Palatalized Labials in Polish Dialects: An Evolutionary Perspective*

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Abstract: Two types of explanations for typological asymmetries are in current use: synchronic, which rely on phonological filters that make learners more receptive to some patterns than others (e.g., markedness), and diachronic, which appeal to phonetically systematic errors that arise in the transmission of the speech signal. This paper provides a diachronic account of palatalized labials in standard and dialectal Polish. It is shown that the weak perceptibility of the palatal element in a specific phonetic context is a good predictor of depalatalization and that dissimilation arises whenever a phonetic signal can be interpreted in a non-unique manner. The Polish data exemplify three sources of natural sound change: (i) neutralization of perceptually weak contrasts, (ii) phonological reanalysis of ambiguous signals, and (iii) change in the frequency of phonetic variants. Sound change is shown to be non-deterministic and non-optimizing. There is no role for markedness in this account.

1. Introduction

Two questions about which phonologists disagree are whether the explanation for typological patterns is synchronic or diachronic and whether linguistic systems are goal-oriented or not. The line of research represented by Chomsky and Halle (1968), Archangeli and Pulleybank (1994), Flemming (1995), Steriade (2001), and Hayes and Steriade (2004) assumes that typology finds an explanation in synchronic biases. These are either innate and make up Universal Grammar (Chomsky and Halle 1968) or emerge primarily from the phonetic input the learner is exposed to (Hayes and Steriade 2004). Adopting the framework of Optimality Theory (Prince and Smolensky 2004), Hayes and Steriade (2004) propose that phonetic knowledge informs the ranked constraints that make up the phonological component. In

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other words, synchronic grammars, which comprise hierarchically ranked constraints, are induced from phonetic substance. The emergent rankings of these phonetically grounded constraints account for attested patterns, while other patterns are predicted not to exist because the constraints or the rankings that could generate them cannot be induced from phonetic input.

Synchronic accounts typically invoke markedness to explain typological asymmetries (Hayes and Steriade 2004). It is argued that cross-linguistic high frequency of certain patterns correlates with their unmarked status and the rarity of others with their marked status. In Optimality Theory (OT) markedness laws assume the form of violable markedness constraints which penalize particular structures in surface forms. Faithfulness constraints provide a counterbalance by favoring similarity between input and output forms. Markedness constraints ensure that grammars are inherently optimizing (goal-oriented).

Representing a different approach, Evolutionary Phonology (EP), Blevins (2004), following Ohala (1981), proposes that explanations for recurrent sound patterns in the world's languages are historical and not goal-oriented. Natural sound change, which gives rise to linguistic patterns, is phonetically based and stems from systematic errors that occur during language transmission between the speaker and the listener. Ohala's (1981) model relies on "innocent misapprehensions", because the basic mechanism of innovation involves mishearing a structure and assigning it an interpretation that differs from that assigned by the previous generation. Blevins relieves synchronic grammars of the task of providing explanations and argues that they are primarily descriptive. It follows that in EP finding motivation in phonetics is central to diachronic accounts. There is no role for teleology or markedness in this model.

Proponents of EP raise two arguments against synchronic generative models such as OT. One comes from parsimony and the other from typology. Insofar as OT constraints are derived from phonetic input, parsimony dictates against the need for a phonological component that copies phonetic knowledge only to translate it into constraints. If typology can be explained by phonetics, why duplicate explanations by positing a phonological component that likely makes

use of the same phonetic facts (Ohala 1990b, Hale and Reiss 2000, Blevins 2004: 81–85, 237)?[1]

The argument from typology is based on the fact that no model of Universal Grammar can account for the attested and unattested linguistic patterns in the world's languages. In fact, as Anderson (1981) points out, most of the phonology of natural languages is non-natural. A Universal Grammar that would come close to accounting for typology would have to allow for what seem to be crazy (phonetically bizarre) rules from a synchronic perspective (Bach and Harms 1972). Crazy rules no longer seem crazy when judged from a historical perspective, because they reflect a succession of phonetically transparent sound changes. Moreton sums up this line of reasoning by pointing out that "a theory of Universal Grammar which is liberal enough to admit crazy rules must also admit so many unattested processes that it can no longer make useful typological predictions" (2008: 97). In the same vein, markedness, a property of Universal Grammar, has been criticized for its vagueness and lack of explanatory power, leading several researchers to replace it by other, more specific concepts rooted in phonetics and frequency of use (Blevins 2004, Hume 2004, Haspelmath 2006). In view of both parsimony and the wrong predictions of synchronic accounts, EP pushes the bulk of explanation for sound patterns into the diachronic dimension (Blevins 2004: 259). With no role for markedness, sound change in EP accounts is necessarily non-optimizing and unpredictable.

This position encounters opposition from those researchers who advance arguments from typology showing patterns that do not reflect phonetics alone and must be filtered by phonological predispositions attributable to synchronic grammars (Archangeli and Pulleyblank 1994, Steriade 2001, Hayes and Steriade 2004, Moreton 2008). Kiparsky (1995) and de Lacy (2006) argue that phonetically based sound change may be blocked by phonological biases. Kiparsky (2006) argues that EP is unable to predict the direction of sound change because it cannot

[1] Blevins makes it clear that EP does not question the existence of Universal Grammar per se: "though EP challenges the existence of *phonological* universals, it does not deny, and, indeed, it embraces work in phonetics and cognitive sciences more generally which demonstrates synchronic effects of innate knowledge or processing effects in these two domains" (2006: 246).

refer to the relative markedness of particular classes of sounds. Purnell (2009) questions the predictive power of phonetically based accounts.[2]

In the present analysis I argue that the development of palatalized labials in Polish dialects can be explained without reference to synchronic biases. I present an EP account of data drawn from Standard Polish (SP), Eastern Polish (EastP) and the North Mazovian dialect of Polish (NMD), a rural dialect spoken in the northeast central part of Poland. Located within the North Mazovian region is the Kurp area with its distinct Kurp dialect (KD).[3] I attempt to verify the assertion that natural sound change results from reinterpretation of the phonetic signal and from phonetic variation. I look at cases which show that contrasts which cannot be saliently implemented tend to be neutralized and that those which are perceptually strong are maintained. The account of dissimilation advocated here involves a phonological reanalysis of an ambiguous signal.

In section 2 I outline the mechanism of phonetically based sound change. Section 3 provides an overview of the various realizations of palatalized labials in NMD and points out how they differ from their SP counterparts. Section 4 looks at previous analyses of palatalized labials in Polish dialects, in particular Kochetov's (1998) account couched within Articulatory Phonology (Browman and Goldstein 1989). In section 5.1 I claim that variation in gestural timing led to phonetic variation, a source of phonetic change. Next, I discuss contrast neutralization before /i/ (section 5.2), word-finally (section 5.3), and in the context of stridents (section 5.4). Finally, section 6 provides evidence from other languages which suports this phonetically based analysis. Section 7 summarizes the most important conclusions.

[2] While synchronic generative accounts couched in Optimality Theory generally do not attempt to explain sound change, the goals of Optimality Theory and EP converge when finding an explanation for phonological typology is concerned (Kager 1999, Hayes and Steriade 2004). Thus EP is an alternative model to Optimality Theory (Blevins 2006: 247–48).

[3] The variety described as NMD is spoken in, for instance, the village of Grabowo and KD in Dębe (Zduńska 1965: 14–25). The areas where NMD and especially KD are used are currently shrinking.

2. Phonetically Based Sound Change

EP rests on the assumption that typology originates from a variety of phonetically based processes which applied in the past. Blevins argues that linguistic patterns reflect language change, which is essentially diachronic and arises in the course of the transmission of sound patterns across generations. The explanation for recurrent synchronic sound patterns does not reside in synchronic grammars. Rather, synchronic patterns have their origin in diachronic phonetically motivated sound change. In other words, under EP the explanation for synchronic patterns is located in the diachronic dimension. Furthermore, sound change is non-optimizing in that it is not driven by articulatory ease, perceptual distinctness, or markedness. Should these properties arise as a result of a sound change, they are emergent and non-deterministic, and merely reflect common sources of sound change (Blevins 2004: 14–15). The sources of natural sound change in (1) are drawn from Blevins (2004: 32–33).

(1) General typology of sound change in Evolutionary Phonology (S = speaker, L = listener)

a. CHANGE: The phonetic signal is misheard by the listener due to perceptual similarities of the actual utterance with the perceived utterance.

Example: S says [anpa]
L hears [ampa]

b. CHANCE: The phonetic signal is accurately perceived by the listener but is intrinsically phonologically ambiguous, and the listener associates a phonological form with the utterance which differs from the phonological form in the speaker's grammar.

Example: S says [ʔa̯ʔ] for /aʔ/
L hears [ʔa̯ʔ] and assumes /ʔa/

c. CHOICE: Multiple phonetic signals representing variants of a single phonological form are accurately perceived by the listener, and due to this variation the listener (i) acquires a prototype or best exemplar of a phonetic category which differs from that of the speaker and/or (ii) associates a

phonological form with the set of variants which differs from the phonological form in the speaker's grammar.

Example: S says [kakáta], [kăkáta], [kkáta] for /kakata/
L hears [kkáta], [kăkáta], [kakáta] and assumes /kkata/

The underlying mechanism of a sound change classified under CHANGE in (1a) is perceptual similarity. Perceptual biases may give rise to the reinterpretation of a sound signal. In this particular example, the alveolar nasal is misheard as the labial nasal before a prevocalic oral labial stop. This misperception is grounded in the intrinsic weakness of place cues for the nasal in this position. The cues of the following pre-vocalic oral stop are not compromised (Ohala 1981). CHANGE (1a) invariably involves a change in pronunciation and may or may not lead to phonological reanalysis.

CHANCE (1b) has its roots in ambiguities in the phonetic signal which arise through coarticulation. In the course of language acquisition, coarticulated non-local percepts need to be associated with their sources. If a listener chooses a phonological analysis of the ambiguous speech signal that is distinct from that of the speaker, a sound change occurs. In the example in (1b), laryngealization, a feature with a multisegmental domain, is involved. Laryngealized vowels are commonly accompanied by glottal stops and vice versa. Insofar as it is difficult to determine whether the source of this long-domain feature is a vowel, a glottal stop, or both, phonological reanalysis may take place. The mechanism of CHANCE is schematized below; feature F stands for a long-domain feature such as laryngealization.

(2) S says [$C^FV^FC^F$] for /C^FV/
L hears [$C^FV^FC^F$] and assumes /C^FV/
or L hears [$C^FV^FC^F$] and assumes /V^F/
or L hears [$C^FV^FC^F$] and assumes /VC^F/
or L hears [$C^FV^FC^F$] and assumes /C^FVC^F/

At the root of CHOICE (1c) lies the intrinsic synchronic variability of speech. Each uttered form can be placed along a continuum from

hyperarticulated to hypoarticulated speech (Lindblom 1990). The example in (1c) demonstrates the role that frequency of use plays in language change (Bybee 2001). The range of forms for /kakata/ for a speaker S is, from the most to the least frequent, [kakáta], [kăkáta], [kkáta]. The leftmost, most frequent, form is designated as the prototypical one. If for a listener L there is a change in the frequency of the variants, a different prototypical form will result: [kkáta], [kăkáta], [kakáta]. This, in turn, may lead to phonological reanalysis: /kkata/. Blevins argues that the shift in frequency is not goal-oriented or deterministic (2004: 44–47).

3. Palatalized Labials in Polish

There are five contrastive vowels in Standard Polish (SP): front unrounded /i/ and /ɛ/, central /a/, and back rounded /u/ and /ɔ/ (Gussmann 2007).[4] The consonant inventory is given in (3).

(3)	/p b m/	bilabial	[+back]
	/pʲ bʲ mʲ/	bilabial	[–back]
	/f v/	labio-dental	[+back]
	/fʲ vʲ/	labio-dental	[–back]
	/t d n s z t d ts dz/	dental	[+back]
	/r l/	alveolar	[+back]
	/š ž tš dž/	post-alveolar[5]	[+back]
	/ɕ ʑ tɕ dʑ ɲ/	alveolo-palatal	[–back]

[4] There are two competing positions on the status of /ɨ/, spelled <y>. According to Rubach (1984) and Bethin (1992), the central (or front retracted, Sanders 2003: 43) vowel should be granted phonemic status. Conversely, Gussmann observes that /i/ and /ɨ/ appear in complementary distribution, with /i/ preceded by palatalized consonants and /ɨ/ occurring in the context of non-palatalized consonants, e.g., [pʲiw] 'he drank' and [pɨw] 'dust' (2007: 33). This leads him to grant phonemic status to only one of the vowels and derive the other. While I essentially agree with this point, it should be mentioned that the two vowels are marginally contrastive in endings and loanwords, for instance *chłop+i* [xwɔpi] 'peasant' nom.pl. versus *chłop+y* [xwɔpɨ] 'lad' nom. pl. and *team* [tim] 'team' versus *tym* [tɨm] 'this' inst.sg. Gussmann's view is adopted for the purposes of this diachronic analysis.

[5] Post-alveolars are represented with the non-IPA symbols /š ž tš dž/.

(3)	/j/	palatal	[–back]
	/k g x w[6]/	velars	[+back]
	/k^{j} g^{j} x^{j}/	palato-velar	[–back]

SP consonants can be palatalized or non-palatalized. This classification correlates with the feature [–back] and [+back] respectively. Following Gussmann (2007), I assume that virtually all non-palatalized consonants have palatalized counterparts. This includes labials and velars. Specifically, the assumption of the phonemic status of palatalized labials is necessary for the diachronic analysis in the next section, as all the dialectal realizations historically derive from /p^{j} b^{j} f^{j} v^{j} m^{j}/ (contemporary SP can be handled without this extension; cf. Rubach 1984 and Bethin 1992). Thus the phonemic contrast between *pił* [p^{j}iw] 'he drank' and *pył* [pɨw] 'dust' resides in the palatalized /p^{j}/ and the non-palatalized /p/ respectively, and the vowel is predictable. In phonetic terms palatalized labials are characterized as labials with secondary palatal articulation. The sound inventories of Eastern Polish (EastP), North-Mazovian dialect of Polish (NMD), and the Kurp dialect of Polish (KD) largely coincide with the one presented above. An important difference pertains to coronal stridents. While SP has three series—alveolar, post-alveolar, and palatal—NMD and KD have only two—alveolar and palatal. This point becomes relevant in section 5.4. Finally, it is useful to provide a list of palatal consonants relevant for the following discussion.

(4)	/j/	palatal glide
	/ɕ/	voiceless palatal strident fricative
	/ʑ/	voiced palatal strident fricative
	/ç/	voiceless palatal non-strident fricative
	/ʝ/	voiced palatal non-strident fricative
	/ɲ/	palatal nasal

Palatal fricatives are either strident or non-strident (Kochetov 1998). Below we show relevant data from EastP, SP, NMD, and KD. The NMD and KD data are drawn from Friedrich (1955: 80–101) and

[6] The approximant /w/ has a secondary labial articulation.

Zduńska (1965: 14–43) and, in view of considerable synchronic inter-speaker variation, must be seen as an idealization.

(5)		**EastP**	**SP**	**NMD**	**KD**	**Gloss**
	/pʲ/	pʲasɛk	pjasɛk	pçasɛk	pɕasɛk	‘sand’
		drapʲɛ	drapjɛ	drapçɛ	drapɕɛ	‘it scratches’
		pʲura	pjura	pçura	pɕura	‘feathers’
	/bʲ/	bʲawɨ	bjawɨ	bʝawɨ	bʑawɨ	‘white’
		bʲɔdrɔ	bjɔdrɔ	bʝɔdrɔ	bʑɔdrɔ	‘hip’
		bʲɛda	bjɛda	bʝɛda	bʑɛda	‘poverty’
	/fʲ/	kfʲat	kfjat	kfçat kçat	kfɕat kɕat	‘flower’
		ɔfʲara	ɔfjara	ɔfçara ɔçara	ɔfɕara ɔɕara	‘sacrifice’
	/vʲ/	vʲadrɔ	vjadrɔ	vʝadrɔ ʝadrɔ	vʑadrɔ ʑadrɔ	‘bucket’
		tšwɔvʲɛk	tšwɔvjɛk	tswɔvʝɛk tswɔʝɛk	tswɔvʑɛk tswɔʑɛk	‘man’
		vʲatr	vjatr	vʝatɛr ʝatɛr	vʑatɛr ʑatɛr	‘wind’
	/mʲ/	mʲastɔ	mjastɔ	mɲastɔ ɲastɔ	mɲastɔ ɲastɔ	‘town’
		mʲut	mjut	mɲut ɲut	mɲut ɲut	‘honey’
		rumʲanɛk	rumjanɛk	rumɲanɛk ruɲanɛk	rumɲanɛk ruɲanɛk	‘chamomile’

In the most simple terms, the differences among the four dialects relate to the realizations of the palatal element of the labial. EastP exhibits the presumed earlier historical stage when labials were contrastively palatalized or plain. SP, NMD, and KD realizations can be viewed as later modifications of this state. In EastP palatality is manifested as secondary articulation of the labial. In the remaining dialects palatality shows up as a separate segment following the labial. In SP it is a front glide and in NMD and KD it is a palatal fricative, non-strident and strident, respectively. The reflexes of palatalized labial frica-

tives and the nasal show synchronic variation in NMD and KD. Realizations with deleted labials occur alongside those where labials are preserved. Zduńska reports that the variants deleting the labial fricatives are significantly more frequent than the variants which preserve them—70% vs. 20%, respectively, in certain villages. The rate of the deletion of the labial nasal may be as high as 90% (1965: 21, 32). In the following section I take a look at previous accounts of palatalized labials in Polish dialects.

4. Previous Analyses

The Polish facts were previously analyzed by Kochetov (1998), Czaplicki (2000), Ćavar (2004), and Kijak (2008), among others. What follows is mostly a summary of Kochetov 1998, where he looks at the differences in the development of palatalized labials in Polish dialects and attempts to relate them to gestural organization. In the description of the various realizations of palatalized labials Kochetov relies on the insights of Articulatory Phonology (Browman and Goldstein 1989). In this model, phonological representation employs a gestural score. The phonetic gesture is defined as a set of coordinated movements of an articulator. There are four articulators: lips, tongue body, glottis, and velum. A set of parameters completes the representation of each gesture.

(6) Relevant articulator sets and parameters (after Browman and Goldstein 1989)

Gestures:

Articulators	**Dimensions**
Lips	Constriction degree, constriction location, stiffness
Tongue Body (TB)	Constriction degree, constriction location, stiffness
Glottis	Constriction degree, stiffness
Velum	Constriction degree

Constriction degree is specified as [closed] for stops, [critical] for fricatives, and [narrow] for glides. The values of constriction location include [labial], [dental], [palatal], and [velar]. Stiffness is a correspondent of the phonological feature [consonantal].

Without going into the details of Kochetov's (1998) analysis, the fundamental difference between EastP on the one hand and SP, NMD, and KD on the other lies in the synchronous vs. asynchronous execution of gestures of the palatalized labial. Specifically, in the synchronous variant the labial [closed] and the palatal [narrow] gestures are more or less simultaneous; there is a considerable overlap. In the asynchronous realizations the palatal gesture is delayed with respect to the labial gesture. The reduced gestural overlap in the latter realization gives rise to an excrescent palatal segment in perception.

Regarding the SP, NMD, and KD realizations in (5), the temporal reorganization of an additional variable comes into play. In the SP realization [pj], the glottis is specified as [wide] only throughout the production of the stop. In the [pç] and [pʑ] realizations, on the other hand, the feature [wide] is extended to the excrescent palatal segment, resulting in the perception of voicelessness. In addition to the devoicing of the palatal element, the overlap of the features [closed] and [narrow] produces an intermediate value [critical] which is characteristic of fricatives (Kochetov 1998: 9). On the perception side, these dialectal realizations incorporate a range of perceptual cues for identification (Flemming 1995). In (7) the palatalized labial is contrasted with the plain labial and the palatal fricative /ʑ/ is contrasted with the alveolar fricative /s/.

(7) Perceptual cues to palatalized labials and stridents (Flemming 1995, Johnson 2003)

		p	**p^{j}**	**pj**	**pç**	**pʑ**	**ʑ**	**s**
Release:	high F2	–	+	+	+	+		
Duration:	long	–	–	+	+	+		
Noise Intensity:	fricative	–	–	–	+	+	+	+
	strident	–	–	–	–	+	+	+
Place:	palatal				+	+	+	–

As shown in (7), when palatalized labials are contrasted with plain labials in minimal pairs like /pʲasɛk/ 'sand' (with the palatalized labial realized as [pʲ], [pj], [pç], or [pɕ]) vs. /pasɛk/ 'belt', the cues that differentiate [pɕ] from [p] include high F2 at the release, overall duration, fricative noise, and stridency. The [pʲ] variant, on the other hand, diverges from [p] only in the high F2 at the release. For our purposes, the contrast between /ɕ/ and /s/ is encoded by the feature [palatal].[7] The analyses of Kochetov (1998) and Ćavar (2004) both underscore the teleological premises of the development of palatalized labials. Their position is briefly summarized and addressed below.

The motivating factor for the asynchronous realizations is the enhancement of contrast. Regarding perceptual salience, Kochetov argues for the following scale of preference: pɕ > pç > pj > pʲ. This accords with the number of perceptual cues associated with each of the realizations in (7), with [pɕ] being the most and [pʲ] the least distinct from [p]. The weak perceptibility of palatalized labials in relation to consonants with other places of articulation gets further support from Kochetov's (2004) perceptual study. Thus the maximization of contrast is highest for the [pɕ] variant and lowest for [pʲ], with intermediate values for [pj] and [pç].

Teleological accounts that make reference to contrast enhancement run into problems when linguistic patterns are analyzed from a broader perspective. These accounts are well suited to explain why patterns resulting from an optimizing sound change occur in a single language (a frequent shortcoming of Optimality Theoretic accounts pointed out by Vaux 2008). However, they predict that other languages or dialects with similar preconditions for a sound change should follow the same path. Concretely, suppose that the KD realization with palatal stridents marks an improvement on contrast perceptibility and, at the same time, reduces markedness, what prevented a similar change in SP? One could invoke faithfulness and claim that it interplays with perceptual salience. KD will then be seen as giving priority to perceptual salience, while in SP faithfulness will take

[7] Place of articulation of fricatives correlates with the frequency of frication noise, with higher frequencies reserved for fricatives with a constriction located in the front of the mouth and lower frequencies characteristic of fricatives with a constriction further back in the mouth (Johnson 2003: 124–27). With reference to this analysis, [palatal] is cued by lower frequency noise relative to [alveolar].

precedence. This line of reasoning is not particularly compelling, especially in the case of closely related dialects of one language such as SP and KD. The problem is pushed back: why is the tradeoff between perceptual salience and faithfulness resolved in favor of the former in KD and in favor of the latter in SP? We could also argue that at some point SP and KD speakers were exposed to different token frequencies of variants of palatalized labials. However, the rationale for these different frequencies remains unclear. Blevins concludes that "as far back as we go, we will be forced to posit a difference between populations which does not appear to have a phonetic motivation, but results from stochastic effects of frequency in language use" (2004: 280, after Bybee 2001).

Blevins adds another argument against synchronic generative accounts relating to the fact that each phonological representation has multiple phonetic variants. Some of these variants could be claimed to be more effortful and some more salient than others. Insofar as there is always a wide range of phonetic variants at any given time, calculation of phonetic optimality is not feasible in the case of intraspeaker variability (2004: 45–46). In the account of palatalized labials below I follow Blevins in assuming that synchronic linguistic patterns find an explanation in diachronic sound change that is non-optimizing and non-deterministic.

5. Palatalized Labials: An EP Account

In this section I attempt to demonstrate how phonetic variation and weakness of phonetic cues might give rise to sound change. Special attention is given to contrast neutralization.

5.1. Phonetic Variation

This section presents an EP account of the development of palatalized labials in Polish which incorporates Kochetov's insight resting on articulatory gestures. It is claimed that a shift in the frequency of synchronic variants led to phonological reanalysis. The source of change is CHOICE (1c). Recall that this mechanism involves intrinsic synchronic variability. Below is the hypothesized development of /p^{j}/ with each step representing a Polish dialect.

(8) a. EastP—no change

Speaker		Listener
/p^{j}a/		/p^{j}a/
↓ 1		↑ 3
[p^{j}a, pja, pça, pɕa]	2→	[p^{j}a, pja, pça, pɕa]

b. SP /p^{j}a/ → /pja/

Speaker		Listener
/p^{j}a/		/pja/ (/p^{j}a/)
↓ 1		↑ 3
[pja, p^{j}a, pça, pɕa]	2→	[pja, p^{j}a, pça, pɕa]
↑ 4		
[p^{j}a, pja, pça, pɕa]		

c. NMD /pja/ → /pça/

Speaker		Listener
/pja/		/pça/ (/p^{j}a/)
↓ 1		↑ 3
[pça, pja, pɕa, p^{j}a]	2→	[pça, pja, pɕa, p^{j}a]
↑ 4		
[pja, pça, pɕa, p^{j}a]		

d. KD /pça/ → /pɕa/

Speaker		Listener
/pça/		/pɕa/
↓ 1		↑ 3
[pɕa, pça, pja, p^{j}a]	2→	[pɕa, pça, pja, p^{j}a]
↑ 4		
[pça, pɕa, pja, p^{j}a]		

The variant sets in (8) show variants in order of decreasing frequency. Example (8a) shows the EastP synchronous realization, without a

change in pronunciation. The crucial element of the developments in (8b–d) is the shift in the frequency of variants from the speaker as a child to the speaker as an adult, marked as step 4 (Blevins 2004: 38–44). This shift is hypothesized to have triggered phonological reanalysis for the listener. In line with the assumption that phonetically based change is gradual, it is assumed that KD went through all the stages involving shifts in variant frequency in (8). In other words, (8) shows the hypothesized diachronic development of palatalized labials in KD, with each intermediate stage additionally coinciding with the state of affairs in another contemporary dialect.

While compelling evidence for restructuring of phonological forms in SP and NMD is difficult to obtain (hence the variants without restructuring in step 3 in (8b–c)), closer examination of the reflexes of palatalized labial fricatives reveals that KD underwent a phonological reanalysis—step 3 in (8d). The case of palatalized labial fricatives deserves special attention, as Kochetov overlooked it. It is arguably crucial for the full understanding of the development of palatalized labials in KD. Example (9) shows the hypothesized diachronic development of /vʲ/.

(9) /vʲ/ > /vj/ > /vj̇/ > /vʑ/ > /ʑ/

The labial element is dropped completely and only the palatal segment remains, as in /vʲadrɔ/ → [ʑadrɔ]. The final stage in (9) is perceptually motivated. The deletion of the labial fricative can be explained if one takes into account the fact, articulated by Ohala (1990b) among others, that a consonant has stronger cues before a vowel than before another consonant.

It is plausible to argue that the non-alternating emergent palatal fricatives, such as the one in [ʑadrɔ], can no longer be derived synchronically from /vʲ/ (contra Kochetov 1998). However, it would be inaccurate to conclude that the contrast between the reflexes of /vʲ/ and /ʑ/ is fully neutralized in KD. There still remain alternations at morpheme boundaries.

(10) gwɔv+a ~ gwɔʑ+ɛ 'head' nom.sg. ~ dat.sg.

The presence of such synchronic alternations makes the relation of /vʲ/ and /ʑ/ transparent to the speakers. The recoverability of /vʲ/ at mor-

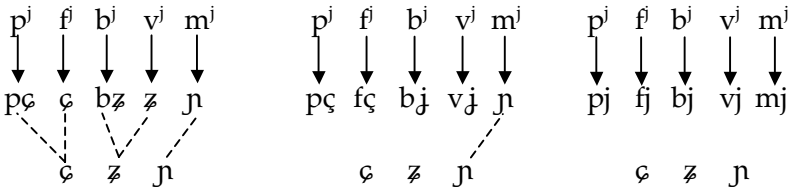
pheme boundaries, aided by the prestigious role of SP, brings about hypercorrection. The word *ponoże* /pɔnɔʑ+ɛ/ 'part of a spinning wheel',[8] which never had a palatalized labial fricative, in hypercorrect speech is frequently pronounced [pɔnɔvjɛ] (Friedrich 1955: 93).

Hypercorrection is also attested morpheme-internally. For instance, /ʑɛlaznɔ/ 'iron' adj.inst.sg.fem. (cf. SP *żelazną* /žɛlaznɔ̃/) is realized as /vjɛlaznɔ/ (Friedrich 1955: 93). The word *nieuk* /ɲɛuk/ 'ignorant person', containing a non-derived palatal nasal, surfaces as either /mɲɛwuk/ or /mjɛwuk/ (Friedrich 1955: 97), and *Niemiec* /ɲɛmjɛts/ 'German person' ends up as /mɲɛmjɛts/ (Friedrich 1955: 95). In all these cases the speaker wrongly assumes that the palatal segment is derived from the palatal labial and "corrects" it under the pressure of standard speech. Crucially, such cases of hypercorrection are not proof of a synchronic derivation of [ʑ] from /vʲ/ in KD, as they are characteristic of those speakers who are aware of the norm and automatically substitute [vʲ] for any instance of [ʑ]. Rather, such substitutions testify to the complete neutralization of the reflexes of palatalized labials and palatals in KD. If the reflexes of palatalized labials were synchronically transparent, KD speakers would make a distinction between forms such as /gwɔʑɛ/ and /ʑɛlaznɔ/ in that only the former item would be subject to hypercorrection, not the latter. To sum up, the development of palatalized labials in KD is an instance of a phonological reanalysis of a gradient phonetic phenomenon. Specifically, the retiming of gestures resulted in excrescent palatal segments in perception which eventually found their way into the phonological representation.

An important difference between KD on the one hand and NMD on the other is that while in KD the reflexes of palatalized labials have merged with the already existing palatals /ɕ ʑ ɲ/, the parallel development in NMD is non-neutralizing for obstruents. The emergent non-strident palatals are distinct from the existing strident palatals, as illustrated below. The solid arrows show the diachronic development of palatalized labials and the dotted lines indicate neutralizations. Although SP does not show neutralizations of the relevant contrasts, these are included in (11) for completeness.

[8] This item is realized in SP with a post-alveolar fricative, [pɔnɔžɛ]. KD diverges from SP in that instead of having three series of coronal fricatives it only has two: alveolar and alveolo-palatal. The post-alveolar series is missing (see section 5.4).

(11) a. **KD** b. **NMD** c. **SP**



In KD the reflexes of palatalized labial fricatives and the nasal have merged with the existing palatals. The reflexes of palatalized labial stops are also potentially neutralized. However, it is more appropriate to relate the reflex of /bʲ/ to the non-derived [bʑ], as in *bies* 'devil' vs. *bzie* 'elder' (loc.sg.). The contrast is preserved in SP [bjɛs] : [bʑɛ], but not in KP [bʑɛs] : [bʑɛ]. NMD is similar to SP in that the emergent palatals did not merge with the existing palatals. With the exception of /mʲ/ → [ɲ], the reflexes of palatal labials are distinct from non-derived palatals, as they show up with a non-strident fricative, [bʝɛs] : [bʑɛ]. A major difference between NMD and KD is that in the former the relation between the reflexes and the palatalized labials is synchronically transparent, for instance the /vʲ/ in [vʝadrɔ] is as transparent as the /vʲ/ in [gwɔvʝɛ] : [gwɔva]. As argued above, in KD there is no basis for a synchronic link between a palatalized labial and its palatal reflex, except in alternating cases as in (10). In contrast to KD, in NMD the phonetic process might not have reached the stage of phonologization. We now turn to cases of contrast neutralization in SP, classified as CHANGE in EP.

5.2. Before /i/[9]

An important difference between SP and KD becomes evident when we look at palatalized labials in the context of the following high front vowel.

[9] An earlier version of the analysis in sections 5.2–5.4 was presented at Formal Approaches to Slavic Linguistics 18 at Cornell University.

(12)	**SP**	**KD**	**gloss**
	pivɔ	pɕivɔ	‘beer’
	wubin	wubʑin	‘lupine’
	figura	fɕigura / ɕigura	‘figure’
	viɕɲa	vʑiɕɲa / ʑiɕɲa	‘cherry’
	pɔmidɔr	pɔmɲidɔr / pɔɲidɔr	‘tomato’

Insofar as palatality resides in consonants and not in vowels (see the discussion in section 3), reflexes of palatalized labials are expected in both dialects in (12). What we find instead is that only the KD data show a proper realization of palatalized labials. In SP, in place of the expected [pji], [bji], [fji], [vji], [mji] we find [pi], [bi], [fi], [vi], [mi].[10] Arguably, the elimination of the palatal glide before /i/ results from its low perceptibility in this context. Strings of acoustically similar segments show poor modulation in the signal and are cross-linguistically avoided. For instance, in sequences such as [wu] and [ji], the glide is insufficiently distinct from the following homorganic vowel and is likely to be dropped (Ohala 1990a: 320–26, after Kawasaki 1982). This is exactly what happens in SP: an excrescent glide fails to emerge before a homorganic vowel. CHANGE is used to formalize the process.

(13) SP /pjivɔ/ → /pivɔ/: CHANGE + CHOICE

Speaker		Listener
/pjivɔ/		/pivɔ/
↓ 1		↑ 3
[pjivɔ]	2 →	[pivɔ]

The source of the sound change in (13) is misperception. The speaker produces the form accurately. However, due to the weak perceptibility of /j/ before a homorganic vowel, the listener fails to detect the glide and phonological reanalysis occurs. This change may also involve an element of CHOICE, which makes reference to the intrinsic variability of speech. Depending on the rate of speech, the listener is exposed to a

[10] The labials exhibit coarticulatory palatalization, surface palatalization (Rubach 1984: 25).

continuum of forms ranging from careful to casual speech, [pji … pi]. The primary acoustic difference among these forms resides in the duration of the palatal element. Given that the rate of speech affects the duration of segments or features, the sound change /pji/ → /pi/ is hypothesized to have occurred when the listener assumed the casual speech variant [pi] as the prototype for careful speech as well. Thus it looks like the loss of contrast in SP had its source in both CHANGE and CHOICE. This is a welcome result, as Blevins argues that the fact that certain sound changes are cross-linguistically more common than others finds a plausible explanation within EP in their multiple phonetic sources (2004: 271–73).

In KD the palatal element, a strident fricative or a palatal nasal, does not run the risk of being confused with the following vowel and is predictably preserved. The acoustic features of the palatalized fricative and the adjacent vowel are auditorily distinct. In the next section I discuss the realizations of palatalized labials word-finally and attempt to relate them to phonetic factors.

5.3. Word-Finally

So far we have looked at palatalized labials in prevocalic position. According to Ohala (1990b) consonants before vowels are the most salient, as their phonetic cues are robust. Any analysis that attempts to provide a phonetic explanation would be incomplete without looking at other positions where the cues are weaker. The data below show word-final palatalized labials in SP and KD (Zduńska 1965: 25–27). We limit the discussion to the reflexes of /pʲ/, /bʲ/, and /vʲ/. Word-final labials /fʲ/ and /mʲ/ are uncommon.

(14)	**SP**		**KD**		**Gloss**
	nom.sg.	*gen.sg.*	*nom.sg.*	*gen.sg.*	
	kurp	kurpja	kurpɕ	kurpɕa	‘Kurp person’
	gɔwɔmp	gɔwɛmbja	gɔwɔmpɕ	gɔwɛmbʑa	‘pigeon’
	žuraf	žuravja	zuraɕ	zuraʑa	‘crane’

The SP items show the loss of palatality in word-final position. Thus, instead of the expected [pj] and [fj], we get [p] and [f] (by Final De-

voicing). The expected realizations are found in prevocalic position. KD retains the palatal element in word-final position.

The loss of palatality in SP and its preservation in KD seem puzzling until we consider the realizations of the palatal segments in the two dialects. In SP palatality is manifested by means of /j/, while in KD the palatal element shows up as /ɕ/ and /ʑ/. Notice that in word-final position the (potential) excrescent segment is preceded by a voiceless obstruent (by Final Devoicing) and not followed by a vowel. The consequences for the acoustic signal are different in the two dialects. The expected realization of 'pigeon' (nom.sg.) in SP is [gɔwɔmpj]. Polish does not allow the glide /j/ in the so-called "extrasyllabic" position, that is, when it is word-final and not adjacent to a vowel (Bethin 1992: 86). This restriction is based on acoustic premises and can be explained as having its source in CHANGE. The salience of word-final sonorants when preceded by obstruents is compromised because they lack both CV and VC transitions. In addition, they are frequently devoiced along with the obstruents, for example [pjɔtr̥] 'Peter', [spasm̥] 'spasm' (cf. [spazmu] gen.sg.) (Wierzchowska 1971). Voiceless sonorants and particularly voiceless glides have typically very little acoustic energy and are less prominent than voiced sonorants. This makes them candidates for deletion or reinterpretation as positional variants of their voiced counterparts (Blevins 2004: 30). Ladefoged and Maddieson (1996: 326) list no more than four languages (Yao, Klamath, Aleut, and several dialects of English) that have contrastive voiceless glides. Weak perceptibility is also reported for palatalized labials. Kochetov's (2004) perceptual study shows that the cues of palatalized labials are weak relative to the cues of both palatalized coronals and plain labials. A plausible explanation relates depalatalization of word-final labials to the reinterpretation of the acoustic signal under CHANGE.

(15) SP /kurpj/ → /kurp/: CHANGE

Speaker		Listener
/kurpj/		/kurp/
↓ 1		↑ 3
[kurpj]	2 →	[kurp]

The very short, low-energy period of voicelessness at the end of a word may be attributed to the release features of the preceding conso-

nant (Blevins 2004: 163). These phonetic facts explain why a word-final voiceless glide following a labial is hard to hear and is consequently, in line with the mechanism of CHANGE, lost over time.

In KD the situation is different, as the palatal segment is a strident fricative. Noisy segments are not in danger of misperception because their cues are fairly robust. What is more, fricatives, unlike oral stops for example, have internal cues and do not depend on the adjacent vowel for transition cues. Devoicing of fricatives does not decrease their salience. Another aspect that contributes to the stability of fricatives as the manifestation of palatality is the fact that sequences of obstruents are fairly common and relatively unconstrained in Polish. In sum, in KD word-final palatalized labials are preserved as their phonetic cues are strong. In SP, on the other hand, palatality is insufficiently cued to be accurately recoverable from the signal. In the next section I attempt to provide a phonetically based account of dissimilatory processes involving palatalized labials.

5.4. After Palatal Stridents

Let us turn to the context of preceding palatal stridents. Here, KD is less faithful than SP. For expository purposes, the reflexes of palatalized labial stridents (5.4.1) and palatalized labial stops (5.4.2) are discussed separately.

5.4.1. Palatalized Labial Stridents

The data in (16) show labial fricatives in the context of palatal fricatives and affricates. In KD the palatal element fails to emerge. Forms that are expected but unattested in KD are marked with an asterisk (two forms are given for each item to show that the labial element is optionally dropped).

(16)	**SP**	**KD**		**Gloss**
	ɕfjat	ɕfat	*ɕfɕat *ɕɕat	‘world’
	ɕfjɛntɕi	ɕfɛntɕi	*ɕfɕɛntɕi *ɕɕɛntɕi	‘saints’
	ɕfjɛža	ɕfɛža	*ɕfɕɛža *ɕɕɛža	‘fresh’
	tɕfjartka	tɕfartka	*tɕfɕartka *tɕɕartka	‘quarter’
	zvjɛš	dʑvɛš	*dʑvʑɛš *dʑʑvɛš	‘animal’

The KD items in (16) show that, instead of spawning a palatal element, the labial fricatives depalatalize. The context invariably consists of a preceding fricative or an affricate. In determining whether the blocking fricative is of a particular kind, the word for 'moment' is helpful: /xfʲila/ → [xɕila]. The velar fricative [x] does not prevent the emergence of the palatal element. Thus the blocking in (16) is triggered by a fricative (or an affricate) that is identical with the potential emergent palatal fricative.

I hypothesize that CHANCE is the source of this type of dissimilation. Two identical segments fail to emerge because the listener localizes the features [palatal, strident] in the initial segment and mentally factors them out from the second segment (Ohala 1981). Example (17) is a schematic representation of this listener-oriented sound change under CHANCE, where F stands for the acoustic cues of [palatal, strident].

(17) $[C^{F}C^{F}V] \rightarrow /C^{F}CV/$

The mechanism for /ɕfʲat/ in KD is provided in (18).

(18) KD /ɕfɕat/ → /ɕfat/ : CHANCE

Speaker		Listener
/ɕfɕat/		/ɕfat/
↓ 1		↑ 3
[ɕfɕat]	2 →	[ɕfɕat]

The speaker produces the word accurately, [ɕfɕat]. The listener assumes that the second occurrence of the palatal strident has its origin in the initial sound and internalizes the word accordingly, /ɕfat/.

5.4.2. Palatalized Labial Stops

KD shows yet another strategy to avoid sequences of identical palatal segments. Before giving the details of this process, it is necessary to point out differences relating to fricatives in KD and SP. The presentation is limited to the relevant clusters.

(19)	**SP**	**KD**	**Gloss**
	špadɛl	ɕpadɛl	‘spade’
	pašpɔrt	paɕpɔrt	‘passport’
	štaxeta	ɕtaxɛta	‘rail’
	kaštan	kaɕtan	‘chestnut’
	šklanka	ɕklanka	‘glass’
	kaškʲɛt	kaɕkʲɛt	‘visored cap’

The items in (19) demonstrate that the SP post-alveolar fricatives in clusters with stops (/šp/, /št/, and /šk/) correspond to palatal fricatives in KD (/ɕp/, /ɕt/, and /ɕk/). The substitution of palatal fricatives for post-alveolar fricatives is termed *siakanie* (Zduńska 1965: 63–70). In place of three series of strident fricatives, as in SP (see section 3), KD has only two: alveolar and palatal. Now we are in the position to determine what happens when the palatal fricative cooccurs with a palatalized labial stop. The words *szpieg* ‘spy’, *szpital* ‘hospital’, *szpilka* ‘pin’, and *śpiewają* ‘they sing’ show reflexes of palatalized labial stops in the context of palatal fricatives. In (20) we consider SP and KD forms. Predicted but unattested forms are marked with an asterisk.

(20)		**SP**	**KD**	
	a.	špjɛk	spɕɛκ, spçɛk, ɕpʲɛk, ɕpçɛk	*ɕpɕɛk
	b.	špʲital	ɕpʲital, spçital, ɕpçital	*ɕpɕital
	c.	špʲilka	ɕpʲilka, spçilka	*ɕpɕilka
	d.	ɕpjɛvajɔ̃w̃	spɕɛvajõ	*ɕpɕɛvaõ

The KD forms in (20) avoid identical palatal fricatives /ɕpɕ/. This accords with the reflexes of palatalized labial fricatives in (16). What distinguishes the data in (20) from the data in (16) are different strategies to accomplish this. Example (21) is a summary of the treatment of the /ɕpʲ/ cluster in KD. The expected realization is [ɕpɕ].

(21) /ɕpʲ/ cluster in KD

a. the emergent segment is /j/: /ɕpʲ/ → [ɕpj]
b. depalatalization of the underlying /ɕ/: /ɕpʲ/ → [spɕ]
c. the emergent segment is [ç]: /ɕpʲ/ → [ɕpç] – rare

Dissimilation in the cluster affects either the first (underlying) palatal fricative or the second (emergent) fricative. Of interest is the fact that the two consonants are modified in different ways. While the change in (21b) involves depalatalization of the first strident, in (21a) the palatalized labial fails to spawn the (second) palatal fricative. What sets the latter process apart from the process illustrated in (16) is that the palatality of the labial segment is preserved, but not in the expected form. Thus the /pʲ/ in [ɕpʲɛk] 'spy' remains palatal, although the palatal element is a glide, not a strident fricative. Interestingly, what the processes in (21a) and (21b) (applying in, for instance, [spɕɛk] and [ɕpʲɛk]) have in common with the process in (16) ([ɕfat]) is that they all block the emergence of sequences of identical segments. The variability of the realizations in (20) evidences that sound change is largely unpredictable and gives rise to different structural reinterpretations.[11] The mapping of /ɕpɕɛg/ to /spɕɛg/ under CHANCE is given in (22).

(22) $[C^{F}C^{F}V] \rightarrow /CC^{F}V/$

On hearing [ɕpɕɛk], the listener internalizes the feature [F], standing for [palatal], on the *second* consonant of the cluster. Additionally, the palatality of the first consonant is mentally factored out, yielding /s/.

(23) KD /ɕpɕɛg/ → /spɕɛg/: CHANCE

Speaker		Listener
/ɕpɕɛg/		/spɕɛg/
↓ 1		↑ 3
[ɕpɕɛk]	2 →	[ɕpɕɛk]

[11] Blevins (2004: 279) argues for non-directionality of sound change on the basis of the developments of Sulawesi final consonants.

Analogous processes involving mental dissociation of a feature realized on several segments are documented in Indo-European, Mayan, Romance, Eastern Polynesian, and Yurok (Blevins 2004: 148–49 and references therein).

The discussion of the data in (20) cannot be complete without considering the process in (21c), illustrated by the form [ɕpçɛk] for 'spy'. It is worth pointing out that this realization is not as common as the other realizations in (20) (Zduńska 1965: 64). Crucially, the fact that the forms *do* show the emergent fricatives is in agreement with the nature of dissimilation. Segments [ɕ] and [ç] in the cluster [ɕpç], although similar, are not identical, thus dissimilatory tendencies are not expected to be as strong as in the [ɕpɕ] cluster. This is borne out in (19), where the avoidance of [ɕpɕ] is categorical and the avoidance of [ɕpç] is gradient. Needless to say, the word /xfɕila/ is not subject to dissimilation, as the two fricatives are auditorily distinct.

In the SP items corresponding to (16) and (20), the palatal element /j/ is not confusable with either /ɕ/ or /š/ and the contrast is maintained, cf. [ɕfjat], [špjɛk], and [ɕpjɛvajɔ̃w̃]. To summarize this section, it has been shown that the reflexes of palatalized labials preserve their palatal elements as long as the latter have strong phonetic cues. If, on the other hand, palatality is difficult to recover from the acoustic signal, it is either lost or its source is reinterpreted. A reasonable question is whether analogous phonetically based sound changes are reported in other languages.

6. Other Languages

Repetti and Tuttle (1987: 85–89) provide data from Romance as well as other unrelated languages that bear close resemblance to the Polish data discussed in section 5.1.

(24) a. *Western Romance*

plēnu 'full' → pʎẽ ~ pjẽi ~ pčẽi ~ pṣʲẽi ~ pṣœ ~ pfẽ
incopulare 'disconnect' → eikobʎa ~ eikobja ~ ekobẓʲa ~ œkobẓa ~ ekobva
flamma 'flame' → fʎama ~ fjãnma ~ fčamna ~ sʲãma ~ sama

(24) b. *Sardinian*

apiāriu 'apiary' → aβiárğu
ingeniu 'nature' → irgéndzu
coriu 'skin' → kórdzu
veniō 'come' → bendzo

c. *Old Provençal*

apiu 'parsley' → api ~ apche
*hapja (Gmc.) 'axe' → apia ~ apcha
*(ap)propriāre 'assimilate' → (a)propriar ~ (a)propchar
sepia 'cuttle-fish' → sipia/supia ~ sepcha

d. *T'ien-Chow*

Siamese	*Lungchow*	*T'ien-chow*
plaa 'fish'	pjaa	čaa
plau 'empty'	pjau	čuu

e. *Albanian dialects*

Albanian	*Tosk*	*E. Gheg*	*S.E. Gheg*
plak 'old (man)'	pjak	pčak	čak
plot 'full'	pjot	pčot	čot

The first items in (24a–c) document the Latin source unless indicated otherwise. Example (24a) evidences considerable synchronic variation in Western Romance. The reflexes of /l/ preceded by a labial consonant range from a palatal lateral to a fricative with or without the labial. Interestingly, variants with a palatal glide alternate with those with a palatal fricative, pj ~ pʂʲ, bj ~ bʐʲ, fj ~ sʲ. Notice that, apart from the last item in each case, the segments are palatal and not homorganic with the preceding labial.[12] Following the analysis in section 4, it is plausible to argue that reorganization of articulatory gestures gave rise to the variants in (24a). The data are important for one more reason: they show that sound change cannot be fully predicted. When we tentatively arrange the realizations of the labial /p/ with the palatal

[12] It would be interesting to see whether Western Romance exhibits analogous developments in word-final positions or in clusters. Notice, however, that the data involve reflexes of labials followed by the sonorant /l/. Considering the fact that the cues of /l/ are robust only in the context of a neighboring vowel (Wright 2004: 37), clusters of this kind are presumably rare in Western Romance.

element from the least to the most advanced, /pj/ → /ptš/ → /pṣʲ/, it will be difficult to explain why in certain dialects the process stopped halfway. Analogous processes exhibiting affrication or spirantization of postconsonantal jod can be found in Sardinian (24b) and Old Provençal (24c), as well as in languages unrelated to Romance, the T'ien-Chow dialect of Thai (24d) and Albanian dialects (24e) (Repetti and Tuttle 1987 and references therein). Along with the Polish data analyzed in section 5.1, these developments can be classified under CHOICE, which has its roots in phonetic variation. It would be difficult to argue for the directionality of the developments. A sound change may or may not occur, and *if* it occurs, its results vary. The data provide support for the present analysis of palatalized labials in Polish. A sound change that is phonetically based is not expected to be limited to one language.

7. Conclusion

On the assumption that sound change is goal-oriented, synchronic accounts of the reflexes of palatalized labials in SP (/j/) and KD (/ɕ/) will likely appeal to perceptual salience. The palatality of a labial is better perceived on a noisy segment—a strident fricative—than on a glide. Hence, the principle of contrast enhancement will favor the KD realization. If sound change is optimizing, the SP realization, which is perceptually less salient, is hard to motivate. Neither does reference to faithfulness as a counter force to contrast enhancement offer a viable explanation. In Optimality Theoretic terms, the demotion of faithfulness below contrast enhancement in KD (or its promotion in SP) must in effect be due to random factors. A similar lack of directionality of change is also evidenced in other, unrelated languages.

Synchronic phonological biases like markedness are not necessary to account for the processes discussed in this paper: loss of the palatal glide before a homorganic vowel in SP, word-final depalatalization in SP, and dissimilation in KD. The first two processes result from the misperception of features with weak phonetic cues. Segments that are not accurately perceived tend to be omitted from mental representations. The dissimilatory processes find an explanation in various reinterpretations of the ambiguities in the phonetic signal. The Polish data lend support to the assertion that contrasts are preserved in positions in which they can be implemented in a perceptually salient manner.

Admittedly, some of the patterns discussed here can be generated in synchronic accounts. The loss of contrast for palatality word-finally in Standard Polish /kurpʲ/ → /kurpj/ → /kurp/ likely falls out from the Sonority Sequencing Generalization (Selkirk 1980), and the underlying mechanism for its preservation in the Kurp dialect /kurpʲ/ → /kurpɕ/ might have to do with the suspension of the Sonority Sequencing Generalization with regard to obstruents in Polish (Rubach and Booij 1990). Contrast neutralization is readily modeled in more recent goal-oriented accounts that rely on phonetic cues (Steriade 1999, Hayes and Steriade 2004). If the parsimony argument is correct, however, diachronic phonetically based explanations should have priority over synchronic generative accounts. Various dissimilatory strategies used to avoid sequences of palatal stridents indicate that sound change cannot be fully predicted and is best seen as non-deterministic and due to extra-linguistic factors.

The Law of Open Syllables in Slavic is an example that is frequently cited by proponents of goal-oriented accounts. In this line of research, the conspiracy for open syllables, affected by coda avoidance, was responsible for a range of processes in Slavic (cf. Bethin 1998 and references therein). Of interest is whether Evolutionary Phonology can account for the Law of Open Syllables. Blevins proposes that seemingly optimizing sound changes are driven by Structural Analogy, a tendency to disambiguate contrasts in favor of those already present in the grammar.[13] Thus various processes that conspire to create open syllables might have arisen through the low frequency of coda consonants. Hearing an ambiguous phonetic signal, the listener is more likely to phonologize the form with open syllables (2004: 297–99). That analogy is the right place to look for explanations is argued by, for instance, Bybee (2001) and Albright (2002). Among the phenomena which have recently been reanalyzed in evolutionary terms are place assimilation (Ohala 1990b), compensatory lengthening (Kavitskaya 2002), and consonant harmony (Hansson 2007). To verify the validity of Evolutionary Phology, future research in this model should focus on finding diachronic explanations for other typological asymmetries which under synchronic accounts are argued to reflect phonological universals.

[13] Wedel (2007) applies simulations demonstrating that more frequent patterns in the lexicon create attractive biases.

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