops
 - Numerous examples, including Zoque postnasal voicing (5b), Basque stop deletion (6a), Turkish coda devoicing (6b), Polish fricative assimilation (10).
- b. Affricates do not form a natural class with fricatives based on [cont]
 - Affricates and fricatives may pattern together only through shared manner or place features, and stridency is one such shared feature.
 - Examples include English plural formation, Polish strident assimilation (11), Modern Yucatec Maya morpheme structure constraints (7).
- c. Affricates do not form a natural class to the exclusion of stops (Kehrein 2006:2, 36)
 - Under the stop approach, affricates either pattern with stops through [stop] or with fricatives through place or manner features, but cannot form a single class through [stop, cont] or [stop, +delayed release].
 - Archi deaffrication (Kehrein 2002:37-38) turns strident and lateral affricates into fricatives but crucially stops and non-strident affricates are unaffected. That is, it is not the case that all affricates form a natural class, but only manner-specified affricates do; therefore, there is no need to specify affricates with [stop, cont] or [+delayed release].

Summary so far

- (16) The commonly accepted view seems to be that
 - a. The affricate is phonologically different from its phonetic realization: either it has unordered stricture features or more likely it is simply a phonological stop.
 - b. Phonetically (or postlexically in some analyses, e.g. Rice 1994, Lombardi 1995), the affricate has a stop closure followed by a fricative release: i.e. the two stricture features must become ordered,

or the projection of the fricative release must occur, or the specific manner/place feature of the affricate must be realized phonetically on the release.

- c. Predictions: Affricates cannot exhibit edge effects phonologically, and edge effects are only possible in the phonetic component.
- d. There is a mismatch between the phonological and phonetic representations and also a difference in how affricates behave phonologically vs. phonetically.

Phonological edge effects in Piro

(17) Piro obstruent co-occurrence restrictions (Lin 2005, data from Matteson 1965)

- a. The obstruents in Piro include [p t k ts tʃ tɕ s f ɕ], with [tɕ] and [ɕ] as non-strident palatal segments specified with both CORONAL and DORSAL.
- b. The restrictions apply both in underlying representation and during the derivation.
- c. When nonpermissible clusters occur through morpheme concatenation and boundary vowel deletion, the first consonant of the cluster deletes (i.e. cluster simplification) with compensatory lengthening of the preceding vowel (Matteson 1965:33-34, Lin 1997); e.g. /hitsrukate+tʃi/ → [hitsrukʌt-tʃi] → [hitsruka:-tʃi] ‘chief’.
- d. The co-occurrence restrictions therefore are assumed to be phonological.

(18) The data and patterns

- a. *[pp] *[tt] *[kk] *[fricative-fricative] *[affricate-affricate]
- b. *[t-affricate] cf. [affricate-t] allowed
- c. [fricative-affricate] allowed
- d. *[strident affricate-strident fricative] cf. [tɕ-fricative] & [affricate-ɕ] allowed.

(19) The generalizations

- a. The *[affricate-affricate] clusters are ruled out as a class (18a), suggesting that these affricates may just be CORONAL stops to be ruled out together with *[tt].
- b. However, the edge effects shown by *[t-affricate] vs. [affricate-t] (18b) and the edge effects shown by generally prohibited *[affricate-

fricatives] clusters vs. permissible [fricative-affricate] clusters (18cd) suggest that [cont] must be present in the affricate and ordered at the right edge.

- c. The *[affricate-fricatives] clusters are prohibited only when both are strident (18d), which suggests the patterning of affricates and fricatives in term of stridency (Rubach 1994, Kim 1997), but this patterning involves edge effects since [strident fricative-strident affricate] clusters are allowed.

(20) None of the proposed representations of affricates works.

- a. If affricates are represented with ordered [stop-cont], the OCP on [cont] that rules out *[fricative-fricative] clusters would also rule out well-formed [tç-fricative] clusters.
- b. If the two features are unordered, the OCP on [cont] would rule out well-formed [fricative-affricative] and [tç-fricative] clusters.
- c. If affricates are stops, the OCP on homorganic [stop] that rules out *[tt] and *[t-affricate], together with *[pp] and *[kk], would also incorrectly rule out well-formed [affricate-t] clusters.

(21) A two-level analysis (Lin 2005, cf. Steriade 1989)

- a. Affricates are stops in the lexical phonology but have fricative release at the right edge postlexically
- b. Different constraints are active at different levels.
- c. In the lexical phonology, the OCP on [cont] rules out *[fricative-fricative] clusters; affricates are not affected at this point since they are stops, and there is no problem preserving those well-formed [fricative-affricate] and [tç-fricative] clusters.
- d. At the postlexical level when affricates have ordered stricture features or fricative release, there are three active constraints:
 - An OCP constraint against a sequence of affricates rules out *[affricate-affricate] clusters.
 - An OCP constraint on homorganic [stop] bans *[pp tt kk] and *[t-affricate]. Since the [stop] part of the affricate is now on the left edge, well-formed [affricate-t] clusters are retained.
 - An OCP constraint on both [+strident] and [cont] rules out *[strident affricate-strident-fricative]. Since the [cont] part is at the right edge of the postlexical affricate, well-formed [strident fricative-strident affricate] clusters remain, and since [tç] is not

strident, well-formed [tç-fricative] clusters are not subject to the constraint.

(22) Problems with the phonological stop approach

- a. To be consistent with the stop approach, the postlexical level in Piro must be the phonetic implementation level; then the edge effects are expected.
- b. Moreover, since Piro has strident and non-strident affricates, to rule out *[affricate-affricate] clusters seems to treat all and only affricates as a natural class, which can pose a problem for the stop approach (15c), but if the constraint operates at the phonetic level, the issue diminishes.
- c. It remains unclear, however, if the postlexical level in Piro is phonological or phonetic. Given that the cluster restrictions also hold underlyingly, and that cluster simplification (the repair for nonpermissible clusters) is a categorical rule that operates at both lexical/cyclic and postlexical/noncyclic levels, the restrictions may occur in the phonology after all.

Phonetic anti-edge effects in Piro

(23) Transitional vowels and syllabic consonants

(Lin 1993, 1999, 2005, data from Matteson & Pike 1958, Matteson 1965)

- a. This is purely a phonetic implementation process, as argued by Levin (1987) and Lin (1993, 1999).
- b. A transitional vowel is inserted between a stop and the following stop or fricative, but in the transition from a fricative to a stop, the fricative becomes syllabic without a transitional vowel:

stop-stop	[t ^h po]	‘curve’
stop-fricative	[k ^h su]	‘...’s house’
fricative-stop	[ʃkota]	‘low abdomen’

- c. Since affricates are stop-like at the left edge, as expected, in the transition from a stop to an affricate and a fricative to an affricate, transitional vowel insertion applies to the former and consonant syllabicity applies to the latter:

stop-affricate	[p ^h tʃowi]	‘an edible root’
fricative-affricate	[yoçtʃita]	‘he changes course’

- d. Since affricates are fricative-like at the right edge, a transition from an affricate to a stop should result in consonant syllabicity, but affricates

unexpectedly behave like stops with a transitional vowel added in its transition to either a stop or a fricative:

affricate-stop [tʃ^okotu] ‘cebus monkey’

affricate-fricative [petʃitʃ^oçeta] ‘he always lies in wait’

- e. This looks like an unexpected case of anti-edge effects because the process refers to the right-edge context of the first consonant, and yet affricates pattern with stops rather than fricatives.
- f. The process applies also to sonorants, which always show up as syllabic consonants when followed by any consonant, and a transition from a fricative to a sonorant leads to transitional vowel insertion (e.g. [smota] → [s^omota] ‘blunt poiint’), unlike the syllabic fricatives in (23bc). Transitional vowel insertion always applies between a stop/affricate and any other consonant

(24) A sonority-based analysis (Lin 2005)

- a. Stops and affricates as a group are less sonorant than fricatives, which in turn are less sonorant than sonorants.
- b. A transitional vowel is inserted when the first consonant is a stop or affricate or when it is less sonorant than the second consonant.
- c. The first consonant becomes syllabic if it is a sonorant or if it is more sonorous than the second consonant.

(25) Problems with the phonetic representation of affricates

- a. If stricture properties determine relative sonority of segments, as is commonly assumed, the fact that affricates and stops belong to the same sonority class seems to suggest that the stop part of the affricates is primary and the fricative part is secondary even at the phonetic level.
- b. Alternatively, it is likely that affricates, like released simple stops but unlike fricatives and sonorants, have release aperture positions (Steriade 1993, cf. (1b)), so stops and affricates behave the same when the releases are not masked by the next consonant and thus perceptually interpreted as transitional vowels.
- c. Whatever the analysis and interpretation of the data, this phonetic patterning of affricates with stops may indicate the fundamental nature of affricates as being stops.

The phonology-phonetics mismatch under the stop approach

(26) From a stop to an affricate

- a. In recent years, the stop approach appears to have a strong following. Even in a challenging case like Piro, the affricate appears to be more like a stop in nature (i.e. it is underlyingly a stop and phonetically behaves like a stop).
- b. The mismatch between a phonological stop and a phonetic [stop closure-fricative release] sequence then characterizes the affricate.
- c. The stop that becomes an affricate differs from a simple stop in that it contains some place or manner feature that is used to contrast with a simple stop but is typically ill suited for manifestation during an obstruent stop closure, e.g. stridency.

(27) Why the mismatch?

- a. If the fricative release of the affricate is purely phonetic, the need for such a release for an underlying stop can be interpreted as an enhancement of the perceptibility of the contrastive underlying manner or place feature that cannot be well perceived during a stop closure, e.g. [+strident], or the minimal place contrasts between stops within a major place category can be differentiated better with affrication (Kehrein 2002).
- b. This is then a case of phonetic enhancement of phonological contrastive features for the purpose of contrast preservation.
- c. This also means that we have a case of phonology-phonetics mismatch in that an affricate is a stop bearing an “incompatible” feature that can be better perceived on or is more compatible with a continuant segment or release rather than a stop.

(28) Questions and possible directions for answers

- a. Why are “incompatible” feature combinations allowed in phonological specifications?
- b. How and why an “incompatible” feature routinely ends up with some stops across many languages?
- c. If affricates are just stops, why is that in many languages the supposedly phonetic fricative releases exactly match the phonemic fricatives in terms of place features and stridency (van de Weijer 1996:64,139; §2.2.3). Why is there this constant coincidence?
- d. Perhaps what is relevant is feature economy (Clements 2003) by which each language makes an efficient and maximal use of a limited

set of distinctive features by sharing them across different types of segments in organizing underlying inventory (cf. Lin 2005: footnote 4).

- e. It is not entirely clear if all cases where the fricative release is referred to can be claimed to occur in the phonetic component. For example, the contradictory results of the Piro data, i.e. affricates as underlying stops with postlexical phonological edge effects and phonetic anti-edge effects seem to still point to the ambiguous dual properties of affricates.
- f. The phonetic property/representation of the fricative release of an affricate is really not the same as the phonetic realization of the underlying [cont] feature of a fricative, so the cases where [cont] is referred to for an affricate may have to be reanalyzed in terms of phonetic release rather than phonological/phonetic continuancy.

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