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The irrelevance of phonetics : the Polish palatalisation of velars

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Résumé : On accorde d'ordinaire un rôle important à la phonétique dans la description et l'explication phonologiques, en synchronie comme en diachronie. Le présent article met en doute la pertinence de ces facteurs. La palatalisation des consonnes vélaires en polonais remonte au 16^{ème} siècle et s'observe devant voyelle antérieure. Son résultat moderne sont des alternances entre [k, g, x] et [c, ʃ, ç], alternances qui produisent également une distribution sérieusement restreinte de la seconde série de consonnes. En s'appuyant sur des faits synchroniques, diachroniques et dialectaux, l'auteur montre qu'il n'existe aucun lien de cause à effet entre le changement et son contexte. Les analyses antérieures sont basées sur un examen incomplet des données et un enracinement fort dans l'approche phonéticienne qui fait crédit au conditionnement phonétique des régularités phonologiques. Si l'on apprécie l'ensemble des données pertinentes qui sont à notre disposition, la supposée naturalité du processus qui palatalise des consonnes vélaires devant de voyelle antérieure s'avère relever de l'illusion. La conclusion provisoire est que tout conditionnement phonétique qui se veut linguistiquement pertinent doit être phonologiquement fondé.

1. Introduction*

Phonology seems to be singularly oblivious to the importance of finite sets of data. This is surprising since the data base of phonology – basically words in their different

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shapes – constitutes a limited, if large, set. Since, however, it is possible to make generalisations and draw potentially interesting conclusions on the basis of highly restricted sets of examples (as in the various workbook problems), once a plausible generalisation has been established there is the understandable temptation of concluding that whatever contradictory evidence can be found, it can always be explained away in one way or another. It is a contention of this paper that this strategy of taking shortcuts is erroneous and leads to both descriptive and theoretical superficialities. What is more, some of these superficialities become so firmly entrenched in the general linguistic consciousness that they are seldom questioned or examined. By paying close attention to the data of a corpus we are often forced to abandon some of the most fondly cherished views and beliefs, no matter how commonly they may be proclaimed or how steadfastly adhered to. The specific issue that we scrutinise in this paper is the role of phonetics in phonology, and in particular the significance or relevance of phonetic explanation in phonology.

The general belief in the phonetic basis of phonology or in the need for phonologists to “hug the phonetic ground” is so overwhelming that it seems almost perverse to doubt it. However doubt one must, if only to maintain one’s phonological sanity in a world where belief in various theoretical artefacts tends to be sacrosanct and to override demands for the re-examination of the basics. In this paper we propose to cast some, hopefully serious, doubt on the phonetic basis of phonology, or at least on some of the interpretations which derive from a belief in this. Obviously it is impossible within the scope of a single paper to examine in any detail a problem which has dominated and continues to dominate phonological thinking from the inception of the discipline. Similarly, we do not propose to review any of the numerous instances of phonetically motivated sound changes (or synchronic phonological regularities) that have been discussed in the literature, many of which may be actually correct. We will consider the issue of the alleged phonetic causality of phonological regularities by looking closely at the palatalisation

of velars in present-day Polish and its recent history. In line with the pronouncement made above we will try to be exhaustive on the empirical side, especially with reference to the situation in the present-day language, with a view to providing a solid factual basis for the theoretical issue we pursue and its consequences for the overall architecture of phonology. We do not so much wish to indulge in data-mongery as to allow a full range of data to make its presence felt in theoretical discussion. If successful, our attempt should demonstrate how finite sets of data and their exploitation can contribute to the understanding of phonology and bring to light results that would remain unknown otherwise.

The specific issue we wish to consider is a bromide found so commonly in synchronic and diachronic phonological accounts that it needs no comment: front vowels tend to palatalise preceding consonants. We will consider Polish velar obstruents and their palatalised congeners in an attempt to see whether the causal link of vowel frontness and consonant palatalisation can be upheld if all available data are taken into account. In view of what has already been said above, it should come as no surprise that we answer the question in the negative.

2. Polish palatalisation of velars : basic facts.

The objects that shall occupy us in this paper are the plain obstruents [k, g, x] as in *koto* [kɔwɔ] ‘wheel’, *waga* [vaga] ‘scales’, *chmura* [xmura] ‘cloud’, and also the palatalised obstruents [c, ʃ, ç] as in *kita* [cita] ‘(fox’s) tail’, *magik* [maʃik] ‘magician’, *machina* [maçina] ‘machinery’¹. While the former group is uncontroversially described as velar, the palatal identity of the latter is less certain. As noted by

1. In our transcriptions we use the IPA system of symbols. Stress, almost exclusively penultimate in Polish, is left unmarked. Not to overburden the transcriptions, we simplify so-called nasal vowels and mark them as [ẽ, õ], although they are diphthongs in some contexts and sequences of an oral vowel, followed by a nasal consonant homorganic with the following obstruent, in others. These simplifications have no bearing on the points made in the paper. For a detailed phonetic study of the Polish nasal vowels see Zagorska-Brooks (1968).

Ladefoged and Maddieson (1996 : 33) *among articulations that have loosely been called ‘palatal’ there are two distinct types involved, as well as a number of intermediate cases*. For this reason it is perhaps not surprising that the Polish consonants we transcribe as [c, ʃ, ç] have been referred to not only as ‘palatal’ but also as ‘post-palatal’, ‘pre-velar’ or ‘palato-velar’. Although the exact phonetic characterisation is not crucial to our argument, which could be made regardless of the particular phonetic label employed, we note that the consonants are transcribed as palatal in the most recent, authoritative phonetic description of Polish (Dukiewicz 1995 : 43-45), and also in the normative pronouncing dictionary of Polish (Karaś and Madejowa 1977). The existence of velar and palatal obstruents is merely a bare observational fact. The reason that they are mentioned together, and regarded as in some way connected, is their involvement in morphological alternations, a point that will be amply illustrated below.

The palatal obstruents [c, ʃ, ç] of present-day Polish – often transcribed in Slavic literature as [k', g', x'] – are historical innovations arising out of plain velars through a process sometimes called the fourth palatalisation of velars. Although there is no absolute agreement as to when exactly the innovation was introduced, it is generally agreed that by the 16th century the palatal plosives [c, ʃ] had been established in the language (Furdal 1964 : 39 ff., Klemensiewicz *et al.* 1965 : 135, Stieber 1973 : 107, Kuraszkiewicz 1970 : 95); the palatal spirant [ç] is normally associated with foreign influences and its appearance in the language is traced to somewhat later times, but not later than the 18th century (Klemensiewicz *et al.* 1965 : 142). What seems to be a “natural” class of palatal obstruents in the modern language arose out of separate historical innovations occurring at different times. In fact, when talking about the Polish palatalisation of velars, historical grammars tend to regard the fronting of the velar plosives as a regular historical process, while the palatal spirant is seen as due to borrowings and/or analogy, a point to which we will return below.

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The palatalisation of velar plosives took place before what might be jointly called “secondary” front vowels. When following a velar consonant, the original, or proto-Slavic front vowels had resulted in earlier palatalisations yielding different reflexes ; front vowels which emerged in Old Polish from other, non-front sources are responsible for the emergence of the palatals [c, ʃ, ç] in the present-day language. These later include retracted [ɨ], spelt <y> in Modern Polish, which presumably arose out of the back, high, non-rounded [u] and is found in words like *dym* [dim] ‘smoke’. Another such vowel is mid [ɛ]. This vowel arose historically from back yer, e.g. *kiel* [cew] ‘tusk’, before a syllabic sonorant, e.g. *zgiełk* [zʃɛwk] ‘bustle, n.’ or from contractions, e.g. **velk*[ije] --> *wielkie* [vʲelɕɛ] ‘big, nom. pl.’ (see Klemensiewicz *et al.* 1965 : 135, 365, Kuraszkiewicz 1970 : 95). As a result of the innovations we find alternations involving velar plosives before the vowels [a, o, u], and palatals before [i, ɛ] in present-day Polish. We will look closely at the range of the alternations in the synchronic grammar and the ways they have been described. The diachronic background of the present-day situation will be touched upon wherever relevant and its implications outlined.

Alternations of velars and palatals : phonological synchrony and diachronic background

The alternations involving velar and palatal plosives are general and regular to the extent that Laskowski (1975 : 91) calls them “almost automatic, devoid of any morphological function”. The velar and the palatal spirant are different and will be discussed separately below. Here we concentrate on the plosives. Consider the examples from the standard dialect, which coincide with the evidence found already in some 15th century texts (see Brajerski 1957/1995). Morphemes are separated by a hyphen where relevant.

(1)

skoki [skɔc-i] ‘jump, nom. pl.’

wagi [vaʃ-i] ‘scales, gen. sg.’

kiel [cew] ‘fang’

skok [skɔk] ‘nom. sg.’

waga [vag-a] ‘nom. sg.’

kła [kwa] ‘gen. sg.’

ptakiem [ptac-ɛm] ‘bird, instr. s.’	ptak [ptak] ‘nom. sg.’
gier [ɟɛr] ‘game, gen. pl.’	gra [gra] ‘nom. sg.’
taki [tac-i] ‘such’	taka [tak-a] ‘fem. sg.’
srogię [srɔɟ-ɛ] ‘harsh, nom. pl.’	sroga [srɔg-a] ‘fem. sg.’
progium [prɔɟ-ɛm] ‘threshold, instr.sg.’	progu [prɔg-u] ‘gen. sg.’

Palatal plosives appear also in words displaying no alternations with plain velars. This happens typically before front vowels, as illustrated in (2).

(2)

kiędy [cɛdɨ] ‘when’	kieszę [cɛɟɛɲ] ‘pocket’
kiębasa [cɛwbasa] ‘sausage’	klakier [klacɛr] ‘claqueur’
parkiet [parcɛt] ‘parquette’	kięlich [cɛlix] ‘chalice’
bukiet [bucɛt] ‘bunch, bouquet’	siekiera [cɛcɛra] ‘axe’
zgięk [zɟɛwk] ‘bustle, n.’	ogier [ɔɟɛr] ‘stallion’
szlagier [ɟlaɟɛr] ‘hit, n.’	męgiera [mɛɟɛra] ‘termagant’
bagietka [baɟɛtka] ‘baguette’	ceregiele [tsɛrɛɟɛlɛ] ‘fuss, ceremony’
gięmek [ɟɛrmɛk] ‘armour bearer’	Algier [alɟɛr] ‘Algiers’

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An observation which needs to be added to the description above is that while the innovation itself can be dated back to the 15th or 16th century, there can be little doubt that it has remained in the language as a productive phonological regularity till today. In this it is similar to the well-known final-devoicing of obstruents which can be traced back to the same and even earlier periods (Stieber 1973 : 115) and is fully productive in present-day Polish. The evidence for the productivity of the velar palatalisation can be found in 19th and even 20th century borrowings, like *klakier* or *bagietka* mentioned in (2) above. Since these very late borrowings from French or German introduce the Polish velar modification, it is clear that the modification must be due to Polish-internal regularities ; as we will see below, no recourse to analogy can be had here since the presence of non-palatalised velars before

front vowels is perfectly possible in Modern Polish, both in native and foreign vocabulary.

The traditional interpretation regards the innovation as a phonetically conditioned process of a straightforward assimilatory nature : velar plosives are fronted before a non-low front vowel. This is said to be a natural, phonetically motivated sound change maintained in the modern language as a natural, phonetically motivated phonological regularity (rule, constraint).

The restriction to non-low front vowels is required by the fact that no palatalisation took place before the front nasal vowel : since presumably in Old Polish the front nasal vowel was low or at least more open than the non-nasal one, i.e. perhaps [æ̃] (Furdal 1964 : 42), the restriction of the palatalisation to non-low front vowels is said to follow naturally². The failure or absence of palatalisation before a nasal vowel is illustrated in (3), although it should be noted that today the nasal and non-nasal vowels do not differ in height. The belief in the historical greater opening of the nasal vowel does not appear to be based on any specific facts (as against a general faith in the phonetic conditioning of sound change or the neogrammarian exceptionlessness hypothesis, cp. Kiparsky 1988 : 363 ff).

2. One of the anonymous reviewers suggests that the historical account is in fact simpler than that, namely the Old Polish nasal vowel was simply back and as such could not induce palatalisation. The split into the modern Polish front and back nasal vowel took place after palatalisation. While undoubtedly the original vowel was back and the modern back-front distinction reflects the historical relations, the chronology argument is not particularly compelling. Historians of Polish maintain that the front nasal emerged (or, actually, re-emerged) in the middle of the 15th century, while the palatalisation of the velar plosives took place in the 15th century as well (Kuraszkiewicz 1970 : 80, 95). Thus the two processes were operative roughly at the same time and it is implausible to assume – since assumption it must be – that the palatalisation of velars ran its course and became inoperative before the emergence of the front nasal vowel. Note additionally, that since velar palatalisation affects 19th and 20th century loans like *makieta* [maceta] ‘model’ (<Fr. *maquette*), there is no reason why front nasal vowels should be exempt from conditioning it (if the frontness of the vowel is the relevant factor).

(3)

kęs [kēs̃] ‘bite, n.’	włokę [vɫɔk-ẽ̃] ‘I drag’
kędzior [kẽdzɔr] ‘hair-lock’	mąkę [mɔ̃k-ẽ̃] ‘flour, acc. sg.’
gęś [gēs̃] ‘goose’	mogę [mɔ̃g-ẽ̃] ‘I can’
gęsty [gẽst-ĩ] ‘thick’	drogę [drɔ̃g-ẽ̃] ‘road, acc. sg.’

Let us conclude this section by noting a glitch which we indicated above. Since velar plosives alternate with palatal plosives, it might be expected that in the same contexts the velar spirant [x] will alternate with the palatal spirant [ç]. The standard language shows no such alternations and the velar spirant [x] appears before front and non-front vowels alike. Consider the examples :

(4)

duchy [dux-ĩ] ‘ghost, nom. pl.’	duch [dux] ‘nom. sg.’
pcheł [pxɛw] ‘flea, gen. pl.’	pchła [pxw-a] ‘nom. sg.’
gluchy [gwux-ĩ] ‘deaf’	glucha [gwux-a] ‘fem. nom. sg.’
gluchemu [gwux-ɛmu] ‘dat.sg. masc.’	gluchej [gwux-ɛj] ‘dat.sg. fem.’
gluchego [gwux-ɛgo] ‘gen. sg. masc.’	
blahe [bwax-ɛ] ‘trivial, nom. pl.’	blaha [bwax-a] ‘fem. sg.’
dachem [dax-ɛm] ‘roof, instr. sg.’	dach [dax] ‘nom. sg.’

Palatalisation of velar plosives : a phonetically natural process ?

The velar palatalisation is said to be a phonetically natural process, occurring where it does and effecting changes of a rational, assimilatory nature. This is in line with the neogrammarian view of sound change which is regarded as predominantly phonetically motivated ; assimilation is a perfect instantiation of such motivation³. On this view, ‘phonetic’ should largely be equated with ‘articulatory’, even if other phonetic factors could also be admitted. The traditional view was tacitly adopted by the structuralist approaches to language change and also, with minor modifications, by the generative

3. For arguments against the purely phonetic nature of sound change, see Kiparsky (1988 : 372-3) and references therein.

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tradition. Here innovations were taken to be phonetically natural rules normally added at the end of the phonological rule component, although options were left open for non-phonetic rule addition and rule modification (see Schane 1972, Bach and Harms 1972). With reference to the palatalisation of velars Gussmann (1980 :10) posits a synchronic rule in Modern Polish which changes the back vowel /ɨ/ to the front /i/ ; this vowel subsequently feeds the palatalisation of velars which thus can be claimed to apply before front vowels.

The belief in the crucial role of (surface) phonetics, reinforced by the term *sound change*, continues to dominate the scene as an axiom that is hardly ever challenged. Dissenting voices (Kaye 1989 : 42 ff, Harris and Lindsey 1995, Ploch 1999, 2003, Gussmann 2001, 2002 : 186 ff) have generally passed unnoticed or, at least, have not met with much response. We believe, however, that the traditional view, no matter how firmly entrenched in linguistic thinking, is not only simplistic but needs to be fundamentally revised if we are to make progress in the understanding of phonological phenomena. It can be claimed to be fundamentally flawed because it overlooks – or doctors – generally accessible data and because it refuses to consider seriously the implications of well-established facts. This paper is offered as another contribution to the growing awareness that the traditional view needs to be substantially revised. We believe that the Polish palatalisation of velars before front vowels is typical of a general pattern, and by looking in detail at one such instance we are in fact looking at a large class of cases. In other words we would like to take exception to the alleged phonetic naturalness and explanatoriness of the statement *Velars are fronted before front vowels*.

The phonetic unnaturalness of the velar palatalisation

The most direct argument which can be marshalled against the phonetic motivation of the historical innovation and its persistent synchronic reflex is its non-necessary character. This follows from the fact that the innovation was introduced at some point in time, hence prior to that introduction there had been nothing wrong or phonetically unnatural about sequences

of non-palatalised velars followed by front vowels. That the palatalisation was not a necessary, phonetically required operation follows further from the situation found in present-day regional dialects : as discussed at length by Dejna (1973 : 124-129) dialects differ markedly in the extent, if any, to which the historical innovation has penetrated there. Some of them display the same pattern as the standard dialect, whereas in others palatalisation is weakly attested and sequences such as [ke, ki, ki, ge, gi, gi] are regularly found. In such cases the standard *cukierek* [tsucɛrek] ‘sweet’, *kiedy* [cɛdi] ‘when’, *kij* [cij] ‘stick’ are pronounced [tsukɛrek, kɛdi, kij], with no palatalisation of the velar. The significance of such facts has not passed unnoticed : Furdal (1964 : 42) remarks pointedly that while one can argue for the palatalising effect of the vowel [ɛ] on the preceding stop in the case of words such as *gier* [ɣer] ‘game, gen. pl.’ (deriving from the earlier [ger]) in southern and western dialects, there is still a problem since what was evidently the same vowel [ɛ] exerted no such influence in northern and eastern parts of the country. Even more puzzling is the failure of palatalisation in central dialects : here, Furdal maintains, the vowel [i] is fronted to [i] but the non-palatalised sequences [ki, gi] are preserved. This must be contrasted with western and southern dialects, where the vowel is more open and retracted, but the plosives are fronted to [c,ɟ] (as is the case in the standard dialect). Thus degree of vowel frontness appears to have no direct impact upon the palatalisation of the preceding velar.

In brief, palatalisation of velar stops before front vowels is something that may but does not have to happen ; it appears to be an idiosyncratic dialectal property and what unites the different instantiations is the condition that if it occurs at all, it occurs before a following front vowel. This does not establish a necessary link between the presence of palatalisation and the presence of front vowels, since there are front vowels – within dialects and cross-dialectally – where front vowels appear after non-palatalised velars.

The nasal vowel presents additional difficulties since some dialects generalised the palatalisation in such a way that it

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affected velars appearing before the nasal vowel, hence *gęś* [gẽc] ‘goose’ of most dialects, including the one regarded as standard, appears as [jẽc] in others. Attempts to explain away such examples as instances of hypercorrection or in some other way (see Furdal 1964 : 41-43) do not detract from the fact that the presence of a front nasal vowel fails to block palatalisation. This of course casts doubt on the historical explanation which, it will be recalled, tried to associate the failure of palatalisation before the front nasal vowel with its more open (less front ?) character. Since sound changes are taken to be language-specific historical processes situated in space and time, this objection might be easily circumvented by assuming a limited activity of the velar palatalisation. As pointed out in footnote 2 above, this is a very feeble argument : the standard dialect continues to palatalise velar plosives in certain loan-words, hence there is no reason why it should exclude native front nasal vowels from the scope of its activity. We also remarked that in the present-day standard dialect there is no phonetic height difference between the nasal and non-nasal front vowel, which must be regarded as another argument against its phonetic motivation. At the same time doubts may arise as to the historical explanation, too : as pointed out by Stieber (1973 :79), Piotr Stojęński-Statorius, the author of a 16th century grammar of Polish, described the front nasal vowel *as a nasal e*, hence no difference in quality was observed (or recorded). If the oral [ɛ] and the nasal [ẽ] did not differ in height, then the phonetically-based approach loses its alleged naturalness. Recognition by today’s historical linguists of a distinction against the evidence of grammarians like Piotr Stojęński-Statorius may be due to the neogrammarian exceptionlessness hypothesis, i.e. to the desire to find a phonetic reason for the failure of palatalisation, rather than actual evidence for its existence in early Polish. This conclusion is strengthened by the available contemporary evidence, including the dialectal variation, which shows no link between the nasality of the vowel and the presence or absence of palatalisation on a preceding velar plosive.

Another important element undermining the strength of the phonetic claim concerns the nature of the high vowel appearing in the sequences [ci, ʝi]. The vowel is front and high, hence it would appear to be a *prima facie* palatalising segment. However, diachronically the vowel [i] in this context comes from the retracted or central vowel [ɨ] (see Furdal 1964 :22-4) and synchronically it must be regarded as a contextual variant of that vowel.⁴ Thus, diachronically, the innovation involving the high vowel was not just a case of a velar plosive being palatalised by a following front high vowel, but rather a simultaneous change of velar plosive followed by a central vowel into a palatal followed by a front vowel. Put simply, the change was [ki] > [ci] (Furdal 1964 : 39, Koneczna 1965 : 146) and not, as some descriptions might imply, [ki]>[ki]>[ci]; there is no diachronic evidence for the intermediate stage. In present-day terms the situation is equally unambiguous, which we will illustrate by one example: the vowel [ɨ] is the morpheme marking, among other things, the nominative singular of masculine adjectives as long as the adjective ends in a (non-palatalised) non-velar plosive consonant. Consider a few examples.

(5)

chromy [xrɔm-ɨ] ‘lame’	słaby [swab-ɨ] ‘weak’
słony [swɔn-ɨ] ‘salty’	stary [star-ɨ] ‘old’
syty [sɨt-ɨ] ‘full up’	radny [rad-ɨ] ‘glad’
bosy [bɔs-ɨ] ‘bare-footed’	cudzy [tsudz-ɨ] ‘alien’
mały [maw-ɨ] ‘small’	głuchy [gwux-ɨ] ‘deaf’
skąpy [skɔmp-ɨ] ‘stingy’	ryżny [rɨʒ-ɨ] ‘red-headed’

When the adjective ends in a velar plosive – as shown by other genders and cases – the nominative singular masculine ending is invariably front with the velar replaced by a palatal, i.e. [ci, ʝi]. Compare the nominative singulars of feminine and masculine adjectives.

4. The phonological position of the retracted vowel has been one of the most hotly discussed issues in both structural and generative phonology. See Press (1986) for an extensive phonetic and structural phonological review and Gussmann (2004) for a more recent statement.

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(6)

taka [tak-a] ‘such’	taki [tac-i]
uboga [ubɔg-a] ‘poor’	ubogi [ubɔɟ-i]

Synchronically, the front vowel [i] in examples such as (6) is restricted in its distribution to the context after velar plosives or, more precisely, after palatal plosives ; in other contexts we find the vowel [ɨ]. Viewed in these terms, the palatalisation before the vowel [i] is a misnomer at the very best, since what we seem to be facing here is a fronting of two non-front segments, with velar plosives emerging as palatal and the central vowel surfacing as front. There is no palatalisation before [i] for the simple reason that this vowel does not appear after velar plosives. (We bypass here the possibility of an intermediate stage where a front vowel is derived from a back one after a velar plosive, as envisaged in generative interpretations mentioned above).

As an additional piece of evidence showing that there is no necessary palatalisation before the retracted vowel [ɨ], one might quote several words in present-day Polish, where the sequence [ki, gi] actually emerges phonetically with no shift to [ci, ɟi]. These words are not very numerous and with the exception of one surname are quite rare (and borrowed), but phonetically completely unambiguous :

(7)

Kydryński [kidɾɨɲsci] ‘surname’
kynolog [kɨnɔlɔk] ‘dog doctor’
gyyz [gɨɨz] ‘ancient Ethiopic’

To sum up : the alleged phonetically motivated palatalisation of velar plosives before the high front vowel is a case of fronting affecting in equal measure the velar plosive and the following central vowel. No causal link can be established between the nature of the vowel and the palatal character of the preceding plosive.

Further resistance to palatalisation

For the mid vowels, in (1-2) we saw examples of the palatalisation of the plosives but not the spirant (4), and we noted the exceptions that the nasal nucleus produces. This does not exhaust the problematic data.⁵ One very clear case involves loanwords. As mentioned above, palatalisation is found in some relatively recent borrowings like *pakiet* [pʌcɛt] ‘packet’ or *bagietka* [bʌʒɛtkʌ] ‘baguette’ (for more examples, see (2)). There are numerous other borrowings, some of them not so very recent and well-established in the language, where no palatalisation is found. Although some variation may occasionally be found with individual speakers, there is no doubt that palatalisation, i.e. the presence of [çɛ, ʒɛ] in place of [kɛ, gɛ] in these loans is ruled out. Consider the words in (8).

(8)

kelner [kɛlnɛr] ‘waiter’	keks [kɛks] ‘fruit cake’
poker [pɔkɛr] ‘game of poker’	kemping [kɛmpʲiŋk] ‘camping’
hokej [xɔkɛj] ‘hockey’	kefir [kɛfʲir] ‘sour milk’ ;
generał [gɛnɛrɔw] ‘general’	germański [gɛrmaŋsci] ‘Ger-manic’
geolog [gɛɔlɔk] ‘geologist’	Eugeniusz [ɛugɛɲjuʃ] ‘proper name’
legenda [lɛgɛnda] ‘legend’	agent [agɛnt] ‘agent’

These examples require some discussion since the behaviour of velars and palatals in loans is more complex than a cursory glance might suggest. For one thing, note that we are dealing only with a sub-case of palatalisation, as the exceptional behaviour is only evinced in the presence of a following [ɛ] and

5. This is a good place to mention yet another case of the failure of palatalisation before the (non-nasal) vowel [ɛ] in native vocabulary. Polish can move some of its clitics : the past tense 1st person masculine singular ending can be detached from the verb and attached to the (normally) first word in a phrase. When the first word ends in a velar plosive, no palatalisation takes place. Thus *Jak zobaczył-em* ‘as I saw’ can become *Jak-em zobaczył* where the plosive in *jakem* [jakɛm] is velar. In fact, admirers of the minimal pair test will be thrilled by the pair *jakem* [jakɛm] ‘as I ...’ vs *yakiem* [jacɛm] yak, instr. sg.’ (although the significance of such a pair is no greater than the celebrated English example of the opposition *thistle – this ’ll*).

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not [i], so that *makijaż* [macijaʃ] ‘make-up’ (< Fr. *maquillage*) or *kirkut* [cirkut] ‘Jewish cemetery’ (<G. *Kirchhof*) never allow a variant with a velar *[makijaʃ], *[kirkut]. Although detailed attestations for all loans are not available, one thing transpires very clearly : the historical panacea for all problems – *first come, first served* – does not work here. It is impossible to claim that the earlier loans were affected by the process because it was still active, while the later ones missed the boat. *Bagietka*, first recorded according to Bańkowski’s (2000) etymological dictionary in 1875, and *makieta*, similarly coming from the second part of the 19th century, do display the palatalisation, while words like *kelner* or *kefir* coming from the same or earlier time fail to do so. Even worse, some words which used to have palatals now are pronounced with velars : Bańkowski (2000) claims that *legenda* was pronounced with [ʃ] in the 18th-19th centuries and with the glide [j] (as *lejenda*) in the 17th-18th centuries. The ways that such changes could have come about, together with the role of spelling and normative tendencies, have been discussed in an illuminating fashion by Bajerowa (1982).

The above discussion brings out one ineluctable conclusion : wholesale palatalisation before front vowels is a phantom phenomenon, both in synchronic and diachronic terms. Palatalisation in the sense of a velar becoming a palatal before a front vowel cannot be confirmed before high vowel(s), it takes place before some instances of the mid vowel but not before others, and it also fails to occur before the nasal vowel. Crucially, all those dialects which preserve the central vowel [ɨ] as such after velar plosives and never palatalise the consonants offer the best possible argument that [ɨ] is not a palatalising vowel. At best then, palatalisation is confirmed before **some** instances of the front mid vowel [ɛ]. If we were to persist in upholding the front vowel palatalisation, we would have to say that some [ɛ]’s are not instances of a front vowel and conversely, that the flagrantly non-front [ɨ] is a front vowel. This conclusion is obviously strained or downright false, but this is what an unbiased inspection of the full range of data

leads to.⁶ The story does not end here, though, since we have so far refrained from discussing the velar plosive [x] at any length. We will turn to it now.

The maverick : a story of the velar spirant

The velar spirant, as noted above, differs from the plosives in failing to palatalise before the traditional front vowels. This was illustrated in (4) and the problem can be pithily illustrated by seeing what happens to the masculine nominative singular adjectival ending. This appears as [i] after anterior non-palatalised consonants **and** after the velar spirant, while stems ending in a velar plosive are replaced by a sequence of a palatal plosive followed by [i]. The same regularity is found before inflectional endings beginning with [ɛ] : *-ego*, *-emu*, *-ej*. Consider one example of each class :

(9)

- a. bosy [bɔs-i] ‘bare-footed’, bosego [bɔs-ɛgɔ] ‘gen. sg. masc.’, bosemu [bɔs-ɛmu] ‘dat. sg. masc.’, bosej [bɔs-ɛj] ‘gen. sg. fem.’ ;
- b. gluchy [gwux-i] ‘deaf’, gluchego [gwux-ɛgɔ], gluchemu [gwux-ɛmu], gluchej [gwux-ɛj] ;
- c. srogi [srɔʃ-i] ‘severe (cf. sroga [srɔg-a] ‘nom. sg. fem.’), srogiemo [srɔʃ-ɛgɔ], srogiemu [srɔʃ-ɛmu], srogiej [srɔʃ-ɛj].

In other words, the velar spirant behaves as a non-velar obstruent. Thus the distribution of the palatal spirant [ç] in the standard dialect and most regional varieties of the language is considerably restricted compared to the palatal stops. Historically (Stieber 1973 :114) the palatalisation is said to have affected velar plosives only while the restricted palatalised

6. It can be added here that the classical generative view of the working of phonology allows us to maintain the phonological generalisation at the cost of introducing absolutely neutralised segments (some instances of the phonetic [ɛ] being derived from a back lax unrounded vowel in Gussmann (1980) and Rubach (1984), others coming from a back mid unrounded vowel in Rubach (1984)) or by allowing rule interactions of considerable complexity. Such derivations are viewed with suspicion or are strictly banned by current research coming from otherwise differing theoretical quarters (Optimality Theory, Government Phonology, Natural Phonology).

spirant, of which more below, arose due to borrowings and analogy.

The most obvious question that suggests itself is why a phonetically natural process should affect velar plosives but leave intact the velar spirant. The question has not passed unnoticed, if only because of its relevance to any phonetically-based account both of the historical innovation and the synchronic phonological regularity. The answers supplied by the phonetic and/or phonetically biased historical tradition can hardly be called illuminating or even plausible. Koneczna (1965 : 147) makes the surprising claim that spirants are less susceptible to the influence of a following vowel than plosives : *Szczelinowa spółgłoska χ wykazuje niższe wzniesienie tyłu języka ku velum i dlatego mniej jest podatna na upodabniający wpływ samogłoski następującej* (The fricative consonant χ [= x E.G], with a lower raising of the dorsum towards the velum (than plosives ?), is less susceptible to the assimilatory influence of a following vowel). A similar, but if anything more crude account is offered in Dejna (1973 : 125) ; fundamentally both are nothing but pseudo-explanations since they establish no link between the degree of aperture and susceptibility to palatalisation (assimilation). This failure is singularly striking since both authors readily admit and amply illustrate cases of dialects of Polish and also other Slavic languages (e.g. Russian) where the spirant is palatalised in the same way as the plosives in standard Polish. The absence of any discussion of such facts reveals the fundamental inadequacy of the phonetic approach, where glib accounts are provided where they appear to provide a fit with the data (front vowels palatalise a preceding consonant) but uncomfortable data are simply disregarded or not brought to bear on the discussion (the failure of the palatalisation of velar plosives in numerous dialects, the dialectal palatalisation of the velar spirant, or even the palatalisation before a low front vowel in an area where irregular palatalisation is found with higher vowels, see Dejna 1981, map 21).

The restricted appearance of [ç] is also mentioned by Dressler (1985) in his attempt to offer a natural phonological

and morphophonological account of the palatalisation complex in Polish. Noting the existence of dialectal variation, he associates the failure of palatalisation of /x/ before /ɛ/ in eastern Poland with the fact that /x/ *there is more back than /k, g/, therefore palatalization is more difficult* (Dressler 1985 : 202). Leaving aside the dialectal variation, which is markedly more complex than and different from what Dressler presents, there is the amazing claim that [x] in some dialects, which would presumably include the standard one as well, is more back than velar plosives are. Polish phoneticians have consistently held that [x] is the fricative equivalent of [k], see e.g. Dłuska (1950/1981 : 91), Wierzchowska (1971 : 170). The unavoidable conclusion is that Dressler doctors phonetic facts to suit his theoretical aim of connecting the change, or its absence, with the phonetic context.

The dialectal situation is worth another comment. All descriptions stress that in practice dialects display varying degrees of implementation of the palatalisation. What the descriptions have in mind is the failure of the innovation before front vowels, its occurrence before the front nasal vowel, and also the fact that the velar spirant can be palatalised in contexts where it is never palatalised in other dialects, including the standard one ; see in particular Zduńska's (1965 : 80-95) detailed study of the central Mazovian dialects. No phonetic description can meaningfully predict the simultaneous absence of palatalisation and its presence before the nasal vowel in a word such as *gęsty* [gɛ̃sti/ʃɛ̃sti] 'thick', or the absence and presence of the palatalisation of the velar fricative in *chyba* [xiba/çiba] 'perhaps', *chytry* [xitri, çitri] 'cunning'. But these are the facts amply documented in detailed descriptive studies of Polish dialects.

The phonetic approach which tries to eat its cake and have it proves incapable of supplying a coherent account of a mass of well-documented facts. If we wish to adhere to the textbook saw— velars are palatalised before front vowels — than we must conclude that in cases where no palatalisation is attested, the velars are not really velars, or the front vowels are not really front vowels, or both. Needless to say, few

phoneticians will be prepared to say that [x] is not a velar spirant or that [e] is not a front vowel. If this conclusion cannot be drawn, then it follows that the Polish palatalisation and non-palatalisation of velar obstruents has no phonetic explanation, all traditional phonetic sabre-rattling to the contrary. On a different note, the Polish data surveyed above ask pertinent questions about the nature of phonetics in language (and language change), and they clearly indicate that the line adopted by the traditional approach is, at least in some cases, grossly misleading.

The velar and the palatal spirants again

Turning now to a few additional properties of the velar and the palatal spirants, let us start by reiterating that in the standard language and also numerous dialects, the velar spirant differs from the velar plosives in not displaying wholesale alternations with palatal obstruents. Take again the vowel [i] which marks

1. the nom. singular of masculine adjectives, e.g. *dobry* [dɔbr-i] ‘good’
2. the nom. plural of masculine nouns, e.g. *domy* [dɔm-i] ‘house’
3. the gen. singular of feminine nouns, e.g. *wody* [vɔd-i] ‘water’.

In all cases it appears as [i] after stem final velar plosives, which in combination with the vowel are realised as palatals : *drogi* [drɔɟ-i] ‘dear’, *łąki* [wɔ̃c-i] ‘meadow, nom. pl.’, *łaski* [wasc-i] ‘grace, gen. sg.’. Nouns and adjectives ending in a velar fricative display no changes : *gluchy* [gwux-i] ‘deaf’, *muchy* [mux-i] ‘fly, nom. pl.’, *łachy* [wax-i] ‘sand-patch, gen. sg.’. We argued above that the existence of such facts weakens the argument for the role of phonetic facts in the interpretation of the velar palatalisation. The case is further weakened by the fact that the velar fricative does alternate with the palatal in a group of native verbs.

Polish verbs display the category of so-called *derived imperfectives* (DI), and one of the suffixes which implements this function is [iv]. It regularly appears after anterior non-

palatalised consonants, while stems ending in a velar – any velar ! – consonant, replace the velar by a palatal and the suffix itself takes the shape [iv]. Consider some examples.

(10)

- | | | |
|----|-------------------------------------|----------------------------------|
| a. | zagrzebać [zagʒɛb-atɕ] ‘bury’ | zagrzebywać [zagʒɛb-iv-atɕ] ‘DI’ |
| | załamać [zawam-atɕ] ‘break’ | załamywać [zawam-iv-atɕ] ‘DI’ |
| | czytać [tʃit-atɕ] ‘read’ | czytywać [tʃit-iv-atɕ] ‘DI’ |
| | pisać [pʲis-atɕ] ‘write’ | pisywać [pʲis-iv-atɕ] ‘DI’ |
| | wskazać [fskaz-atɕ] ‘indicate’ | wskazywać [fskaz-iv-atɕ] ‘DI’ |
| b. | opłakać [ɔpwak-atɕ] ‘mourn’ | opłakiwać [ɔpwac-iv-atɕ] ‘DI’ |
| | wczołgać [ftʃɔwg-atɕ] ‘crawl in’ | wczołgiwać [ftʃɔwɟ-iv-atɕ] ‘DI’ |
| | zakochać [zakɔx-atɕ] ‘fall in love’ | zakochiwać [zakɔɕ-iv-atɕ] ‘DI’ |

The examples in (10a) illustrate the suffix as it appears after anterior consonants – apart from mechanical concatenation nothing worthy of note is found there. In (10b) stems ending in a velar undergo velar palatalisation : there is nothing new with the velar plosives, since we have observed similar effects elsewhere – recall the three different morphemes [i] we have just discussed. What is surprising is the fact that the palatalisation also affects the velar spirant, something that is robustly not tolerated elsewhere – recall the three morphemes [i] in *gluchy*, *muchy*, *luchy*. What the verbal evidence tells us is that phonetically speaking, there is nothing wrong about the sequence [ɕi] in native derivatives, even if their number is very low (about ten items altogether). The significance of these facts cannot be overemphasised as they constitute a major embarrassment for all those phonetically based descriptions which try to connect the failure of spirant palatalisation with the nature of the consonant (cf. Koneczna’s and Dejna’s views mentioned above). We would have to believe that the spirant is less susceptible to palatalisation before the vowel of one suffix but not another. Thus a handful of lexical items, all native, is not in keeping with the established pattern which is otherwise massively confirmed in the language. If we were to accept any of the various proposals put forward in defence of the phonetic nature of the Polish velar palatalisation, these examples suffice to undermine it. The point is not worth belabouring – whatever

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is responsible for the presence or absence of palatalisation, it is certainly not the phonetic nature of the consonant or of the vowel.

The uniform palatalisation of velar obstruents before the derived imperfective suffix is instructive in yet another way. Traditionally, it is claimed (Koneczna 1965 : 147) that the appearance of the palatal spirant [ç] in forms such as *wymachiwać* [vimaç-iv-atç] ‘wave, DI’ is due to analogy with forms where the appearance of the palatal plosives was expected and regular, e. g. *wykrzykiwać* [vikʃic-iv-atç] ‘yell, DI’, *wysługiwać* [viswuʃ-iv-atç] ‘be a lackey, DI’. Possibly this was the case. However, one cannot fail to be struck by the strangely selective nature of the alleged analogical process : it takes place in a handful of admittedly rare derivatives, while totally disregarding the existence of numerous other forms where an analogy can be found in abundance. Recall the various [i] morphemes mentioned above : if analogy is to be a meaningful mechanism we need to know why it applies before the suffix [iv], but fails to apply before [i], which is both more frequent and more numerous. Unless questions of this sort can be raised and satisfactorily answered, analogy will continue to be an ad hoc mechanism whose application or non-application is controlled by the needs of the moment ; it is hardly worth pointing out that a form which may be the base for analogy can always be found, given a measure of ingenuity and a modicum of patience.

However, there are reasons to think that analogy is not a meaningful explanation for the emergence of the palatal fricative [ç]. As documented by Kowalik (1997 : 76-77) palatals, including the palatal spirant, can be found before certain suffixes, both native and foreign. Consider some examples :

(11)

monarchy [mɔnarx-i] ‘monarch, gen. sg.’	monarchini [mɔnarç-ɪni]
	‘id. fem.’
szachy [ʃax-i] ‘chess’	szachista [ʃaç-ista] ‘chess-player’
Czechy [tʃɛx-i] ‘the Czech Republic’	czechizm [tʃɛç-izm] ‘Czech borrowing’

Lech [lɛx] ‘personal first name’ Lechita [lɛç-ita] ‘member of
the Lech tribe’

While the left-hand column words appear to conform to the traditional claim that the velar spirant resists palatalisation, the right-hand ones show just as unambiguously that it behaves like the two velar plosives. A similar situation is found in foreign words, some of which palatalise the spirant while others refuse to do so.

(12)

hydrant [xɪdrant] ‘hydrant’	vs	historia [çistorʲja] ‘history’
hymn [xɪmn] ‘hymn’		chinina [çɪpina] ‘quinine’
chemia [xɛmʲja] ‘chemistry’		hiena [çɛna] ‘hyena’
heretyk [xɛretik] ‘heretic’		hieroglif [çerɔɟlif] ‘hieroglyph’

In brief, although the palatalisation of the velar spirant is much more restricted as compared to the velar plosives, it is by no means impossible or restricted to foreign words. If the palatalisation were to be a phonetically grounded process, we might expect it to find support in the treatment of loanwords. In actual fact, as indicated above, borrowings reveal a complicated history of their own which involves not just phonetic and phonological considerations; they also are susceptible to normative tendencies and the influence of spelling, see Bajerowa (1982).

Final complications and summary of the evidence

Before taking stock of the main implication of our discussion we must illustrate a final complication in our presentation of the data, namely the appearance of all three palatals before non-front vowels. This happens exclusively in loans which belong to the learned vocabulary. Some examples are offered in (13):

(13)

kiur [cur] ‘curium’	autarkia [awtarca] ‘autarky’
fonologia [fɔnɔlɔɟa] ‘phonology’	giaur [ɟaur] ‘infidel’
monarchia [mɔnarça] ‘monarchy’	hiacynt [çatsɪnt] ‘hyacinth’

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Facts such as these should present no major obstacles to a phonological account, no matter whether it endorses the phonetic nature of phonological regularities or adamantly rejects it. Since in this paper we offer no solutions (see Gussmann 2001, 2004, forthcoming) but rather consider the relevance of a close attention to limited facts, we note the existence of such data as (13) merely for the sake of completeness. For the same reason we record the native verb *giąć* [ʃɔ̃tɕ] ‘bend’ with the voiced palatal stop before a back vowel, where the back vowel alternates with front ones in *zgięty* [zʃɛ̃ti] ‘bent’, *zginać* [zʃinatɕ] ‘bend down’ (see Paulsson 1975).

We have argued above that both as a diachronic process and as a synchronic regularity the palatalisation in focus cannot be understood by invoking such phonetic categories as velarity of consonants and frontness of vowels, at least as long as these categories continue to be associated with the traditional (articulatory and acoustic) configurations. To maintain the phonetic basis of the historical change and its synchronic reflexes one would have to be prepared to admit that some instances of [ɛ] are not front vowels, that the central vowel [ɨ] is in fact front, or that most instances of the voiceless velar spirant are not velar. This follows from the fact that the one context for the velar stops to palatalise involves not the front vowel [i] but rather the central vowel [ɨ] : the change – and, accordingly, its synchronic reflex - is not [ki̯]>[ci̯] but [kɨ̯]>[ci̯] . In other words, what changes is the velar plosive **and** the following vowel with both segments undergoing fronting, hence it is not the case that one of them assimilates under the influence of the other. Likewise we have seen that the velar palatalisation fails to operate before some instances of front vowels (in both native and foreign vocabulary). Crucially we have noted the fact that the velar spirant [x] massively fails to palatalise in instances where the stops regularly display effects of the process/regularity. In restricted contexts, however, the velar is also palatalised, hence there is no across the board ban against the palatalisation of this consonant.

Conclusion

In this paper we have argued that a documented set of facts taken from Modern Polish and partly also from its history cannot be reconciled with the standard notion of phonetic conditioning or motivation, i.e. phonetic causality. This we have tried to achieve by falsifying a universally accepted “solution” and by confronting the classical claim with a rich, hopefully exhaustive set of data. The conclusion concerning the untenability of an explanatory phonetic account is significant in view of the staying power that traditional shibboleths possess – the conviction of the crucial role of phonetics in phonology is so firmly entrenched that it hardly ever comes up for review and is seldom challenged. Even though phonetics, not unlike phonology, is not a uniform doctrine accepted by all practitioners of the field, the belief that it is the foundation of phonology reigns supreme. Variants of statements like *Phonological processes are phonetically motivated* (Dziubalska Kołaczyk ms.) are to be found everywhere ; they are taken to be self-evident and seem to evoke no sense of unease or need to re-examine basic assumptions. In this paper we have tried to show that a close inspection of the data relating to a relatively well-known and uncontroversial change/ regularity casts serious doubts on the received wisdom that palatalisation of velars before front vowels is a phonetically motivated process. If data are studied closely rather than selectively, the phonetics of the change becomes illusory to the point of becoming a mirage. Note that we have not even attempted to consider any of the other numerous instances of the phonetic motivation of phonology. We hope not to have given the impression of making the patently absurd claim that phonology and phonetics are totally separate domains. Quite conversely, by examining a case where a phonetic account fails miserably as an explanatory tool, we are making a plea for a re-examination of the phonetic categories used in linguistics. Clearly, phonetic notions are not given in advance, while the gymnastics of the speech organs and the ensuing acoustic signal can be dissected in numerous ways. Most of these possible dissections are linguistically irrelevant, voice quality being a trivial but straightforward case.

The relevant categories can only be established by reference to the way they work in language, i.e. by phonology. Is it the case then that phonological systems are phonetically motivated, or rather than that phonetic systems are phonologically motivated? And consequently that whatever is relevant in phonetics, i.e. whatever is of linguistic significance, must be grounded in phonology? This would mean that the slogan *phonological processes are phonetically motivated* should translate into the near-tautological *phonological processes are phonologically motivated*. If it shed its delusions of grandeur, phonetics – Dziubalska-Kołaczyk's (ms.) *better informed phonetics*? or perhaps simply *phonological phonetics* – might even become relevant.

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