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TOBIAS SCHEER

Centre national de la recherche scientifique, Nice

Edmund Gussmann

The Phonology of Polish

Oxford University Press 2007, 367 p.

1. Introduction¹

1.1. Poland, Polish and phonological theory

Polish is a phonological language, and Poland is a phonological country. Polish is particularly phonological because of the quite extraordinary patterns that it is made of (even among the Slavic languages). Poland is remarkably phonological in the sense that, unlike anywhere else, there are probably more phonologists around than syntacticians and semanticists. The conjunction of the outstanding material and outstanding phonologists has made Polish a yardstick or, as some may feel, a battleground in the development of (generative) phonological theory. There are few languages (and certainly no Slavic language) that have been studied as extensively as Polish was and is; also probably no other language, and no other country, has produced as many monographs, each trying to frame the sound pattern in a particular generative theory: Laskowski (1975, SPE), Gussmann (1980, SPE), Rubach (1984, Lexical Phonology), Bethin (1992, autosegmental), and now the book under review (Government Phonology, henceforth GP).

Whoever sets out to add a study of this language faces a Hercules' task because of the sound pattern itself, and because of the wealth and depth of the preceding analyses that turn a cumulative ambition into a terrific challenge. And yet for a third reason, there is an unspoken split of the country into two analytic traditions that are carried by the two most prominent figures of the past decades, Edmund Gussmann and Jerzy Rubach. Every Polish phonologist, including the third party that is represented by Katarzyna Dziubalska-Kołaczyk and develops Natural Phonology in Poznań, is concerned by this fundamental divide in one way or another. Since the early 90s, it appears in the coat of the opposition between (D)OT and GP.

¹ This review has benefited from comments by Gienek Cyran, and from detailed correspondence with the author of the subject matter on the basis of earlier versions. I am grateful to both for their constructive criticism.

The project of a new wholesale account of Polish is thus ambitious in itself, and the challenge arguably grows more acute when it is undertaken by one of the two major protagonists, Edmund Gussmann. The solution that the author favours in this situation is certainly wise: the book that he has written is cumulative in the sense that it considers Rubach's work and analyses, but not the theory that these are couched in. The reader will thus be vainly looking for a confrontation of (D)OT and GP, or of GP with any other theory for that matter: the contours of GP are introduced, but there is no comparative discussion with other theories. This follows a more general choice that the author has made: theory is the slave of description in this book; it is presented only insofar as it provides the vocabulary that is necessary for talking about the language. The choice of the theory that provides the descriptive categories is not discussed: like in other monographs, the author expects that the analyses produced will be the best advocate for the theory that is at their origin.

Now we can raise the question why we need to bother (or struggle) with any theoretical bias at all when it comes to the description of a language. This is a question common to all authors of the series "The phonology of the world's languages" that Jacques Durand edits, and where the book under review is accommodated. In the preface, Gussmann recalls the scientific truism that there is no such thing as a theory-neutral description of language. Not any more than of any other object in this world, one may add — and perhaps should, in times where old empiricist (and/or behaviourist) wraiths waft through linguistics in general (Langacker's 1987 "cognitive" linguistics²) and through phonology in particular (e.g. Bybee 2001). Description requires specialized descriptive vocabulary, and vocabulary is necessarily theory-laden. The question is thus a matter of degree, not of principle: how much, and which theory-specific vocabulary do we need in order to get the description going, i.e. in order to be able to talk about anything at all? Conversely, which amount of detail and specialization will have the effect to deny access to the target audience, i.e. the average phonologist and other linguists or non-linguists who are interested in Polish?

In this situation, the worst choice is to feign that there is no theory, and start a "description" with some vocabulary, whose theoretical orientation is unreflected. The second worst choice is to do the same thing while actually being aware that the vocabulary is oriented, but without telling the reader that it is and how the orientation is called. The third worst choice is to do the same thing, but this time with full awareness of the theoretical orientation *and* with explicit notice thereof, as well as of its name. Edmund Gussmann has made a bad choice, the latter, which is as good a choice as one can make. Pace his malicious counsellors John Harris and Gienek Cyran, who the author reports on p.xii, have tried to make the book a book on Government — rather than on Polish phonology, Gussmann has made theory the slave of the descriptive purpose. The preface is explicit on this division of labour, and we will see that the exact amount of theory that is needed is difficult to gauge: it may

² I use quotation marks in order to refer to this kind of work because the label, which was purposefully chosen fallaciously, suggests that this theory has a copyright on cognitive aspects of grammar, and that anything which is non-Langackerian must be non-cognitive.

sometimes be felt to be too present, while on other occasions the reader is left with too little information (see sections 6.3, 7.6). As was mentioned before, this issue is piece and parcel of the genetic code of the book series, and indeed of any attempt to write a wholesale account of a language.

The book thus uses the vocabulary and the concepts of Government Phonology in the broad sense in order to make the reader discover what the sound structure of Polish looks like. The adult reader is advised that this is the case and can therefore make up his mind. He knows that what he is presented with is both Polish *and* Government Phonology — he may then try to filter out the latter in order to see how things would look like if it were replaced by some other theory. Replacing it by nothing, though, will leave him with nothing at all or, in other words, with the noise that empiricists are fond of listening to in myriads of varieties.

1.2. Edmund Gussmann and his way uphill

Since his first contribution on the generative stage in 1980, Edmund Gussmann went down a long and winding road or rather, a track which at last forced him to trace through unexplored fields. Embarking at first on the generative mainstream road in times when the star of SPE was already falling, i.e. just before Lexical Phonology and autosegmental representations turned the field upside down, he turned to the Government Phonology track in the early 90s, a move that was sealed by Gussmann & Kaye (1993). But after some time the author also felt uncomfortable on this byway of the generative road and started to explore his own ways into hills and mountains that were surrounding the GP-track. The guiding light was twofold: on the one hand, the attraction of a neighbouring valley, where structuralist locals once granted the right to morphemes to have multiple copies, but whose access was closed in the 60s; on the other hand, the quest for a wild fruit that could offer an alternative to chunk-based phonology, which Edmund Gussmann believes is actually junk-based.

The book under review is, if not the endpoint, at least a milestone in the personal evolution of the author, which spans a remarkably large array on the theoretical chessboard. The directions that Edmund Gussmann has taken over the years leave the footsteps of a free mind, whose only guide is the promise of insight: whether this leads to large, illuminated roads, seamed with cheering audience or to lonesome and onerous mountain paths plays no role.

1.3. How to use the book

The book encloses a tremendously complete collection of data: few areas, if any, will remain uncovered. Every data set is richly illustrated by pieces that are selected very cautiously. Also, a pervasive strand that runs through the book is the special attention that the author pays to loanwords, their degree of assimilation and their status with respect to the native phonology.

Regarding the question how to access these data, the book pays tribute to its non-theoretical orientation: the progression is narrative, rather than analytic. That is, the introduction of data and theoretical tools is intertwined: the author sets out with a piece of data, on the grounds of which he illustrates an analytical option,

which then grounds the approach to more complicated patterns. This contrasts with the typical analytic approach, which explains all theoretical notions that are needed in a first chapter and then sorts out the patterns according to this filter. The table of contents is then built on the grounds of theoretical, rather than of descriptive notions. Gussmann's approach is quite different: the table of contents uses only traditional vocabulary, such as palatalization, prefixes, nasal vowels, voicing and the like. This is reader-friendly and makes sure that the average phonologist and also non-phonologists will find what they are looking for. It is also unlikely that people will be put off by the theoretical machinery, as the narrative style of the author takes the reader by the hand and introduces just one item at a time.

The price to pay for this progressive access and the concomitant reader-friendliness is precisely this progressive access: in the discussion of the palatalization complex, which spans a hundred and fifty pages for example, there is no way to guess where exactly the particular piece of data that one may be interested in is discussed. That is, readers who are looking for an analytic access will have to follow the narrative track until they hit the data that they are looking for. But even if they find them by using the word index (which is indeed very helpful), they will usually have to backtrack the narrative strand in order to understand how the analysis works. And here again, the critical piece of information may be hidden anywhere in the demonstration.

In sum, thus, the book is well suited for being read from cover to cover, or at least from the beginning of a chapter to its end; accessing it as a dictionary of Polish phonology is less obvious.

2. *Shrinking phonological computation*

2.1. *How much computation does a grammar accommodate, and what else is it made of?*

The core project of the book is the promotion of computational minimalism: the mechanisms that make the synchronically active phonology of Polish are shrunk to a handful of instructions. The contrast with the position that the author advocated in 1980 could hardly be more salient. Edmund Gussmann was then standing on the other end of the spectrum, defending SPE, which was made of computation and basically nothing else. That is, writing the grammar of a language came down to discovering the rules and their extrinsic order that related abstract underlying and surface forms.

In order to illustrate the distance that lies between the computation-promoting underlying Gussmann in 1980 and the computation-shrinking surface Gussmann in 2007 (who is at least as abstract as before, though, as we will see, but in a different way), the following quote from the conclusion of Gussmann (1980) is worthwhile. The author defends abstractness both against (phonetic) "concreteness" and the allomorphic treatment of alternations, i.e. the two lines of attack of Natural (Generative) Phonology (on which more in section 2.2), the major challenger of SPE in the 70s.

- (1) „The study of Polish phonology points to the need for abstract representations and rules which may be contradicted (made opaque) on the surface. We hope to have

shown that without the tense-lax distinction among vowels, large areas of both the phonology and the morphology of the language could be given merely a list-like description and striking generalizations and similarities among the processes would have to be viewed as accidental and unrelated. We have adduced numerous alternations whose systematic nature precludes a concrete or surface-oriented account, and we have tried to show that certain minimal assumptions about abstractness bring coherence to large bodies of data. It should be emphasized that while each individual problem might conceivably be given some quasi-morphological solution, it is the totality of the phenomena covered by an abstract phonological interpretation that constitutes the strongest argument in its favor, since it produces a coherence that no concrete, morphological patchwork analysis could offer.

Contrary to many critics, the endorsement of abstract phonology does not turn phonology into a game with symbols where anything can be derived from anything and even the most bizarre rules can be accepted. Quite to the contrary, the espousal of abstractness entails the need to justify remote representations and rules since, of course, the burden of proof rests with the proponent of solutions which diverge from the phonetic surface. [...] Any description of Polish, we believe, will have to come to grips with these facts, and as long as a concrete interpretation of the totality of these data is not available, they will stand as evidence for abstractness.” Gussmann (1980:131, emphasis in original)

The tacit law in SPE and in the post-SPE period was that no generalizations could be missed, which meant that morphemes that appear in different shapes on the surface must have one single underlying form (oft-quoted examples are *Chr[aj]st* — *chr[i]stian*, *electri[k]* — *electri[s]ity*). This is what Jonathan Kaye calls the central dogma of SPE, which led to inconsiderate rule complexity and no worry for the growing “distance” between underlying and surface forms: typically, underlying forms represented an earlier stage of the language that was distant of a couple of centuries (e.g. Old English, sometimes Common Germanic, in SPE). Under the influence of Kiparsky’s (1968-73) question “How abstract is phonology?”, whose shock-waves dominated the discussion in the 70s and led to the radical positioning of Natural (Generative) Phonology, the field progressively depleted the computation-is-king attitude in the 70s and 80s by doing two things: a certain amount of phonological computation was replaced by (autosegmental) representations, and another part of it was externalized, i.e. made non-phonological.

The latter move dispenses with the central dogma of SPE, and this is the direction that Gussmann pushes as much as possible in his 2007 book, under the structuralist banner of morpho-phonology. In short, while SPE and Gussmann (1980) held that the more phonological computation, the better the grammar, Gussmann now campaigns with the reverse slogan, i.e. the less phonological computation, the better the grammar. Or rather, he argues in the name of phonological realism (a term coined by Vennemann 1976): most of what SPE thought is due to phonological computation (say, 90%), is in fact something else. The remaining online phonology of a language, then, reduces to a handful of instructions.

2.2. Unloading phonological computation I: representations and allomorphy

Most of the labour is thus shifted away from phonological computation, burdening the two devices mentioned, i.e. allomorphy (or suppletion, morpho-phonology in Gussmann's terms) and representations, but also a third device, sound inventories (i.e. an aspect of the lexicon).

The two former movements were common in the 80s: under the pressure of the Kiparsky-driven abstractness debate, all theories admitted to some extent that semantically, paradigmatically or etymologically related morphemes do not necessarily amount to one single underlying form. For example, nobody was buying Lightner's (1978, 1981) rule acrobatics, where the members of the pairs *tooth* and *dental*, *thirst* and *torrid*, *eye* and *ocular*, *sweet* and *hedonistic*, *queen* and *gynaecology* and so forth were derived by rule from a common underlying form. Also, all theories introduced some kind of autosegmental representations, whose possible ill-formedness (a notion that was absent from SPE) depleted the rule component. In these areas the difference between GP in general and Gussmann in particular on the one hand, and mainstream phonology of the 80s on the other, is gradual rather than principled.

The fact that different shapes of the same morpheme are not necessarily related by phonological computation but may also be controlled by allomorph selection (or related mechanisms, see section 6) is a central concern of the book. Gussmann argues that this shift of perspective is a major departure from the generative tradition. In order to mark his distance, he actually calls the generative tradition "generative-derivational" all through the book. According to him, the generative fall of man was the conflation of phonology and morpho-phonology, which were distinct levels of analysis in the structuralist tradition. In section 1.5 of the book, Gussmann carefully goes through the structuralist literature, both general and specifically concerned with Polish, which establishes (and puts to use) morpho-phonemic alternations without any intervention of the phonemic level. This lays the foundations of Gussmann's further practice, which will outsource a whole lot of the alternations that are found in Polish, and hence of the computational burden, to allomorph selection.

The scenario whereby generative theory has done away with structuralist morpho-phonology that today needs to be reinstalled in its rights, falls short of an episode that Gussmann mentions only in passing. Even in SPE, allomorphy has always existed for obvious cases, such as Polish (and English) *idź* "I go" — *szedłem* "I went" and, as was mentioned, under the pressure of the abstractness debate of the 70s, gained much ground in the generative paradigm. The major challenger of the generative SPE-mainstream of the 70s was precisely the offspring of David Stampe's Ph.D (Stampe 1972), i.e. Natural Phonology (Donegan & Stampe 1978, 1979, Dressler 1974, 1984, Hurch & Rhodes (eds.) 1996, Dziubalska-Kołaczyk 2002) and Natural Generative Phonology (Vennemann 1972a,b, 1974a,b, Hooper 1975, 1976). The core of both theories is to tolerate only purely phonetic conditions in phonology (the P-level in NGP), which means that all alternations must be phonetically transparent and hence surface-true (True Generalization Condition, Hooper 1976:13ff). Alternations that make reference to any kind of morphological information, that

are opaque or not one hundred percent regular are rejected into morpho-phonology (the MP level in NGP).

The debate with generative and non-generative Natural Phonology that dominated the 70s (a revolution in the generative kingdom) was parallel to the generative-internal revision of the system (the socio-democratic alternative that left the general structure in place) that Kiparsky (1968–73) undertook and that eventually led to the constitution of Lexical Phonology. The revolutionary and the revisionist enterprise revolved around the same question: how much of what we see is actually phonology?

This looks much like Gussmann's own programme, even though his approach is fundamentally different in other areas (see section 5.3): the input to Gussmann's phonological computation is phonological structure, not phonetic information, and there is no problem with certain forms of opacity (Gussmann allows for a kind of absolute neutralization, see sections 2.3 and 6.3 below).

In any event, there is a post-structuralist non-generative (Natural Phonology) and a generative (Natural Generative Phonology) precedent that outsources most of what SPE thought is phonological computation into morpho-phonology. The latter does not appear at all in the short history of morpho-phonology that is offered in section 1.5 of the book, while the former is represented by Dressler (1985).

Gussmann's plea for emptying phonological computation in favour of morpho-phonology is thus a revival of the core of the phonological debate of the 70s, within as much as beyond the generative paradigm. Opposing the structuralist and the generative tradition on the grounds of morpho-phonology may thus miss the mark: the distribution is not complementary.

Section 5 below reviews the diagnostics that Gussmann applies in order to decide whether something is a phonologically or a morpho-phonologically driven regularity, and also discusses the fate of the Polish stock of alternations in this perspective. But let us first continue the examination of the basic properties of the system that Gussmann sets up.

2.3. Unloading phonological computation II: augmented inventories

2.3.1. Absolute neutralization: a plague in the early generative phonology

Unlike the two surrogates of phonological computation that were discussed in the preceding section (allomorphy and representations), the third outlet, inventories, is less customary: it actually revives an old SPE-rooted factor of abstractness, the so-called absolute neutralization, that came under fire since Kiparsky (1968–73) and was progressively abandoned in the 70s. In GP, the tool that allows for the expression of absolute neutralization are the so-called Licensing Constraints. While these were developed by Monik Charette and Jonathan Kaye at SOAS in the 90s (see section 4.3 below), Gussmann is a pioneer in using them as a computation-killer or rather, as we shall see, as a computation-outsourcing instrument.

A typical case of absolute neutralization is the classical generative analysis of Slavic vowel-zero alternations, which (since Lightner 1965, with applications to Polish by Gussmann 1980, Rubach 1984 etc.) establishes two vowels in the underlying inventory of the language (say, Polish) that never appear on the surface. These so-called yers are

either deleted or appear as [ɛ] on the surface: one is front and causes palatalization, the other is back and inert in this respect.

Since it cannot be predicted whether a Polish [ɛ] alternates with zero or not, “true” and “false” [ɛ]s need to be distinguished in the underlyingly inventory: while the alternating vowel in *pies* — *ps-a* “dog, NOMsg, GENsg” is a yer, the non-alternating [ɛ] in *bies* — *bies-a* “devil, NOMsg, GENsg” is held to be a “true” /ɛ/. Yers thus need to be different from /ɛ/, but also from any other vowel of the Polish underlying inventory, which therefore contains nine vowels, as opposed to the seven vowels that appear on the surface. In the course of the derivation, yers are either “lowered” to [ɛ] or deleted, hence they never appear on the surface in their underlying coat. Their position in the vocalic triangle was said to be in the upper, centralized area (because this is where Common Slavic yers were located), and they were said to be different from <y> /i/, which surfaces as [i], by the virtue of being [– tense]. These two specifications are entirely arbitrary: the items /@/ and /ɛ/ would have done exactly the same labour, and any position in the triangle defined by whatever feature would have done the job, provided that the two yers are different from all other underlying vowels.

This arbitrariness, coupled with the outlawed absolute neutralization, led to the abandon of the analysis in favour of a representational solution, as soon as representational tools were available (Rubach 1986 et passim): the difference between alternating and non-alternating vowels was now encoded in terms of autosegmental structure (in various brands: lexical association to a skeletal slot vs. absence thereof, presence vs. absence of melody, see section 7.1). This evolution was unanimously celebrated as a success of the new representational tool, which was able to cut away the abstract and arbitrary items and the associated computation: there was only one melodic item /ɛ/ left, yers did not have to be subjected to any change (“lowering”) in their melodic properties (they are already /ɛ/s underlyingly), and no deletion rule for stray yers was needed anymore (unassociated melodic material is not pronounced).

2.3.2. Absolute neutralization created by “phonetic packaging”: three different [ɛ]s

On this backdrop, let us look at how Gussmann treats the fact that some [ɛ]s palatalize, while others (opaquely) do not. The (tacit) assumption that is shared by most phonologists is that the palatality, inherent in the phonetic substance of front vowels, is responsible for their palatalizing virtue. Gussmann rejects this perspective: section 2.2 of the book explains why phonetic substance is irrelevant. That is, phonological processes are controlled by phonological, not by phonetic triggers. Therefore nothing allows us to assert that all [ɛ]s should have the same palatalizing potential: all of them may well possess the palatal agent I, but the role played by this melodic prime may distinguish several phonological expressions, all of which are pronounced [ɛ]. In such an environment, a mapping mechanism is needed to decide how phonological structure is pronounced. The phonology-phonetics mapping may be more or less strict, i.e. allow for more or less “distance” between the phonological structure and the phonetic result: the standard assumption mentioned is that there is virtually no slack at all, i.e. the mapping is one-to-one. In contrast to this view, GP and Gussmann allow for a greater amount of discrepancy — of how much exactly is an interesting

question that Gussmann does not address, and from which GP usually shies away (see note 6).

In any event, the slack allowed for by Gussmann is great enough to accommodate three different [ɛ]s, or rather three different phonological expressions that happen to reach the surface as [ɛ]:³ palatalizing [ɛ]s are phonologically (not underlyingly though, Gussmann rejects this notion altogether, see section 4.1 below) distinct from their non-palatalizing cousins.

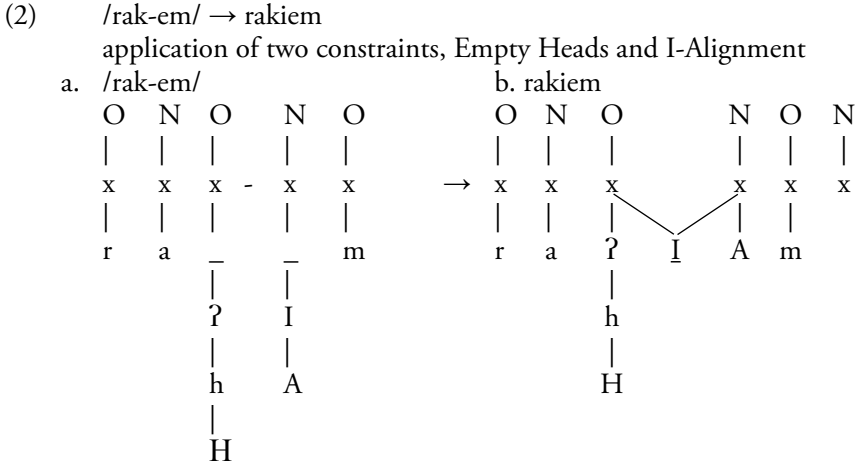
The detail of the palatalization complex in Polish and Gussmann's analysis thereof is much too intricate to fit into the frame of this review. The following may however illustrate Gussmann's distinction of the three different [ɛ]s mentioned. What is traditionally called non-palatalizing e occurs for example in the INSTsg ending *-em*, which does not palatalize dentals (*lot* — *lot-em* "flight, NOMsg, INSTsg"): its lexical identity is I-A (heads are underscored, empty heads are noted as " "). The same morpheme, however, always "palatalizes" velars (*rak* — *raki-em* "crab NOMsg, INSTsg"), a fact that is obviously not due to the specific morpheme at hand (i.e. the palatalization is not triggered by any idiosyncratic property of the vowel of this morpheme). Rather, k, g palatalize before e in the entire language: the ban on *[kɛ], *[gɛ] is surface-true. Surface-true in native vocabulary, one should add, since unpalatalized velars do occur before [ɛ] in (recent) loans such as *kelner* "waiter", *kemping* "camping", *Kenia* "Kenya" and so forth. Whatever the general constraint that disallows *[kɛ], *[gɛ], it must be inoperative in these words. Gussmann argues against a specific loanword phonology and therefore sets up a non-palatalizing [ɛ], A-I (p.65ff). The general constraint against *[kɛ], *[gɛ], then, is sensitive to the empty head of our INSTsg I-A: velars that are also empty-headed, and a CV pair with adjacent empty heads is prohibited by the constraint Empty Heads that Gussmann introduces on page 52: "An empty-headed nucleus cannot license an empty-headed onset". Therefore this constraint does not touch A-I, which is not empty-headed.

Finally, a third configuration that is pronounced [ɛ] identifies as I-A. It occurs for example as the result of the action of Empty Heads: the I of the lexical I-A in our INSTsg suffix is promoted to head status, which makes its vowel and the preceding consonant subject to another constraint, I-Alignment: "A nucleus shares I-head with the onset it licenses" (p. 52). This means that the now I-headed suffixal vowel is forced to share its I with the preceding velar.⁴ What appears as "palatalization" on the surface is thus the effect of a sharing relation in Gussmann's system, where the skeletal slots of the C and the V share an I element.

³ Or rather, as a mid front unrounded vowel, to be precise: there is some variation in Polish regarding the articulation in this area, which may also be [e].

⁴ This constraint does not bite after dentals (*lot* — *lot-em* "flight, NOMsg, INSTsg") since these are not empty-headed: the I of the suffixal vowel is lexically a non-head; it fails to be promoted to head status by Empty Heads since the preceding dental is headed (only velars are empty-headed in the classical GP approach to the internal structure of consonants, see e.g. Harris & Lindsey 1995).

Table (2) below illustrates the application of Empty Heads and I-Alignment to a velar-final root that happens to come to stand before our instrumental singular suffix *-em*.⁵



This also answers the classical hen-egg puzzle of the Polish palatalization complex: much ink was spilled in order to determine whether two distinct vowels (/i/ and /i/) palatalize consonants, or, on the contrary, a single underlying /i/ is palatalized by consonants, which are lexically specified for palatality. While Gussmann stands on the latter (classically structuralist) side, the question is quite immaterial in his system: there is neither hen nor egg since the only relevant property is the sharing relation (more on this in sections 2.3.4 and 3 below). In a sharing relation as under (2)b, then, what is phonetically executed on the vocalic skeletal slot is I-A.

In sum, what we hear as [ɛ] may be either -I-A, I-A or A-I. The unity of all structures that are pronounced [ɛ] is the fact that they are made of the same melodic ingredients, I and A (and also that this is the case of no other Polish vowel). The three configurations exhaust the combinatorial possibilities of structures that involve I and A in the GP perspective where melodic primes may be either head or non-head, and where structures may be empty-headed.⁶

⁵ Gussmann assumes that the lexical recording of vowel-initial suffixes begins with a nucleus that is not preceded by an onset, and that consonant-final stems (and affixes) end in an onset in the lexicon (which is supplied with an empty nucleus upon interpretation in case comes to stand in word-final position). This issue is further discussed in section 7.6 below.

⁶ As was mentioned earlier, Gussmann does not discuss the question of how much slack exactly can be tolerated between phonological structure and phonetic realization. In our case the limits seem to be reasonably set by the fact that all front mid vowels are (or need be) made of I and A. But would a situation where, say, I-A is pronounced [i] be conceivable? It is understandable that this question of general theoretical relevance is not addressed in a book on Polish — but it was mentioned earlier that there is no clear answer in the GP literature either, other than “whatever slack the analysis of natural language requires is admitted”. Given this principle, the next question is why natural language

2.3.3. *Better, but not so different after all: downward computation outsourcing*

On p. 63f, Gussmann contrasts his analysis with the accounts of non-palatalizing *e* that the generative literature has produced. His aim is to show that the threefold phonological identity of [ɛ] can successfully replace the rule-ordering acrobatics of earlier analyses. In this context, Gussmann mentions two cases where derivational solutions are based on absolute neutralization: on the one hand *sen* “sleep NOMsg” whose non-palatalizing *e* was explained by the fact that it alternates with zero (*sn-u* “id. GENsg”) and is underlyingly the back yer (i.e. the non-front vowel /ɤ/, see section 2.3.1). On the other hand, cases like the instrumental singular marker *-em*, whose vowel was supposed to be the underlying non-front and non-round /ɤ/, which is turned into [ɛ] by rule after palatalization has applied (and hence contrasts with /ɔ/ only with respect to the feature round).

Strikingly enough, though, Gussmann and the derivational analyses apply the same strategy: the inventory is augmented in such a way that non-palatalizing *e*'s are granted some property (non-front, A-headed) that prevents them from effecting palatalization. In both cases, some subsequent action makes them acquire the pronunciation [ɛ]: while a rule converts /ɤ/ and /ɤ/ into [ɛ] traditionally, Gussmann needs some mapping statement which makes sure that the three structures $_I$ -A, \underline{I} -A and \underline{A} -I appear as [ɛ] on the surface. Gussmann calls the definitions that determine how a given structure is pronounced as “phonetic packaging”, and leaves it at that. Whatever the formulation, this information needs to be explicitly mentioned somewhere in the grammar.

What really distinguishes the classical analyses that rely on absolute neutralization and Gussmann's distinct phonological structures is the means by which the pronunciation is acquired: phonological computation vs. the phonology-phonetics mapping.

This is not the only difference, though: recall that the underlying identity of absolutely neutralized items is entirely arbitrary (/@/ would do the same job). This is not the case at all in Gussmann's analysis, where every phonological structure is carefully argued for and responds to multiple pressures in the highly intricate system of palatalizations. We are thus facing a system where absolutely neutralized items serve no other purpose than the one that they are absolutely neutralized for, against another system that affords independent control over the phonological identity of inventory-augmenting items.

At the bottom line, Gussmann's system arguably fares better than what he calls the generative-derivational approach — but not really for the reasons invoked. The inventory is augmented on both sides, and there is some conversion of absolutely neutralized X into surface Y on both sides as well. Gussmann's analysis may therefore be more appealing, but it is not that different from its predecessors: unlike representations, but like allomorphy, Gussmann's inventory augmentation is not a computation-killer — it is a computation-transformer that outsources the burden of computation/conversion, upwards to allomorphic computation in one case, downwards to the pho-

does not produce all logically possible mappings, i.e. why some mappings do not occur: there must be a principled reason related to some kind of non-phonological, i.e. “phonetic” identity of melodic primes.

nology-phonetics mapping in the other. In sum, thus, this is all perfectly consistent with Gussmann's general programme that aims to shrink *phonological* computation as much as possible.

2.3.4. Other inventory-augmentations: two [x]s and palatalized labials/velars

Beyond the particular case of the threefold identity of [ɛ], inventory augmentation is a general strategy that the author applies all through the book. A large-scale example is the doubling of the inventory of labial and velar consonants, which in Gussmann's system come in as a plain and a palatalized version. That is, the *-w* in *Wrocław* "name of a city NOMsg" for example is lexically palatalized (/vʲ/) because a palatal element appears in presence of a vowel-initial suffix such as in *Wrocławwi-a* "id., GENsg". This contrasts with plain labials such as the *-w* (which is lexically /v/) in *Kraków* "name of a city, NOMsg", whose GENsg is *Krakow-a*. The *w* — *wj* alternation, is driven by a Depalatalization Constraint (p. 50), which depalatalizes labials and velars iff they are not directly followed by a filled nucleus, i.e. in case they occur in pre-consonantal or word-final position.

Augmenting the consonantal inventory by distinguishing between plain and palatalized labials/velars has the opposite effect on the vocalic inventory, which shrinks. It revives the traditional solution for <i> [i] and <y> [i̯], which were considered as one and the same phonological object in the structuralist literature since Baudouin de Courtenay. By contrast, generative work (heralded by representatives of the structuralist tradition, such as Zwoliński 1958 and Jassem 1966) abandoned the one-phoneme approach: in the generative view, <i> [i] and <y> [i̯] are two distinct phonemes whereby the former, but not the latter, has a palatalizing potential.

The recognition of plain and palatalized labials/velars also allows the analysis to get away with just one vowel that alternates with zero, against the two distinct yers that are assumed in the generative tradition (see section 2.3.1). That is, the difference between *wieś* — *ws-i* "village NOMsg, GENsg" and *wesz* — *wsz-y* "louse NOMsg, GENsg" is not attributed to the fact that the former has a front (and hence palatalizing) yer while the latter originates in a back (and hence non-palatalizing) yer; rather, both lexical items accommodate the same phonological object that alternates with zero, which simply happens to be preceded by a plain labial in one case, and by a palatalized labial in the other.

Also along the line of inventory augmentation is Gussmann's treatment of the velar fricative <ch,h> [x], which sometimes does, but at other times does not behave like its velar congeners. The "true" velars [k] and [g] cannot be followed by <y> [i̯] and <e> [ɛ], and this regularity is surface-true (except for a handful of foreign items such as *gyros* "gyros", *kelner* "waiter" or the proper name *Kydryński*, see also section 2.3.2). We have seen under (2) that expected *-y*, *-e*, appear as *-i*, *-ie* after [k] and [g]. In contrast to this behaviour, [i̯] and [ɛ] may happily appear after [x] (e.g. *chyba* "perhaps", *herbata* "tea"). Facing this situation, Gussmann endorses the consequences of the GP principle according to which only phonological behaviour is evidence for determining the identity of phonological objects (see section 3 below), and of the requirement that phonological regularities be exceptionless: if

[x] does not behave like a velar, it *is* not a velar (p. 85ff). What we hear as a velar sound is in fact the phonetic packaging of something else, an /h/, which happens to be pronounced [x].

Alongside with the “non-velar” [x], however, there are also instances in Polish where [x] lines up with [k,g]: this pattern is observed in derived imperfectives. Gussmann first establishes that the relevant morpheme, *-iw-/yw-*, must be lexically /-yw-/ (p. 89f). This follows from the fact that it appears as *-yw-* after plain labials and dentals (*za-grzeb-ać* — *za-grzeb-yw-ać* “to bury”, *czyt-ać* — *czyt-yw-ać* “to read”), while *-iw-* is found after palatalized consonants, including labials (*wy-kp-ić* — *wy-kp-iw-ać* “to ridicule”). Finally, “true” velars follow the latter pattern: just as under (2), the empty-headed suffixal /y/ cannot cohabit with empty-headed [k,g]; the constraint Empty Heads is therefore satisfied by the promotion of I, which is only operator in /-y/, to the head position. The result is thus [ci, ii] as in *o-ptak-ać* — *o-ptak-iw-ać* “to mourn”. Unlike in the general pattern, the velar fricative [x] does not part company: *-iw-*, not *-yw-*, is observed in *za-koch-ać* — *za-koch-iw-ać* “to fall in love”. Since [x] behaves like a velar in this case, it must *be* a velar, i.e. the empty-headed item /x/.

All in all, Gussmann thus argues for an augmented inventory of two distinct phonological objects that are both pronounced (i.e. absolutely neutralized as) [x].

3. *Against chunk-phonology*

In the spirit of absolute neutralization, Gussmann thus augments the inventory of... well, of what exactly? Not of phonemes, since of course there is only one distinctive /ɛ/ in Polish, not three; not of sounds in the phonetic sense either since there is no correlation between either of the three items that Gussmann distinguishes and a particular phonetic realization. What we are talking about is the inventory of *phonological expressions*, i.e. the set of phonological primes that may define the pronunciation of a single skeletal slot in a given language. Polish happens to have three phonologically distinct melodic expressions in the front mid area which are all pronounced the same, [ɛ]. This illustrates the GP-methodology, according to which the only way to find out about the phonological identity of an item is to observe its phonological behaviour (in our case, how “[ɛ]” behaves in regard to palatalization) — phonetic properties of [ɛ] are entirely irrelevant (Kaye 2005:283, section 2.2 of the book).

In such a system, the only thing that counts are phonological expressions: there is no meaningful way to talk about segments, phonemes or any other melodically defined sub-portion of the linear string. The only measure of linearization, the only objects for which a linear consecution can be established and which have a paradigmatic identity, are skeletal slots. As one may see under (2), melodic primes do not have any linearizable identity: while they may belong to just one skeletal slot, they may as well be shared by several timing units (like the I under (2)b). In the latter case, the shared prime is truly shared, which means that it does not belong any more to one skeletal slot than to another: it contributes to the definition of the phonological properties of both, and its eventual lexical origin (the I is suffixal

and hence vocalic under (2)) is entirely irrelevant. This is because phonology is a computational system that operates over a string of anonymous units and is perfectly unable to identify the morphological identity of its subparts: following the footsteps of structuralism, Gussmann holds that phonological computation is out of business as soon as morphological conditioning kicks in (in which case we are in morpho-phonology).

In any event, it is only in very specific cases, i.e. when morphology allows us to isolate an item as under (2), that the lexical identity of a vocalic slot can be defined in terms of melody. The general case is when the sharing CV pair is monomorphemic: *kierować* “to manage”, for example, illustrates exactly the same sharing structure as under (2)b, where a palatalized velar is followed by a front mid vowel <kie> [çɛ]. This time, though, it is impossible to determine, and idle to try to, whether the shared I “belongs” to the consonant or to the vowel: it contributes to the definition of both, and this is the only relevant phonological statement. Gussmann shows that the syntagmatic relationship between consonants and vowels is actually a central piece of the phonological system of Polish, whose domain of operation are CV units: the fate of a C-slot and a following V-slot is sealed together.

This is what Gussmann means when he calls GP a “syntagmatically oriented framework” (p. 18). The syntagmatic perspective applies in his approach to melodic representation (i.e. phonology below the skeleton), for which Polish in general, and the palatalization complex in particular, are especially eloquent advocates. But it also extends to syllable structure (i.e. phonology above the skeleton), where GP builds on lateral relations between constituents (Government and Licensing), rather than on the classical paradigmatic arborescence (Scheer 2004).

Gussmann thus campaigns against everything that is paradigmatic:

- (3) „what matters phonologically are the mutual relations between successive melodic and syllabic units. Segmental inventories, if relevant at all, are secondary or derivative of the syntagmatic relations found and defined over melodies and constituents. Chopping across the relations in an attempt to determine a number of units is bound to artificially distort the picture.” p. 45f

„The death of the phoneme” was a programmatic section title of Kaye (1989:149ff), and the inadequateness of chunk-isolating theories is also central in Kaye’s recent work (in collaboration with Markus Pöchtrager, see Pöchtrager 2006). Gussmann participates in this movement that denies linearity at the melodic level, and this positioning is truly original in the historical landscape of phonology: it directly opposes the basic structuralist units, phonemes, as much as the generative equivalents, segments, or even phonetic „sounds” (although among all audiences phoneticians know best that the exercise of identifying linear chunks in a spectrogram is artificial).

4. Computation in (Gussmann's) GP: how it works and on what it operates

4.1. Monostratal and non-derivational?

Another property that Gussmann insists on all through the book is the non-derivational and monostratal character of phonology.⁷ That is, “the notion of any underlying representation distinct from the surface is incoherent within our model. There are no phonological structures from which phonetic shapes are in any sense derived: what we have is a single level of representation which contains all linguistically important information” (p. 61). Or, also perfectly explicit:

- (4) „[R]epresentations like those in (21) [a structure where I is shared between an onset and a nucleus] are not the result of turning an underlying segment into some surface realization or the selection of an allophone in a context but simply a static representation capturing the relevant generalizations. Within the framework of this book the distinction between underlying and surface, or phonemic and allophonic, loses its significance. [...] [R]ecall again the apt formulation of Harris and Lindsey (1995:46): ‘there is no level of „systematic phonetic” representation distinct from some systematic phonemic or underlying any more than there is a systematic phonemic level distinct from anything else.’ In brief, there is just one level of representation, whether it be called phonetic or phonemic is totally irrelevant. This is a single level of interpreted representations which reflects all the linguistically relevant properties of the sound structure of the language.” p. 45, emphasis in original

This again is a piece of Gussmann's computation-reducing programme: nothing happens in the sense that no object A is transformed into any object B — all is static, and constraints enforce well-formedness without turning anything into anything.

Devising a generative grammar, or any grammar at all for that matter, without computation sounds strange, though. The very notion of grammar implies that something happens: a language is not just the concatenation of pieces. Gussmann may try to minimize the amount of phonological computation, so far so good. But the small computational residue will have to do computation — and in fact it does: beyond the futile debate about vocabulary items such as „underlying”, „surface” and the like, there is no doubt that Gussmann's computational system does transform objects, which are different before and after the application of computation. A case in point is illustrated under (2): the lexical representation of the suffixal vowel of the INSTsg *-em* is $_I-A$; after velars, this item is transformed by the constraint Empty

⁷ The word monostratal was coined by Declarative Phonology (e.g. Scobbie 1996). Gussmann's use is in the same spirit, but technically quite different: while alternating morphemes are underspecified for the alternating property which is „filled in” by constraints (e.g. the voice value in final devoicing systems) in Declarative Phonology, no such mechanism is instrumental in Gussmann's system, where alternations that involve different grammatical forms of the same morpheme are rather outsourced into morpho-phonology.

Heads into \underline{I} -A, which is then forced by the constraint I-Alignment to share its \underline{I} with the preceding consonant.

Gussmann actually admits the existence of both “underlying” forms (which he calls basic or morpho-phonological, p. 51) and of the transformational action of his constraints, even if this is not their primary *raison d’être*: “they are not, at least not primarily, instructions to change one set of properties into another one” (p. 46); they “[k_i , g_i] do not emerge and, where expected on morphological grounds [...], they are replaced by their palato-velar congeners, and followed by the vowel [i]” (p. 86).

Also, the rejection of any level of systematic phonetic representation, or of any other mechanism of phonetic interpretation may make sense on the backdrop of the fact that unlike (binary) features, privative (monovalent) primes are independently pronounceable. John Harris (Harris 1990, 1996 et passim) and others have emphasized this fact over the years, which has a number of interesting consequences (see Harris’ recent work, e.g. Harris 2006).

This does not mean, however, that there is no mapping from phonological expressions to phonetic realization: not only must some mechanism convert the cognitive object “ $\underline{-I}$ -A” into some articulatory movement and hence some signature in the sound wave; it must also be decided somewhere that in Polish \underline{A} -I is pronounced [ϵ] rather than, say, [\acute{c}] or [e]. While sound signatures of elements are arguably universal (see Harris 2006), the decision which elemental makeup is pronounced how is an idiosyncratic property of each language that must be recorded somewhere.

Gussmann talks only about phonological expressions that are pronounced or subject to “phonetic packaging” (p. 26) — the packaging process itself is not described since it lies beyond phonology, i.e. applies to the output of phonological computation. The impression that there is nothing going on regarding phonetic implementation should thus be eschewed.

In sum, Gussmann’s system is more computation-hostile in word than it is in fact, both regarding phonology-internal computation and the relation of phonology with phonetics.

4.2. Computation is king in OT but not with Gussmann, still Gussmann’s constraints are ranked and violable

Gussmann’s general movement away from phonological computation is the exact opposite of what has happened in mainstream phonology since the early 90s: OT has progressively depleted grammar from everything that is non-computation, and shifted relevant labour to computation. That is, the contribution of the lexicon (Richness of the Base, i.e. the prohibition to introduce distinctions in the lexicon, that is to have any theory of the lexicon at all), of parameter settings, of inventory specifications, of representations and even of modular boundaries (e.g. the distinction between morphological and phonological computation) was taken over by constraint interaction (in a single constraint chamber). The Cambridge Handbook of Phonological Theory edited by Paul de Lacy (2007) (and de Lacy’s 2007 introduction in particular) provide a well documented survey of this evolution.

This notwithstanding, there are interesting parallels between Gussmann's formal system and OT. OT is a theory of computation, and of computation only. It is not incompatible with a theory of the lexicon, a theory of representations and a theory of the architecture of grammar — its natural tropism for computation, together with the analytic choices made by its founders and by almost all practitioners, have created the misconceived mirage that sound structure could reduce to computation (see Scheer forth b). If one manages to get the overstated and conjectural role of computation out of the way (computation is a piece of grammar, not grammar itself) and looks at the heart of OT, it appears that the core of constraint interaction as conceived in this theory and the mechanism that bears on lexical representations in Gussmann's system is identical: 1) instructions are formulated in prose and may require or prohibit a specific configuration, and 2) in case they conflict, one will be given priority. In short, Gussmann adheres to the idea that phonological computation is effected by ranked and violable constraints.

Gussmann of course makes his instructions explicit and actually calls them constraints — but there is no mention or discussion of the fact that they are also ranked and violable: this much the reader needs to find out by himself. For example, Gussmann's otherwise motivated constraint Empty Heads (see section 2.3.2) prohibits onset-nucleus pairs where both constituents are empty-headed. On the assumption that <i> [i] is I and <y> [i] identifies as $_I$, this explains the fact that no Polish word begins with <y> [i]: the empty-headed $_I$ would be preceded by an empty(-headed) onset. In this situation, the operator I of the [i] is promoted to head status and hence pronounced [i]. However, I-Alignment, another independently motivated constraint that we have already come across in section 2.3.2, demands that I must be shared by an onset-nucleus pair in case it is head. Words that begin with #i such as *igła* [igwa] “needle” should thus be pronounced #ji (*[jigwa]), which they are not. On Gussmann's analysis, this is due to another constraint, Operators Required (p. 55), which demands that “doubly attached {I} must license operators.” Since the onset of *igła* does not contain anything but an eventually shared I, [jigwa] violates Operators Required.

We are thus facing a classical conflict between two constraints, which cannot be simultaneously satisfied: either the I is shared in violation of Operators Required, or the onset is empty in violation of I-Alignment. Gussmann thus explains the absence of the glide by the priority of Operators Required over I-Alignment. His constraints are therefore ranked and violable.⁸

⁸ Edmund Gussmann disagrees with this conclusion or, should it correctly reflect the system described in the book (which I believe it does), would rather modify his analysis by setting up a different constraint system in order to avoid ranked and violable constraints. Another option that he hints at is the modification of the autosegmental ground rule, according to which a piece of melody that is attached to a syllabic constituent (or to an x-slot) has a phonetic existence. In any event, the author holds that instructions for phonological computation must be unviolable and unhierarchised. He also points out that the case discussed is the only instance of the book where two constraints are in conflict — this is true.

4.3. *Computation in GP*

GP is commonly referred to as a representationally oriented theory, and this characterization is certainly correct. The theory was never very explicit on how exactly computation works, except that it does not involve the serial ordering of instructions. All that was known until the mid-90s was the vague statement that processes “apply whenever the conditions that trigger them are satisfied” (Kaye 1992b:141, 1995:291), and that the instructions which are at the origin of phonological processes cohabit in what Kaye (1995) calls the ϕ -function. Doing phonology is applying the ϕ -function to a given string, whereby all individual instructions are applied simultaneously and without hierarchy (i.e. order of importance).

The fact that these instructions are actually constraints is the result of the work of Monik Charette and Jonathan Kaye on Licensing Constraints (Charette & Göksel 1994, 1996, Kaye 2001). Licensing Constraints are an attempt to reintroduce the structuralist system into generative thinking (a goal also pursued more recently by Nick Clements 2000, 2001 and Elan Dresher 2003 a, b). The structuralist insight, which was banned from generative theory since its inception, is that the same sound may behave quite differently according to the kind and number of its neighbours: an [ɛ] is a different linguistic object according to the system in which it occurs. In other words, lexical structure is exposed to two forces: one coming from the environment (the “generative force”), the other from the system (the “structuralist force”).

Licensing Constraints try to kill these two birds with one stone: they primarily express restrictions on how melodic primes can combine, and thus define, the set of well-formed phonological expressions (the inventory); at the same time, though, the restrictions defined are held responsible for phonological processes that are active in the language (vowel harmony in Turkish for example in Göksel & Charette 1994, 1996).

This is the other striking convergence of GP in general and Gussmann’s system in particular with OT, where the same strategy is pursued: static properties of sound systems, such as parametric choices and statements that define inventories, are expressed by constraint interaction, i.e. by the same device that is responsible for active phonological processes. Steriade (2007) provides an overview of the OT literature that tries to unify static and dynamic properties of sound structure in the constraint chamber (Dresher’s work also follows this track).

GP and OT are thus fairly complementary: one is representation-oriented and does not really have an explicit theory of computation, while the other is computation-oriented and has no explicit theory of representations (or of the lexicon). GP in general and Gussmann in particular believe that phonology is better off if phonological computation is minimal, while (mainstream) OT says that the more computation we get, the better a grammar we build. Beyond the question of its amount, however, the way computation works seems to converge: we already knew that GP uses constraints; thanks to Gussmann’s analysis of Polish we now know that these constraints are ranked and violable. His book offers the first explicit and consistent system of constraints that describe the set of regular phonological processes (rather than just the inventory of sounds) of an entire language.

5. Morpho-phonology: what it is and how it is identified

Let us now take a closer look at what Gussmann calls morpho-phonology. As was mentioned, the question is not whether there is such a thing — all theories accommodate a mechanism that manages allomorphy — but how we know that an alternation is morpho-phonological, rather than phonological. The author characterizes morpho-phonological alternations in the following way.

- (5) „Morphophonological regularities, in contradistinction to phonological ones, are partly conditioned by grammatical (morphological) and lexical factors. This does not mean that they are necessarily erratic or irregular. Some of the alternations are regular and productive with both inflectional and derivational suffixes. The non-phonological conditioning is also seen in the absence of any non-arbitrary connection between the phonological environment and the nature of the changes the alternations reflect.” p. 113

Given an alternation between two paradigmatically, semantically and/or etymologically related forms, there are two diagnostics for determining whether it is phonological or morpho-phonological in kind. Both identify morpho-phonological regularities positively: alternation is phonology-driven by default, i.e. when none of them is applicable. That is, a regularity is managed by morpho-phonology and not by phonology if either morphological, lexical or syntactic factors contribute to its definition, or if there is no conceivable causal relation between a triggering context and the effect observed.

5.1. The relationship between morpho-phonologically related items is arbitrary

This definition is concise and provides a number of critical pieces of information that it is useful to comment individually. It recalls that the relationship between allomorphs, as opposed to the relationship between phonologically controlled alternants, is arbitrary: anything can be associated with anything. That is, there is no reason why the sound sequence *id-ɛ* is associated to *szedł-em*, but there is a reason why the suffix *-y*, which is arguably */-i/* underlyingly (see section 2.3.2), appears as *[-i]* on the surface when preceded by a velar plosive: Empty Heads and I-Alignment in Gussmann’s analysis, other phonological mechanisms in other approaches. As we will see in section 6 below, Gussmann sets up “replacement statements” when describing morpho-phonological processes, and the relationship between items that are connected by such a statement is perfectly arbitrary. In the case of the palatal complex, Gussmann identifies Palatalization Replacements (PRs), where for example $\langle r \rangle$ [r] is replaced by $\langle rz \rangle$ [ʒ] in a word like *por-a* — *porz-e* “time NOMsg, LOCsg”. That r is related to rz rather than to, say, p or ch, is hard-wired in the list of morpho-phonological correspondences of the language.

The fact that items which are related by this kind of mechanism do display an obvious “phonetic” similarity (there is an r-rz, but no r-p alternation) is obviously due

to the fact that before being morpho-phonological, their relationship was properly phonological. That is, what we see today are vestiges of a once-phonologically controlled alternation that has aged. This diachronic perspective regarding the life-cycle of regularities was discussed by Baudouin de Courtenay (1895) and also in Natural (Generative) Phonology (e.g. Vennemann 1972a): alternations are born as phonetic regularities, then move into grammar, where they are first phonological but at some point start to be riddled with morphological conditions, followed by lexical factors, and finally they are levelled out or eliminated from the language by some other means. Therefore, asking the question how much of what we see is controlled by phonology is if not identical, at least concomitant with the question how much diachronics are in synchronic sound patterns.

Gussmann does not expand on this aspect of morpho-phonological alternations: in this area as much as elsewhere, the book offers a strictly synchronic view of the language studied. Areas that are worth diachronic investigation are mentioned on occasion, but not analyzed.

5.2. Allomorphy is a blend of phonological and morphological factors, but phonological computation is pure

As indicated by their name, morpho-phonological regularities are open to both morphological and phonological conditioning. That is, suppletion sure selects allomorphs according to morphological contexts, but may look at phonological factors, too. Consider for example the treatment of the dative singular morpheme *-e* that Gussmann proposes on page 108.

- (6) „Morphophonology of palatalization before the dative *-e*
 Before the {A•I} of the dative replace the stem final consonants in accordance with the table as follows:
- | | | | | | | | | | | | | | | |
|----|----|----|----|----|---|---|---|----|----|---|---|----|----|---|
| p | b | f | v | m | n | w | r | t | d | s | z | k | g | x |
| | | | | | | | | | | | | | | |
| pʲ | bʲ | fʲ | vʲ | mʲ | ∅ | l | ʒ | tɕ | dʒ | ç | z | ts | dʒ | ʃ |

This rule applies only if both the morphological (only the dative is concerned) and the phonological (only the expression {A•I} is concerned) condition is satisfied. Palatalizations that are effected by (6) include cases such as *ryb-a* — *rybi-e* “fish NOMsg, DATsg” and *idiot-a* — *idioci-e* “idiot NOMsg, DATsg”.

On the other hand, phonological computation, which as shown above is made of ranked and violable constraints, does not suffer any morphological influence: only phonological properties may condition phonological processes. This “no morphology-in-phonology”-programme is shared with Natural (Generative) Phonology, but its implementation is quite different. Like in Natural (Generative) Phonology, phonology is defined negatively as the residue of alternations that are not conditioned by morphological factors. The positive definition of what phonology is, however, contrasts: in Natural (Generative) Phonology, phonological processes 1) can only take into account phonetic properties and therefore 2) have to be surface-true (opaque

alternations cannot be phonological, see section 2.2). Gussmann does not endorse either of these definitions: phonetics are irrelevant, and phonology is able to produce opacity without any problem. The latter is due to the kind of absolute neutralization that is omnipresent in the book and closely related to inventory augmentation as well as to a complex phonology-phonetics mapping that allows for neutralization (see section 2.3).

The former was already discussed (cf. sections 2.3.2 and 3), and Gussmann is explicit on what he means exactly when he talks about phonological factors.

(7) „[P]honological regularities establish a direct link with the context in which they occur (Kaye, Lowenstamm, and Vergnaud’s 1990: 14 non-arbitrariness condition). The context is specifically restricted to phonological information and domain boundaries (Kaye 1995); it should be kept in mind that phonological information should not be equated with traditional phonetic labels as it can also include empty categories and skeletal and syllabic organization.” p. 30

Conditioning factors can thus make reference to everything that a phonological representation is made of: melodic and syllabic (eventually higher) structure, as well as domain boundaries. These simply indicate the beginning and the end of the string over which phonology operates when it is accessed by the morpho-syntactic derivation that sends a specific chunk in need of phonological interpretation (which is thus cyclic, cf. Kaye 1995, something that today is called derivation by phase, cf. Chomsky 2001 et passim).

5.3. *Native alternations in loanwords, regularity and productivity*

In section 3.10 of the book, the author discusses an argument that is typically made by those who hold that many of the alternations that he argues escape phonological control are indeed managed by synchronic phonological activity. Speakers apply native alternations to new words (typically loans, but also acronyms etc.) that they have never heard before (e.g. *fiat* — *fiac-ik* “Fiat (car), id., diminutive”; *czat* — *czaci-e* “chat NOMsg, LOCsg”). This, goes the argument, points at online phonological activity. Gussmann shows that this argument is flawed: many alternations that affect loans are just as irregular and riddled with lexical exceptions as those that apply to native vocabulary.

An eloquent example presented by Gussmann are the two suffixes *-izml/-yzm* and *-istal/-ysta*. Both are obviously borrowed (i.e. related to English *-ism* like in *Marx-ism* and *-ist* like in *Marx-ist*), and both come in a soft (i-initial, *Marks* — *marks-izm* “Marx, Marxist”; *bas* — *bas-izm* “bass, bass-player”) and a hard (y-initial, *klasyc-yzm* “classicalism”, *klasyc-ysta* “classicalist”) version. The striking fact is that both cause palatalization, but not of the same consonants: while *-t*, *-d*, *-r* remain untouched by *-izml/-yzm* (*dyletant* — *dyletant-yzm*, *Budda* — *budd-yzm*, *Hitler* — *hitler-yzm*), they undergo palatalization before *-istal/-ysta* (*flet* — *flec-ista* “flute, flutist”, *ballada* — *balladz-ista* “ballad, ballad writer”, *afera* — *aferz-ysta* “scandal, schemer”). In case a stem can take both suffixes, “minimal pairs” such as *awangarda* “vanguard” — *awangard-yzm*

“avant-gardism” vs. *awangardz-ista* “avant-gardist” are thus found. This makes sure that no synchronic phonology of whatever kind can account for both patterns with a single computational system.

But in addition, the suffix *-ysta* has a flickering behaviour: alongside with the palatalizing effect illustrated on *-t*, *-d*, *-r*, there are items where palatalization does not take place: *Bonaparte* — *bonapart-ysta* “Bonaparte, supporter of Bonaparte”, *Conrad* — *konrad-ysta* “Conrad, specialist in the works of J. Conrad”, *humor* — *humor-ysta* “humour, humorist”. And to round off the jumble, there is some free variation with the same suffix as well (which may on occasion be promoted to semantic connotation): *propaganda* — *propagand-ysta* or *propagandz-ista* “propaganda, propagandist”.

Gussmann concludes, no doubt correctly, that palatalization in these cases is neither suffix-driven nor the result of any phonological regularity; rather, it is a lexical property of individual derivatives. So far so good. But the suffixes examined are derivational, and it is well known that derivational morphology produces much more irregularity than inflectional morphology. The same point could not be made, say, with the LOCsg suffix *-e* (*-ie*) that turns the aforementioned *czat* “chat NOMsg” into *czaci-e* “id., LOCsg”. Here it will probably be difficult to find any stem at all, foreign or native, that does not palatalize. According to Gussmann, however, this is no guarantee for the phonological character of the alternation either since, as is made explicit under (5), allomorphy is not necessarily irregular or erratic: it may well produce one hundred percent exceptionless patterns.

In sum, then, loanword patterns may be indicative of the non-phonological status of alternations, but they are unable to provide evidence in favour of truly phonological computation. The evidence that they provide is therefore not any different from the one that is adduced by native patterns, which may also be regular or irregular.

Talking about the regularity of phonological processes, it is to be noted that the statement under (5) does not mention this issue. Absolute exceptionlessness of regularities that ambition to be knighted as phonological is however required by Natural (Generative) Phonology (phonological regularities must be surface-true), as much as by Gussmann. But again, Gussmann has a different definition of what exceptionlessness means: rather than being phonetically defined or in reference to the surface (phonetics are irrelevant), phonological regularity refers to phonological structure.

This being said, Gussmann admits one kind of exception to exceptionlessness: regarding cases such as *butik*, *plastik* [*s*]inus and *riposta* (which need no gloss) whose dental should be a palatal, according to Gussmann’s (and anybody else’s phonological grammar), Gussmann notes that “it seems that the failure to conform to I-Alignment is a marker of foreignness in Polish phonology. [...] The existence of violations of constraints is simply another way of saying that there is exceptionality in phonology” (p. 101). What we may take stock of, then, is the fact that Gussmann admits exceptions to phonological constraints only in foreign vocabulary: native items must be truly exceptionless.

5.4. A theory-dependent and a theory-neutral criterion

Let us now have a closer look at the two diagnostics that Gussmann mentions under (5). Both define phonological regularities negatively: an alternation is under phono-

logical control iff it is not counted out by 1) the presence of morphological factors or 2) the absence of a non-arbitrary relationship between the phonological environment and the effect produced. The former is theory-neutral and may be decided on the grounds of a pre-theoretical description. The latter, however, is theory-dependent: whether a given environment and a candidate effect entertain an arbitrary relation or not can only be decided when we know what a (non-)arbitrary relation is — and this depends on the theory used.

In actual fact, it is not obvious to define what a (non-)arbitrary relationship is in the first place. Intuitively, a non-palatal consonant (such as a velar) that becomes palatal in presence of a palatal vowel is a reasonable, that is non-arbitrary scenario. But the reverse may be as well: a velar that becomes non-velar in the presence of another velar. This is what is called a dissimilation. On the other hand, a process whereby *r* becomes *p* before a schwa certainly illustrates an arbitrary relationship between the trigger and the change. Not in SPE, though, since SPE is a theory of computation that does not impose any formal restrictions on the relationship between the structural description of a rule (X_Y in the universal rule format $A \rightarrow B / X_Y$) and the structural change ($A \rightarrow B$). Also today in OT, there is no formal restriction on what a constraint can ban or demand. In both cases, the accuracy, or the plausibility of a rule, is largely a matter of subjective judgement.

This issue is closely related to the abstractness debate, which among other things prompted the request for rules to be “natural” (this is also where the name of Natural (Generative) Phonology comes from). It was believed that objective diagnostics could be found that measure whether a rule is natural, simple, elegant, phonetically plausible, psychologically real or typologically invariant (Hellberg 1978, Koutsoudas 1980, Dinnsen 1980). This was by and large in vain, just as much as the attempt to define an evaluation metric (also sometimes called evaluation measure) that would be able to measure different degrees of abstractness (Kiparsky 1974, Campbell 1981, Goyvaerts 1981).

The following case illustrates how the same process may be declared regularly phonological or arbitrary, depending on the theoretical premises assumed. Let us first look at the locative singular of masculine and neuter nouns. The morpheme appears as either *-e* (*-ie*), which causes palatalization (all examples below contrast the NOMsg with the LOCsg: *chłop* — *chłopi-e* “peasant”, *lot* — *loci-e* “flight”, *doktor* — *doktorz-e* “doctor”), or *-u* (*stoń* — *stoni-u* “elephant”, *stolarz* — *stolarz-u* “joiner”, *człowiek* — *człowiek-u* “man”, *wróg* — *wrog-u* “enemy”, *duch* — *duch-u* “spirit”). The distribution is easy to state: *-e* (*-ie*) appears after labials and dentals, while *-u* attaches to (functional) palatals and velars. Also, it appears to be reasonably regular, put aside a few hard-stemmed items that go with *-u* (such as *dom* — *dom-u* “house”, *syn* — *syn-u* “son”, *pan* — *pan-u* “gentleman”, which all belong to the oldest — and most frequent — stock of vocabulary).

Facing this record, Gussmann concludes that there is no “obvious connection between the specific allomorph selected and the context. [...] The desinence allomorphy to a small extent involves lexical idiosyncrasy despite the fact that, generally, it can be captured by rules whose conditioning may be arbitrary. [...] Thus the allomorphic variation and its contexts may be arbitrary and idiosyncratic” (p. 111).

The fact that the distribution is complementary and easily stateable notwithstanding, this is certainly a reasonable take: while velars may be held responsible for a following *-u*, the same cannot be said for palatals. Let us therefore take a look at a case in Czech that is parallel to the Polish pattern, except that *-u* does not appear after palatals. In Czech, the vocative singular morpheme of masculines has three allomorphs, *-e*, *-i* and *-u*. The former is found after labials (there is no issue regarding the opposition between soft and hard labials in this language: all labials are hard) and dentals (*holub* — *holub-e* “pigeon NOMsg, VOCsg”, *hrad* — *hrad-e* “castle NOMsg, VOCsg”), *-i* appears after palatals (*Tomáš* — *Tomáš-i* “Thomas NOMsg, VOCsg”), and *-u* is found after velars (*hoch* — *hoch-u* “boy NOMsg, VOCsg”, *Zdeněk* — *Zdeněk-u* “proper name NOMsg, VOCsg”).⁹

Would the selection of vocative allomorphs in Czech count as a truly phonological process where the quality of the desinential vowel entertains a non-arbitrary relationship with the stem-final consonant? There can be little doubt that the distribution makes sense: palatals select *-i*, velars select *-u* and all other consonants (labials, dentals) receive *-e*. The latter vowel may be regarded as underlying or default, while the two former are the result of an influence coming from the stem-final consonant. This analysis thus supposes the presence of some melodic prime in palatal consonants that is able to produce *-i*, and the presence of some other melodic prime in velar consonants that is able to produce *-u*. While hardly anybody will doubt that the former is true, the latter statement may or may not be endorsed according to the theory of melodic representation of consonants that one subscribes to.

In the standard GP model of the internal structure of consonants (Harris & Lindsey 1995, briefly exposed in section 2.2 of the book), labials are U-headed, dentals are A-headed, palatals are I-headed and velars are empty-headed. This system does not allow for a non-arbitrary link between velar consonants and *-u* since the vowel is made of the prime U, which however is absent from velar consonants. The entire distribution of vocative allomorphs will thus be declared non-phonological and rejected into morpho-phonology by followers of the standard model of melodic representation. In a system where velar consonants are empty-headed but contain U, however, the same distribution will be declared truly phonological: the appearance of *-u* can be analyzed as the spreading of U from the velar consonant.

The presence of U in velars is a long-lived subject of debate in GP: evidence in its favour has been collected for example by Scheer (1999) and Rennison (1990). The purpose of this section is not to continue this debate. It is simply to point out that Gussmann’s second diagnostic for deciding whether an alternation is morpho-phonological or phonological is theory-dependent. Therefore the consistency of the causal relationship between the change effected and the triggering environment of an alternation will not be able to be used as a classifying argument in the same way as the other diagnostic, whose terms can be evaluated on theory-neutral grounds.

⁹ The handful of Polish lexical exceptions boils down to just one word in Czech: *syn* — *syn-u* “son, NOMsg, VOCsg”.

5.5. Gauging the stock of phonological alternations

Gussmann's evidence for distinguishing between phonological and morpho-phonological regularities being defined, the question is where exactly the isogloss between phonology and morpho-phonology runs in the utterly complex system of alternations and selectional activity that is found in Polish.

Each case needs to be examined in its own right, and it is of course hopeless in this review to try to list those morphemes whose concatenation produces effects that are controlled by the phonology, as opposed to those whose effects are due to morpho-phonological activity according to Gussmann. Regarding the palatalization complex, the author has roughly devised chapter 3 of the book to phenomena that are controlled by phonology, while chapter 4 is concerned with material that he considers morpho-phonological.

On a global count, Gussmann believes that the "absolute majority" of phenomena escape phonological control (p. 113). Also, chapter 6 is about alternations that are completely or largely morpho-phonological. Processes that are triggered by the LOCsg and VOCsg, such as in *obiad* — *obiedzi-e* "dinner NOMsg, LOCsg", *czoł-o* — *czel-e* "front part, head NOMsg, LOCsg", as well as the alternation between *o* [ɔ] and *ó* [u] (e.g. *łódź* — *łodzi-i* "boat, NOMsg, GENsg") fall into the former category, while the allophonic realization of nasal vowels is an instance of the latter.

6. Morpho-phonology: how it works

6.1. Replacement of segments, rather than of morphemes: why?

We have so far been talking about morpho-phonology, allomorphy and suppletion quite synonymously when it came to characterize a non-phonological regularity. What everybody thinks of in this context is a mechanism that selects among several lexically stored versions of a morpheme according to a grammatical, i.e. non-phonological context. The aforementioned pair *idź* "I go" — *szedłem* "I went" illustrates this pattern.

Quite surprisingly, though, this is not what Gussmann has in mind when he is talking about "replacement statements", which is how he calls the rules that he holds responsible for morpho-phonological alternations. The term appears for the first time on page 113, and while reading through the rest of the chapter on the morpho-phonology of palatalizations, it took me a while to understand that what the author really means is not the selection of distinct morphemes, but of distinct segments. That is, morphemes have one single lexical recording, and diacritics may be either attached to a specific segment or to an affix as a whole. In the former case they specify how to modify the segment in question and in which morphological environment this modification takes place; in the latter case they determine the kind of modification that a segment of an adjacent morpheme will be subject to.

In order to see how this works, let us first look at two replacement statements that belong to the specific category of palatalization replacements <PR> that define the morpho-phonology of palatalizations.

(8) Palatalization Replacements (p. 128)

PR1	p	b	f	v	m	r	w	n	t	d	s	z
	pʲ	bʲ	fʲ	vʲ	mʲ	ʒ	l	ʃ	tɕ	dz	ç	z
PR3	t	d	s	z								
	ts	dz	ʃ	ʒ								

A *t* for example alternates with *tɕ* in some morphological contexts (LOCsg for example, <PR1>: *lot* — *loci-e* “flight NOMsg, LOCsg”), but with *ts* in others (inflected forms of the related verb for example, <PR3>: *lot* — *lec-e* “flight, he flies”). The relevant diacritic corresponding to the replacement pattern is thus attached to the suffixes in question and acts on the root-final consonant. In our cases, the result is as under (9) below.¹⁰

(9) a.	loci-e „flight LOCsg”		b.	lec-e „he flies”	
	O	N	O	N	O
	l	o	t	- e	ć
	<RV2>	<PR1>		<RV2>	<PR3>

In both cases, the stem-final *-t* is thus subjected to the modification that is specified by the diacritic which is provided by the suffix.

Segment-specific diacritics may be illustrated by RVs (which is shorthand for Relate Vowel), another variant of replacement statements that among other things are responsible for the vowel alternations that were mentioned in section 5.5. Under (9), <RV2> manages the e-o alternation that is found when our stem *lot* appears as a verb (but which is absent in the nominal declension of the same stem). E will thus turn into o iff the morphological context associated with <RV2> is met.

Diacritics associated to affixes that provoke the modification of root segments are a classical means of managing morphologically conditioned alternations, albeit in systems like SPE where no difference is made between phonological and morphophonological computation. That is, SPE would have written a rule that transforms *t* into *tɕ* before *e*, but only if the *e* is the LOCsg morpheme. In other words, SPE would have associated “LOCsg” to the suffix, rather than <PR1>. However in a perspective where the alternation is allomorphic rather than phonological, this solution is surprising: instead of morphemes, it substitutes individual segments in a morphologically defined environment. The same goes for segment-specific diacritics.

¹⁰ Gussmann indeed assumes that the lexical recording of vowel-initial suffixes begins with a nucleus that is not preceded by an onset, and that consonant-final stems end in an onset in the lexicon. This issue is further discussed in section 7.6 below.

What Gussmann calls morpho-phonology is thus quite different from what is commonly known as allomorphy or suppletion. The author does not discuss this issue, but we may take stock of the fact that his system is original and, as far as I can see, unprecedented at least in generative quarters.

This perspective has important consequences since it demands an activity that no current theory provides for, and that will be difficult to accommodate in the overall (generative) architecture of grammar. Allomorphy is usually treated after syntax, but crucially before lexical (vocabulary) insertion, i.e. before morpho-syntactic terminals are spelled out (i.e. transformed) into phonological material through a lexical access (e.g. *Distributed Morphology*, Harley & Noyer 1999). On this count, morpho-phonological activity, i.e. allomorphy, could not possibly apply after lexical (vocabulary) insertion, which is what Gussmann's solution supposes since it works on individual phonological segments. What Gussmann's solution probably comes closest to is the so-called PF Movement (Embick & Noyer 2001) which also creates some kind of intermundia where phonological material is already present, while morpho-syntactic structure is still available: in such an environment, morphemes may perform syntactic movement along the tree on the grounds of phonological motivation.

PF Movement and associated intermundia, however, are suspicious in the modular architecture of grammar that is central for generative (and structuralist) thinking. The basic property of cognitive modules is indeed the fact that they operate on a proprietary vocabulary and can "understand" no other (e.g. Segal 1996).

In any event, there is good reason to wonder why Gussmann chooses to replace segments, rather than morphemes, and whether anything hinges on this choice. A segment-replacing "allomorphy" will be difficult to accommodate in a generative architecture. But I am not sure after all that at the present stage of Edmund Gussmann's uphill evolution he is ready to pay a lot for being able to continue to advance under the generative banner.

6.2. *Lexical relatedness (LRs)*

Gussmann also introduces another mechanism that appears as a <X>-type diacritic in phonological representations: so-called statements of Lexical Relatedness <LR>. These are different in kind from <PR>'s and <RV>'s, though: unlike the latter, they do not represent any regularity, either phonological ("before a front vowel") or morpho-phonological ("in the LOCsg of masc. nouns"). Rather, their triggering context is lexically defined: the association of an <LR>-bearing morpheme with morpheme X or Y will produce a specific form of the segment to which the <LR>-diacritic belongs. <LR>'s are thus a special case of segment-specific diacritics (they are never attached to a morpheme as such). In other words, Gussmann's preference for segment-, rather than morpheme substitution also holds in cases where the substitution-trigger is an idiosyncratic property of another morpheme. The author explains LRs in the following way.

- (10) „Such statements are intended to connect different phonological shapes without assigning any directionality to them, that is, without deriving one from the other

in any way. By connecting the floating vowel in some words with the non-floating one in others we are simply making a statement that the words share some parts despite the unpredictable differences between them. The LR information can be regarded as contained in the specification of the vowel in the same way as other morphophonological instructions contained there.” p. 229

The case that Gussmann is referring to in the quote are vowel-zero alternations which mock any regularity. The vowel of the stem *zew* “call (noun) NOMsg” for example does not alternate with zero throughout declension (*zew-u* “id., GENsg” etc.), but is absent in the context where alternating vowels regularly appear as zero in some prefixed forms such as *po-zew* — *po-zw-u* “summons NOMsg, GENsg” (though not in all: *od-zew* — *od-zew-u* “response NOMsg, GENsg”, p. 228). Therefore Gussmann treats this alternation with the statement <LR1> that relates an e associated to its skeletal slot and an e that is not attached. The unique lexical representation of the morpheme *zew*, then, is as under (11) below.

(11)	O	N	O
	x	x	x
	z	e	w
	<LR1>		

Whenever the morpheme is processed by the component that is in charge of the computation of LRs, the associated or the floating version is chosen according to the presence or absence of morphemes that are specified for triggering either version of the morpheme.

One could ask how far LRs can go in modifying the structure of morphemes which are supposed to have only one lexical recording. The answer is: very far, in any event far enough to make GP-phonologists shudder. Gussmann’s <LR2> (p. 233) is also concerned with vowel-zero alternations, but of the kind that require the presence or the absence of an entire nucleus (rather than of an association line). Polish is very regular in not vocalizing what appears to be an alternation site before word-final consonants (more on this in section 7.4). Hence the final cluster of the stem of *form-a* appears to enclose a nucleus on account of the related adjective *forem-ny* “shapely” and the diminutive *forem-ka*. In the GENpl *form*, however, the alternating vowel refuses to surface. <LR2> deals with this situation by specifying that a full nucleus together with its x-slot and an attached melody is related to nothing. That is, the lexical recording /forEm/ contains the nucleus in question, which is augmented with the diacritic <LR2> and accordingly “deleted” in the appropriate lexical environment (i.e. when the following consonant is word-final). But this is not all: in Gussmann’s syllabic model, this “deletion” also supposes that the preceding consonant, r in *form-a*, which is an onset in the lexical recording /forEm/, “becomes” a coda.

Gussmann is thus consistent in upholding a single lexical recording for every morpheme where, in case this morpheme is involved in morpho-phonological or

lexical variation, diacritics that hook on this single lexical recording do the job, rather than distinct lexical recordings of the same morpheme. This is to be related to the fact that the author constantly rages against the SPE-doctrine of single underlying forms for morphemes.

Another question that one could ask is in which way Gussmann's replacement statements are really different from the typical SPE-type rules that mention morphological and/or lexical conditions in their structural description. Consider the rules under (12) below.

- (12) a. $t \rightarrow t_c / _e$
 but only if this e is the LOCsg morpheme
 $t \rightarrow t_s / _e$
 but only if this e is a verbal marker
- b. $e \rightarrow \emptyset / _CV$
 but in the stem *zew* only when it is prefixed by *po-*
 $e \rightarrow \emptyset / _C\emptyset$
 but only if the following empty nucleus is final in a domain

(12) a accounts for cases such as *lot* — *loci-e* “flight NOMsg, LOCsg” vs. *lot* — *lec-i* “flight, he flies”, while (12) b does the same labour as <LR1> and <LR2>. The difference between Gussmann's replacement statements and the rules in (12) is the fact that SPE claimed the latter to be piece and parcel of the phonological computation, while the former are explicitly non-phonological. This is the whole point of the architecture that is defended in the book, which argues for the recognition of a computational system that is distinct from phonology, i.e. morpho-phonology.

Another difference, however, is perhaps more interesting: Gussmann's way to go about the alternations at hand are replacement *statements*, while (12) shows *rules*. Both need diacritics, which however are domiciliated in lexical representations in one case (Gussmann), against the body of a rule in the other (SPE). We are thus back to Gussmann's consistent antipathy against computation: statements are static, and the part of them that words the replacement action according to a specific morphological or lexical context is not made explicit in the book: <LR1> on page 229 for example depicts related associated and unassociated e's, but does not supply the description of the action: “insert X in context A”. This would come closer to (12).

I do not know whether inscribing diacritic information in the computational system or in lexical representations produces any measurable empirical contrast. I do know, however, that the SPE-option is not viable in a modular environment since modules are autistic and can only understand their own vocabulary. Hence phonological computation for sure cannot “look at” locatives, verbal markers and the like. This does not mean, however, that Gussmann's solution fares better for it basically does the same scrambling of morphological triggers and action that modifies phonological objects — only that this is done in a distinct computational system. No matter what the system is called, phonology or morpho-phonology, however, it cannot access morphological and phonological information at the same time: these belong to distinct

vocabularies and hence to distinct modules.¹¹ This is why traditional allomorphy where morphemes are selected, rather than segments, seems to be the only way out — or at least deserves serious consideration.

6.3. *Component ordering, another kind of absolute neutralization and vacuous Duke of York*

Gussmann's system is devised to prepare all pieces so that the last component of the overall derivation, phonology, can apply without exception. This is how the promise of a 100% regular phonology is brought home. In order to achieve this goal, morpho-phonology and statements of lexical relatedness get all obstacles out of the way. Hence they necessarily apply *before* phonology. Gussmann is not really explicit on the global architecture of his grammar, but on occasion confirms this ordering: "phonology merely receives structures supplied by the lexicon and morphophonology" (p. 234). This corresponds indeed to the canonical sequence of events if Gussmann's morpho-phonology is assimilated to regular allomorphy (the segment- vs. morpheme-replacement debate lain aside).

Now this order appears to be in conflict with a specific use that Gussmann makes of replacement statements in a different context, where they are the instrument of another kind of absolute neutralization. At least since Kuryłowicz (1952), the national sport of Polish phonologists (and phonologists of Polish) is to try to characterize occurring and non-occurring word-initial sequences of consonants as a natural class. All attempts have failed so far because, some local regularities notwithstanding, the overall situation is simply anarchic: whatever the pattern invoked, there will always be clusters that exist when they should not, and others that do not occur when they should.¹² Gussmann's attempts in the book do not take exception to this rule (see pp.

¹¹ Edmund Gussmann has pointed out to me that he could well conceive of an interface mechanism that draws on both phonological and morphological vocabulary. This is a major departure from common structuralist and generative thinking, which is modular in the sense of Fodor (1983). Structuralist Level Independence and the generative Indirect Reference Principle (e.g. Nespov & Vogel 1986) prohibit the use of untranslated morpho-syntactic information in phonology: in order for phonology to be able to parse morpho-syntactic information at all, this information needs to be translated into phonological items (which over the years have been juncture phonemes, SPE-type boundaries and the Prosodic Hierarchy). Allowing computational systems to access distinct vocabulary, or even abolishing modular contours altogether, is current practice in OT and more generally the programme of connectionism in Cognitive Sciences (see Scheer forth a).

¹² The exhaustive inventory of Polish initial clusters on which all analytic work is based has been established by Sawicka (1974) (see also Rowicka 1999:309ss and Scheer 2004:§§375,622). Relevant analytic literature includes Rubach & Booij (1990), Gussmann (1991), Cyran & Gussmann (1998,1999) and Rowicka (1999). Cyran & Gussmann (1998,1999) for example provide a GP-based analysis that improves over Kuryłowicz' results, but admit that even then Polish clusters resist a proper characterization in terms of natural classes: „in fact [r] can only be followed by some obstruents and never by sonorants, while [n] cannot be followed by anything. Likewise [m] can be followed but not preceded by a sonorant. [...] Regularities of this sort fail to result from the licensing mechanism called PG. [...] These complex issues are not fully understood at present" Cyran & Gussmann (1998:135). Based on a broader record that takes into account the exhaustive list of occurring and non-occurring clusters in 13 Slavic languages, and also considering the overall typological situation beyond Slavic, I have argued in Scheer (2007) that it is idle and unsuccessful to look for any pat-

220, 225), but the author tries to reduce the clusters that resist analysis as much as he can. Palatalization Replacements are instrumental in order to achieve this goal.

Gussmann's general line of attack is to broadly follow Kuryłowicz' double onset analysis: Polish words can begin with two onsets in a row, either of which (but not both) may be branching. This implies the presence of an empty nucleus between the two onsets, and the structure then follows the general rule that the author has set up on page 215 according to which sequences of two empty nuclei in a row are prohibited (more on this in section 7.5 below). Hence #O \emptyset ON (where O is an onset and N a filled nucleus) is well-formed, while #O \emptyset O \emptyset is not. In addition, on page 214 Gussmann argues against the possibility for both onsets to branch: this would open the door for inordinate overgeneration.

Given this general landscape, Gussmann analyzes three-membered initial clusters whose first item is an s-sound (besides s, z, ʃ, ʒ, in Polish at least *ɕ* and *ʑ* participate in the notoriously deviating s+C phenomenology). A ground rule in GP is that s+C sequences do not qualify as branching onsets (Kaye 1992a). Therefore clusters such as *spr-*, *str-*, *skn-*, *zbr-*, *zgr-*, *ʃkw-* and the like can only be interpreted as a sequence of s plus a branching onset. The s itself could be either an onset or a coda; in the latter case, it is preceded by an empty nucleus and an empty onset. Gussmann mentions this option, but despite the fact that it is Kaye's original take and is also widely used in the book, he chooses the former without comment or argument, merely stating that the clusters in question "can be interpreted naturally as a non-branching onset followed by a branching one" (p. 210). *Sprawa* "matter", *schludny* "spruce, adj." or *sknera* "miser" thus identify as s \emptyset .CCV.

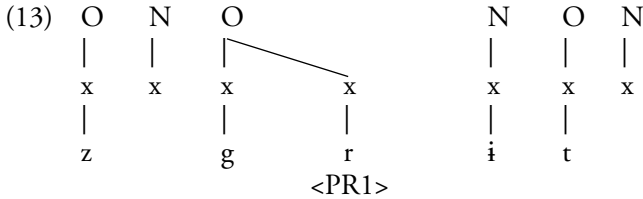
Items like *zgrzyt* [zgʒɨt] "gnashing", however, appear to be counterexamples since [gʒ] cannot be interpreted as a branching onset. What can and cannot count as a branching onset is actually a constant concern in the discussion of initial clusters, and readers who are not familiar with the ins and outs of GP will be lost fairly quickly. For example, a statement that one comes across is: "branching onsets must conform to complexity conditions with the governor, or head, being more complex than the governee or dependent" (p. 200). The trouble is that neither complexity nor the notions governor, governee, head or dependent have been introduced or defined.

It was mentioned earlier that the author generally avoids technical terms and theoretical excursus in the interest of the general, non-theoretically inclined audience. For example, the fact that sequences of two empty nuclei in a row are ill-formed is stated in these terms throughout the book, and the fact that in GP this is due to a lateral relation called government is never mentioned. The sudden appearance of technical terms such as governor or complexity will thus trouble the reader. True, the technical statement is supplied with a translation into pre-theoretical vocabulary on the bottom of the same page: "[t]wo consonants can form a branching onset if the first of them is

tern at all because there *is* no pattern: existing and non-existing initial clusters that violate sonority sequencing are a lexical accident. That we are indeed facing accidental, rather than systematic gaps is shown by the diachronic situation: existing modern clusters are simply those who enclosed a yer in Common Slavic, and the distribution of the two consonants in a CS sequence #C-yer-C of course is lexical accident.

an obstruent, preferably a plosive, and the second a sonorant, preferably a lateral or the trill. The lateral can be phonetically either [l] or the semivowel [w], as generally accepted in this book” (p. 200). But this only provides a gross orientation, and the reader has to believe the author when he makes decisions regarding this cluster that can and that cluster that cannot be a branching onset.

But let us return to *zgrzyt* [zgʒit] “gnashing”, whose [gʒ] is not a possible branching onset according to Gussmann. In absence of this option, the word should not be able to exist since the only structure that it can instantiate bears two empty nuclei in a row: *zøgøryt*. The solution that Gussmann advocates in this situation builds on PRs: we know that ʒ stands in a morpho-phonological replacement relation with r; the PR in question is <PR1>, see (8). Now if the [ʒ] were not a ʒ but a r, everything would be fine since unlike gʒ, gr qualifies as a branching onset. Therefore Gussmann proposes the following representation, which sets the awkward *zgrzyt* back to a regular and well-behaved item (the representation below is reproduced from p. 211).



Evidently, this is yet another form of absolute neutralization: a segment is held to have a phonological (or „underlying”) identity that never appears on the surface. Unlike in the cases discussed in section 2.3, however, the conversion is not operated by the phonology-phonetics mapping: this time, morpho-phonology is supposed to do the job.

Beyond the issue of absolute neutralizations and their eventual management by morpho-phonology, the trouble is that the order of application of morpho-phonology and phonology does not allow this scenario to work. There can be no doubt that syllabic well-formedness is a phonological property, that is assessed in the phonology. Morpho-phonology which transforms „underlying”/lexical r into ʒ, however, must apply *before* phonology is active. In other words, Gussmann’s salvaging strategy for *zgrzyt* is useless, a kind of Duke of York movement that, unlike in the historical case, is vacuous and effectless: the item in question is first made distinct from its pronunciation at some “basic”/lexical level in order to avoid being assessed by the phonology, but then is converted back into its surface identity *before* the actual phonological assessment takes place. When phonology decides about the well-formedness of the structure, it thus sees ʒ and not r, which should lead to agrammaticality because gʒ is not a good branching onset. Another way of describing the situation is that it is hard to see in which way the “r” that Gussmann introduces could be “basic”, “lexical” or “underlying” in any meaningful way.

7. Syllable structure and related issues

7.1. Vowel-zero alternations

Let us now turn to the second half of the book, which is concerned with syllable structure and related issues. The preceding sections have already introduced a number of relevant pieces of Gussmann's approach, namely regarding vowel-zero alternations. Two questions arise: in which way are alternating vowels different from their non-alternating cousins, and what kind of mechanism drives the presence and absence of alternating vowels?

While the traditional linear analysis relies on the augmentation of the vowel inventory (two "abstract vowels", the yers, are added, see section 2.3.1), the lexical contrast between alternating and non-alternating vowels is expressed in terms of association in various ways since the advent of autosegmental representations: non-alternating vowels are lexically associated with a skeletal slot, against alternating vowels that have been thought of as melodies without skeletal slot (Rubach 1986 et passim), an empty nucleus without melody (Gussmann & Kaye 1993) or a nucleus with a floating melody (Scheer 2004, 2005). Gussmann follows the latter option.

The association of floating melodies is in this respect regulated by a mechanism that was suggested by Anderson (1974) and already argued for in Gussmann (1980), but left unexploited in the literature since then:¹³ the constraint Melody Association requires to "attach floating [ɛ] to the nucleus when the following nucleus has no melody attached to it" (p. 191). At first sight this appears to do the same labour as the regular mechanism that manages vowel-zero alternations in GP, i.e. government. In this perspective, nuclei that host an alternating vowel are unpronounced iff they are subject to government, and a government relation can only be established if the following nucleus is pronounced (i.e. possesses associated melody). Both Gussmann's and the government-based mechanism rule out two successive empty nuclei, or rather, for the time being, sequences of two empty nuclei when the leftmost nucleus hosts a vowel-zero alternation. That is, the floating E in /p'Esø/ will have to be associated because it is followed by an empty nucleus (Gussmann), or because the following nucleus, being empty, is unable to govern it (the regular mechanism).

Two empty nuclei in a row, none of which hosts a vowel-zero alternation, however, are not affected: the putative word-initial sequence #køtøpV is well-formed since there is no floating melody that could be associated. Therefore the mechanism that regulates vowel-zero alternations must be complemented on both sides: Gussmann introduces a constraint that "disallows two consecutive domain-internal empty nuclei" (p. 215), and the government-based analysis states that every (domain-internal) empty nucleus must be governed.

One could thus believe that Gussmann does not mention government (which indeed does not appear anywhere in the book) just in order to avoid burdening the reader with theoretical notions in a descriptively oriented book. This however turns

¹³ In Gussmann (1980:30), this mechanism took the following form: „the string is first scanned for the [alternating] segments; once these are identified, the change is implemented simultaneously”.

out not to be the case, since his mechanism in fact is quite different from the government-based analysis. This appears when it comes to sequences of alternating vowels, like in *pies-ecz-ek* “dog, double dim.”, which is represented under (14) below.

(14) a. <i>pies-ecz-ek</i> „dog, double dim NOMsg”	b. <i>pies-ecz-k-i</i> „dog, double dim NOMpl”
O N O N O N O N	O N O N O N O N
x x x x x x x x	x x x x x x x x
p ^j e s e cz e k	p ^j e s e cz e k i

Crucially, Gussmann’s Melody Association looks at the string only once it is fully pieced together, and the fate of all floating melodies is decided simultaneously. Hence under (14)a, every floating melody looks at the following nucleus and observes that it has no melody attached. All three floating melodies therefore associate. Under (14)b, only the two leftmost floating melodies are followed by a nucleus without associated melody: the last item precedes a nucleus that is filled with the NOMpl marker and therefore does not surface.

The pattern at hand is called Lower: it describes a situation, found among other (Slavic) languages in Polish, whereby in a sequence of alternating vowels all appear on the surface. The traditional analysis involves a step-by-step derivation where every instance of *-ek* sits in a cycle of its own. Hence *pies-ecz-ek* identifies as [[*[pies]* ek] ek], and the rule (or constraint) Lower is applied from the most to the least embedded cycle. The formulation of Lower is by and large identical to Gussmann’s Melody Association (or rather, the other way round): an alternating vowel appears on the surface iff the following vowel/nucleus has the same properties. Classically, this comes down to “yers vocalize iff followed by another yer” (Lightner 1965), Gussmann & Kaye’s (1993) version is “an empty nucleus is vocalized iff the following nucleus is empty, i.e. cannot govern”, and Rubach (1986 et passim) and Scheer (2004, 2005) associate a floating melody iff the following vocalic melody is also unassociated (i.e. iff the following nucleus has no melody attached).

For the sake of illustration, let us look at the cyclic derivation in Gussmann & Kaye’s (1993) analysis: the innermost cycle *pies* identifies as [p’øso] (note that all morpheme-final consonants are onsets of an empty nucleus); the leftmost nucleus is followed by another empty nucleus and therefore vocalizes. At the next cycle, [p’esøkø] is evaluated and again, the leftmost empty nucleus vocalizes for the same reason. The *e* that follows the *p’* on the other hand is out of reach since only empty nuclei (classically: yers) are subject to the rule. Finally, the string that is evaluated on the last cycle identifies as [p’esekøkø], and again the leftmost empty nucleus is vocalized.

7.2. Gussmann rejects cyclic derivation for sequences of alternating vowels, but applies it elsewhere

Gussmann thus shares the basic mechanism which vocalizes alternating vowels before empty nuclei/yers with traditional analyses, but rejects its cyclic application. He has actually

remarkably strong feelings against anything that could remotely resemble a step-by-step derivation. In comment of his own treatment of *pieseczek*, he writes on page 199:

- (15) „The suffix *-ek* confirms the fundamental insight of the model we have adopted in our description, namely, the non-derivational nature of phonological relations; it is not the case that one application of a regularity creates the context for a successive application of either the same or a different regularity. Phonology interprets representations and whatever is significant phonologically is not derived, produced, or processed by lexical or cyclic rules, but is statically available ‘all the time’. An interpreted representation shows all the phonological relations and regularities—in other words, whatever is phonological can be read off the representations without underlying, intermediate and derived stages.” p. 199, emphasis in original

This untempered damnation of any derivational element in phonological analysis is rather surprising since GP, and indeed Gussmann himself, fully endorse cyclic derivation. Following Kaye (1995), cycles are called domains in GP, and the idea that the string to which phonological computation applies is defined outside of phonology, i.e. by morpho-syntax, is common generative thinking. On page 237 for example, Gussmann himself explains what domains are and that phonology processes them independently. His entire analysis of the peculiar behaviour of prefixes and prepositions is based on domain structure. In the example from page 237, Gussmann considers the association of the preposition *z* “with” and the noun *lew* “lion”, which produces *z lw-em*. The preposition identifies as /zE/ because it appears as either *z* or *ze* according to specific contexts. The root vowel of the noun *lew* is regularly unvocalized because the INSTsg suffix *-em* follows. Now the sequence /zE lEwem/ should trigger the vocalization of the preposition since the floating prepositional E is followed by another floating melody. The fact is that this does not happen, and Gussmann explains the non-vocalization of the preposition by the presence of a domain boundary: *z lwem* identifies as /zE/ [lEwem]/. That is, prepositional E “does not see” the unassociated root-internal E since it is not computed on the same cycle. Gussmann puts it the following way.

- (16) „[S]yntax-derived prepositional phrases contain a domain boundary between the preposition and the following nominal. This leads to tangible phonological consequences since each domain is processed independently — in our terms, the final floating vowel of the preposition remains unattached because it is not followed by an empty nucleus which would license its attachment.” p. 237

Where Gussmann actually means „...not followed by an empty nucleus” *in the same domain*. But even with this addition the analysis is incomplete: domains are processed from inside out, which means that /lEw-em/ first turns into *lowem*, and [zE] into *z*. However, there is also a higher domain that encompasses both /zE/ and

/lEw-em/, which will thus be assessed as /zE lEvem/: the Es that enter this domain unassociated are still present (otherwise the structure would bear two empty nuclei in a row and hence be ill-formed altogether). The result should therefore be *ze lwem after the application of Melody Association.

The only way to derive the correct result is to rely on the principle of Phase Impenetrability (which Gussmann does not mention). Developing a device that was introduced by Chomsky (1973) and applied to phonology by Kean (1974) and Mascaró (1976), Kaye (1995) holds that the result of phonological computation that was achieved on an earlier cycle cannot be undone at later cycles. This device is absolutely critical for Kaye's system, and since then has become a central piece of Chomsky's (2000, 2001 et passim) Phase Theory. Hence given [[zE] [lEvem]] and Phase Impenetrability, [zE] and [lEvem] are first computed on their own, which produces *z lwem*. On the outer domain, then, the preposition cannot be vocalized, even though it is followed by a nucleus without associated melody, for the sake of Phase Impenetrability: the non-association of the prepositional nucleus and its melody was decided by previous computation and cannot be undone.

In sum, Gussmann rejects a domain (cycle-) based analysis for phonology as such and for suffixal vowel-zero alternations in particular, but needs to apply it to prepositions. His anti-cyclic positioning is an obvious expression of his general antipathy for computation, which he attempts to minimize. From the point of view of GP, though, there is nothing wrong with the cyclic computation of domains along the embedded morpho-syntactic structure, which is piece and parcel not only of this theory (Kaye 1995), but indeed a genuine feature of generative thinking (since Chomsky et al. 1956:75).

7.3. Lower governs Modern Polish, but what about Havlík that rules in Old Polish?

A related issue is the existence of another pattern of vowel-zero alternations: given a sequence of alternating vowels, all of them surface when the Lower pattern rules, while only every other vocalizes (counting from the right edge) in languages that follow the Havlík pattern. The two patterns at hand appear to exhaust the cross-linguistic variation that is found in the vocalization of chains of alternating vowels. While modern Slavic languages such as Polish and Czech follow Lower, the regularity that Antonín Havlík (1889) discovered in Old Czech governs for example Old Polish, Old Czech, German, Moroccan Arabic and French (Scheer 2004:§§416,468). In Old Polish for instance, the diminutive of *pies* "dog NOMsg" was *piesek*, while the presence of a desinential vowel made the root vowel "reappear": *pies-k-a* "dog dim., GENsg" (e.g. Rospond 1979:74).

Whatever the correct analysis of this pattern (see Scheer 2004:§473, Ziková 2008 for proposals), it is for sure that it cannot be derived by Gussmann's mechanism: if all floating Es of /p'EsEkø/ simultaneously look at whether the following nucleus has a melody attached or not, only the Lower pattern *piesek* can be derived. The author has pointed out to me that he agrees that a different mechanism for the management of the association of floating vocalic melodies is needed in order to cover the Havlík

pattern. There is no way I can see, though, that could produce the Old Polish *psek* without resorting to some kind of step-by-step derivation. Devising a solution that does not use any step-by-step mechanism thus raises a challenge for Gussmann's derivation-hostile conception of the interaction of morphology and phonology.

7.4. Two generalizations regarding vowel-zero alternations

7.4.1. Polish refuses to break up word-final clusters

Before leaving vowel-zero alternations, a word is in order regarding two generalizations that are not discussed in the book: the fact that Polish regularly refuses to vocalize alternating vowels before word-final consonants (in non-nominative forms), and the fact that the syllabic status of root-final consonant clusters appears to have a bearing on whether they enclose an alternating vowel.

The former fact leads Gussmann to doubt that vowel-zero alternations, despite their absolute regularity elsewhere (cases of lexical conditioning notwithstanding, see section 6.2), are managed by phonology (see his <LR2> that was discussed in section 6.2). The misbehaving forms are those in which we are sure that a cluster encloses an alternating vowel because we see it in suffixed forms (*form-a* — *forem-n-y* “form NOMsg, adj.”), which however fails to appear when the cluster is word-final: the GENpl of *form-a* is *form* and not the expected **forem*. Gussmann illustrates this pattern with rich material (p. 230ff). He also points out the fact that the incriminated forms exhibit free variation for some roots: while the only possible GENpl of *form-a* is *form*, the GENpl of *bitw-a* “battle” may be either *bitw* or *bitew*, and the same variation is found for *wydra* — *wydr/wyder* “otter”, *sarn-a* - *sarn/saren* “roe deer” and a number of other lexical items. This instability indicates that the system is moving, visibly in the direction of regularity, i.e. the vocalization of alternation sites before word-final consonants.

Gussmann hints at a non-phonological reason for the failure of most roots to vocalize when the cluster is final: “when the nouns become the input to further derivations, the floating vowel normally appears in them” (p. 230). While this is certainly a correct description, it may be doubted that the reason for the non-vocalization of *form* is its non-derived character. Rather, the context of non-vocalization can be stated in purely phonological terms: clusters that enclose an alternating vowel refuse to vocalize in word-final position. This is especially striking when comparing the Polish situation with neighbouring Czech (which is what I have a bias for): while the GENpl of *form-a*, *walk-a*, *pasm-o*, *služ-b-a* is *form*, *walk*, *pasm* and *služb* in Polish, the Czech cognates *forma* “form”, *válk-a* “war”, *pásm-o* “area” and *služ-b-a* “service” produce regular *forem*, *válek*, *pásem* and *služeb* (as well as *forem-ní* “id., adj.”, *váleč-ní* “id., adj.”, *pásem-ní* “id., adj.” and *služ-eb-ní* “id., adj.”). Czech is thus as regular in the vocalization of vowel-bearing clusters word-finally as it is before consonant-initial suffixes.

In order to do justice to the empirical situation in Polish, however, an additional condition that is tacit in the discussion so far needs to be made explicit: final clusters only refuse to vocalize if they occur in a non-nominative form (such as *form-a* — *form*). There are many words such as *cukier* — *cukr-u* “sugar Nsg, Gsg”) which possess an alternating vowel before word-final consonants that appears on the surface. It thus

seems that the somehow “basic” nominative has some privilege that other forms, which occur in the same phonological context, do not enjoy.¹⁴

But there is still more to it: while the generalization that word-final clusters refuse to release alternating vowels seems to hold true for monomorphemic clusters (in non-nominative forms: *form-a* — *form*), the (non-)vocalization of heteromorphemic clusters appears to be an individual property of every suffix. As far as I can see, all suffixes refuse to vocalize (e.g. *-Eb-a*, *-stEw-o*, *-itEw-a*) except three: *-ek*, *-ec* and *-n*. Compare /*śluz*-*Eb*, /*świń*-*stEw*, /*modl*-*itEw*/ which appear as *śluz-b*, *świń-stw* and *modl-itw* with /*krok*-*Ek*, /*wzór*-*Ec*, /*peł*-*En*/ which surface as *kroc-ek*, *wzorz-ec* and *peł-en* (cf. *kroc-k-a* “step, dim. GENsg”, *wzor-c-a* “pattern GENsg”, *peł-n-y* “full, inflected”).

Admittedly, the generalization that word-final clusters do not release alternating vowels is intricate: it needs two non-phonological provisos that restrict its validity to non-nominative forms and to a selection of suffixes in case of heteromorphemic clusters. Nevertheless, it seems over-pessimistic to abandon the alternation to an arbitrary lexical diacritic as Gussmann does (<LR2> on p. 233). Rather, a phonological solution that takes into account the individual behaviour of morphemes seems to have a reasonable prospect.

An interesting way to look at the facts is to consider that the appearance of a vowel in suffixed forms (*form-ny*) does not betray the existence of floating piece of melody that is piece and parcel of the lexical representation of the item (and whose absence in *form* thus begs the question). Rather, the *e* could be epenthetic (i.e. lexically absent), because the concatenation produces an ill-formed sequence of two empty nuclei (*forømo-ny*). True, there are two empty nuclei in a row in *forømo* as well, but they are word-final. This makes quite a difference: we know that final empty nuclei “can do more”, i.e. have more licensing/governing potential, than their internal peers. Depending on the theory used, then, the final empty nucleus could license the preceding cluster (while its internal peer cannot), or the final empty nucleus could govern the preceding empty nucleus (while its internal peer cannot).

The fact that word-final clusters do not break up, then, follows from the fact that there is nothing to break them up: they do not enclose any floating melody. This would also cover apparent exceptions such as *iskr-a* — *iskier* “spark Nsg, Gpl”, whose cluster simply does enclose a floating melody. Finally, vocalizing (*-ek*) and non-vocalizing (*-b-a*) suffixes also represent a simple lexical contrast in this perspective: the former do, the latter do not possess a floating melody.

¹⁴ Gienek Cyran has pointed out a counter-example to me where a stem-final cluster breaks up even in Gpl: *iskr-a* — *iskier* “spark Nsg, Gpl”. As far as I can see, nobody has counted items of this kind, but they are not easy to come by in the literature, or by (phonologically competent) natives. It remains to be seen whether there are a lot more. Also note that only cases with stem-final obstruent-sonorant clusters count as counter-examples since other types of clusters (such as *torba* — *toreb* “bag Nsg, Gpl”) are counter-examples anyway, yet on other grounds, to be discussed below in the section.

7.4.2. *There are (almost) no root-final coda clusters that enclose an alternating vowel*

The second regularity concerns root-final monomorphemic clusters: Cyran (2003:176ff) has observed that while vowel-zero alternations are common in clusters of rising sonority (obstruent-sonorant), there are (almost) no cases on record in other clusters, i.e. those which qualify as coda-onset sequences (i.e. sonorant-obstruent, sonorant-sonorant, obstruent-obstruent). Hence while root-final obstruent-sonorant clusters may or may not break up (*wiadr-o* — *wiader* “pail NOMsg, GENpl” vs. *wiatr* — *wiatr-u* “wind NOMsg, GENpl”), all clusters of the language that do not follow this sonority slope seem to be stable (e.g. *czart* “devil NOMsg”, *wilk* “wolf NOMsg”). There is a handful of exceptions (led by the notorious *torb-a* — *toreb* “bag NOMsg, GENpl” where there is no reason to believe that the *-b-* is the suffix *-b-a* that derives abstract nouns), and a number of the items on Gussmann’s list (p.230) that produce hesitating forms also have a sonorant-sonorant cluster (*sarn-a* — *sarn/saren* “roe deer NOMsg, GENpl”, *ziarn-o* — *ziarn/ziaren* “grain NOMsg, GENpl”, see also Cyran’s 2003:188 seven-item inventory).

This robust asymmetric distribution thus seems to obey a syllabic conditioning. Unlike in Czech, where monomorphemic root-final sonorant-obstruent clusters are utterly rare, Polish has a much more equilibrated lexical stock, if only because it has vocalized forms where Czech displays syllabic sonorants (compare Polish *wilk*, *targ* with Czech *vlk*, *trh* “wolf, market”). Also, Polish generously distributes alternating vowels into clusters of recent loans: *sweter* — *swetr-a* “jumper NOMsg, GENsg”, *puder* — *pu-dr-u* “powder NOMsg, GENpl” are two examples out of many. Items with final coda-onset sequences such as *gwałt* “rape”, *kształt* “shape”, *skalp* “scalp” or *dekolt* “décolletage”, however, are never served. The mechanism thus seems to be synchronically active, and Cyran (2003) has proposed that the distribution is a consequence of the fact that branching onsets (obstruent-sonorant clusters) are (universally) more difficult to license than other clusters. On this count, Polish is able to license relatively light coda-onset sequences, but has trouble to maintain heavy branching onsets, which therefore tend to be broken up by an alternating vowel.

7.5. *Mgła, źdźbło and pchła: a different perspective on the relationship between syllabic well-formedness and the vocalization of alternating vowels*

It was mentioned earlier that Gussmann’s ground rule is to ban two empty nuclei in a row (p. 215). This constraint is instrumental for vowel-zero alternations as much as in the analysis of word-initial consonant clusters, whose proliferation is cut down. The only exception that Gussmann provides for concerns (domain-) final empty nuclei, which are not counted by the constraint (p. 227). This is Gussmann’s way to recognize the special properties of the right edge of words (domains), where for example clusters unheard of word-internally and word-initially proliferate. In Polish, sequences of two empty nuclei at the right edge of words are produced for example by *garość* “handful” or *głupostwo* “nonsense, GENpl”. All phonological theories devise some special mechanism for the management of the peculiarities of the right edge: extrasyllabicity

traditionally, increased licensing power of final empty nuclei in Government Phonology (e.g. Charette 1990, Cyran 2003, Scheer 2004:§524).

In this context, let us look at the behaviour of three Polish words, which are notorious in the discussion of Polish word-initial clusters and exhaust the lexical stock of items that instantiate the pattern shown under (17) below.

(17) NOMsg	GENpl	gloss
mgł-a	mgieł	fog
źdźbł-o	źdźbeł	blade of grass
pchł-a	pcheł	flea

Mgła (which is discussed on p. 206ff) identifies as /mɔgɛł-a/. The GENpl *mgieł* is thus well-formed: the E regularly vocalizes in absence of the desinential vowel. But the NOMsg *mgła* begs the question since it bears two unpronounced nuclei in a row, as shown under (18) below.

(18) a.	mgła „fog NOMsg”	b.	mgieł „fog, GENpl”
	O N O N O N		O N O N O N
	m g' e ł a		m g' e ł

This issue is not discussed in the book, but it strikes the reader who is familiar with GP: a ground rule of this theory is precisely that (the word-final situation lain aside) two unpronounced empty nuclei cause a structure to be ill-formed. Edmund Gussmann has pointed out to me that this may be the case in Standard Government Phonology or other versions of the theory, but not in his system where a crucial difference is made between unpronounced nuclei that possess a floating melody and unpronounced nuclei that do not, i.e. which are really empty. Syllabic well-formedness as defined on p. 215 says that „two consecutive domain-internal *empty* nuclei” (emphasis mine) are ill-formed, which is crucially different from “two consecutive unpronounced nuclei are ill-formed”. On this count, *mgła* under (18) is well-formed since it accommodates a sequence of an empty nucleus and a nucleus that hosts a floating melody — not of two *empty* nuclei in a row.

Gussmann’s system is thus able to tolerate two (domain-internal) unpronounced nuclei in a row, something that no other version of GP allows for. Behind this contrast is a deeply rooted divorce with a ground rule of GP. The overt manifestation of this divorce was already mentioned: Gussmann’s book does not contain any reference to (internuclear) government. Neither vowel-zero alternations nor any other phenomenon is held to be a consequence of this lateral force. Traditionally, government regulates vowel-zero alternations: an alternating vowel appears on the surface (a floating melody is attached) iff it escapes government, i.e. iff the following nucleus is unpronounced (or else in Standard GP, if government breaks down due to an intervening cluster). Conversely, nuclei can only be empty if they are governed (or if there is some other good reason).

Gussmann endorses nothing of all this: floating melodies attach iff the following nucleus is not associated to any melody — with no mention of any lateral relation. On the other hand, a structure is ill-formed if there are two empty nuclei in a row — again without any mention of a lateral relation. The central departure from all other versions of GP is thus the dissociation of syllabic well-formedness and the management of vowel-zero alternations (i.e. the association of floating melodies): GP has always considered that the pronunciation of alternating vowels is a function of government, and that government also regulates syllabic well-formedness.

By contrast in Gussmann's system, the vocalization of nuclei has got nothing to do with syllabic well-formedness: in a sequence E- \emptyset (i.e. a nucleus hosting a floating melody followed by an empty nucleus), such as in *mgieł-n-y* /møg'Ełony/ "misty", melody association will vocalize the former, even though nothing is wrong with the sequence regarding syllabic well-formedness. That is, did melody association work in a different way, /møg'Ełony/ could happily be pronounced *mgłny*, which is a well-formed structure because it does not contain any sequence of empty nuclei. Recall from section 7.3 that Gussmann considers that melody association is a language-specific mechanism. In a hypothetical language where floating melodies are not associated before empty nuclei (but only before other floating melodies for example), unbounded sequences of consonants will thus be able to occur: /C₁∅C₂EC₃∅C₄EC₅∅C₆.../ is well-formed since there is no sequence of empty nuclei, and will be pronounced [C₁C₂C₃C₄C₅C₆...].

This is certainly a reason to doubt that it is a good idea to loosen the bonds between syllabic well-formedness and the management of vowel-zero alternations. Giving up on the unification of both under the roof of government, it produces a gain of three words in Polish that could not otherwise be accounted for, but opens the door for the existence of monster languages with unbounded sequences of consonants. But even in the particular system that Gussmann sets up for Polish, overgeneration becomes a serious issue: three-membered initial clusters of plosives (such as #ktpV) or sonorants (such as #mlrV) are entirely absent from the language, and Gussmann argues on p. 207 that this is not an accidental gap. Such clusters are ruled out in his system because they necessarily represent three distinct onsets and therefore "violate the restriction which tolerates only two such events when the intervening nucleus is not filled. In this way the impossibility of three or more adjacent sonorants or obstruents is another way of saying that Polish bans two consecutive empty nuclei domain-internally" (p. 207f). If we do not hear the second nucleus in #køtøpV, however, this does not mean that it is empty: [#ktpV] could represent /#køtEpV/, i.e. where the second nucleus contains a floating melody that never appears on the surface because, unlike in /møgEł-a/ where we can remove the -a, the following vowel happens not to be a morpheme and therefore cannot be removed — it will thus cause the non-pronunciation of the preceding E in all circumstances.

Gussmann's system thus allows for the existence of words that begin with monster clusters such as #ktpV if floating melodies are assumed that never appear on the surface. This should not be a serious obstacle: we have seen elsewhere that the author is not afraid of absolute neutralizations. The distribution of floating melodies is a lexical property of words and hence unrestricted by any context. Therefore there is no reason

why they should be unable to appear in #CøC__CV. Note that the classical system where government regulates both syllabic well-formedness and vowel-zero alternations does not have this problem: /#køtEpV/ is as ill-formed as /#køtøpV/ since in both cases the second nucleus is governed (by the following V) and therefore cannot govern the first nucleus, which therefore cannot remain unpronounced.

7.6. How does concatenation work?

7.6.1. Is syllabic well-formedness enforced in the lexicon or only upon computation?

Throughout the entire book, the author eludes the question what morphemes look like in the lexicon, and what exactly happens when they are concatenated. That is, morphologically complex items such as *pies-ecz-ek* on p. 198 only appear as an undifferentiated block (see (14)) that does not enable to backtrack the lexical ingredients.

The reader has already pricked up his ears on occasion in chapter three, where the author mentions nucleus-initial suffixes (such as *-ny*, *-ski*, p. 97). As a matter of fact, nucleus-initial suffixes are strange animals, not only in GP: I am not aware of any currently entertained phonological theory,¹⁵ and hardly of any syllabic model in the past, that allows for nuclei which are not preceded by an onset. While codas are optional syllabic constituents, onsets and nuclei are obligatory. In GP, this requirement is expressed by the fact that syllabic constituency is a monotonous sequence of onset-rhyme pairs: there can be no onset without a rhyme, and no rhyme without an onset.

In case a word or a morpheme begins with a vowel, the onset of the nucleus in question is empty. Typical evidence for this is French liaison or the appearance of a (non-phonemic) glottal stop in this situation in Polish or German. That Gussmann is really serious about nucleus-initial morphemes is confirmed on p. 197 where the diminutive suffix *-ek* is identified as under (19)a below.

(19) a. diminutive -ek	b. NOMpl -i (-y)
N O N	N
x x x	x
e k	i/y

This does not make sense in itself, but it does not make sense either when the concatenation of such a morpheme with a root is considered. Gussmann is explicit about the fact that he follows the basic GP tenet according to which “onsets must be licensed by nuclei” (p. 200), which means that word- or root-final consonants belong to the onset of an empty nucleus. Given these premises, the concatenation of *-ek* with, say, *pies*, produces the following situation.

¹⁵ With one exception: the so-called VC (Szigetvári 1999, 2001).

(20) a. lexical ingredients

O	N	O	N		N	O	N
x	x	x	x	-	x	x	x
p ^j	e	s			e	k	

b. input to phonology according to Gussmann

O	N	O	N	O	N
x	x	x	x	x	x
p ^j	e	s	e	k	

The lexical ingredients thus ought to be as under (20)a, and the input to the phonological computation that associates the two floating melodies is as under (20)b. The question, then, is how Gussmann gets from one to the other. Is the root-final or the suffix-initial nucleus deleted? If so, how does this work (what triggers deletion?), and of which kind is this mechanism (phonological, morpho-phonological etc.)?

The same question may be asked for all other vowel-initial suffixes: the reader never sees what the lexical recording of, say, the NOMpl *-i* of *pies-k-i* is: the *-i* only appears fully packed up in the final nucleus of (20)b (e.g. p. 198). One may thus assume that its lexical representation is as under (19)b.

Edmund Gussmann has pointed out to me that he makes a difference between representations in the lexicon and during phonological computation: he holds that they are only subject to syllabic well-formedness in the latter situation. That is, onsets need to be followed by nuclei, and nuclei preceded by onsets, only when the representation is processed upon the computation of a domain. In other words, the lexicon may contain syllabic monsters that are ill-formed. In the case of *pies-ek*, *-ek* is therefore able to be nucleus-initial, and *pies* onset-final in the lexicon. The concatenation of both then produces a clean onset-nucleus transition.¹⁶

This scenario has a number of drawbacks and is not in line with either the spirit, the letter or the practice of (Standard) GP. An important feature that sets GP apart from other theories is the presence of syllable structure in the lexicon, and the prohibition of any kind of resyllabification. In Kaye et al. (1990), syllable structure is defined by governing relations among constituents, and resyllabification is formally ruled out by the Projection Principle: “[g]overning relations are defined at the level of lexical representation and remain constant throughout a phonological derivation” (Kaye et al. 1990:221). Lexical representations are thus explicitly subjected to syllabic well-formedness.

Also, the GP literature has always discussed the syllable structure of lexical items: in Standard GP, *tl* clusters as in English *atlas* for example are argued to represent two independent onsets and hence to enclose an empty nucleus because they are neither good branching onsets (they are absent word-initially) nor good coda-onset clusters (e.g. Harris 1994:67). If lexical recordings may be ill-formed at the syllabic level, *atlas* could as well lack the empty nucleus lexically, which would only be inserted when syllabic well-formedness is enforced upon phonological computation. Beyond the fact

¹⁶ On this count, however, the lexical representation of *-ek* under (19)a (p. 197) should lack the final nucleus since an eventual second *-ek* as in *pies-ecz-ek* will also be nucleus-initial.

that nobody has ever argued for this kind of scenario, the question is why such an option should be considered at all. That is, why should a lexical entry obstinately try to be different from what it will be forced to be on the surface? Lexicon Optimization will normalize structures that can never make it to the surface.

The case of *pies* is a little different because there is a motivation for making the lexical entry onset-final, and *-ek* nucleus-initial: both morphemes will tie in neatly upon concatenation. The insertion of constituents, however, is needed as before when *pies* is pronounced in isolation: syllabic well-formedness will enforce the insertion of a (final) empty nucleus.¹⁷ This is incompatible with the Projection Principle, and I am not aware of any precedent in the GP literature (or in any other literature for that matter).

Gussmann’s solution is thus motivated by the wish to get a smooth transition when C-final and V-initial morphemes are concatenated. The author is willing to pay a high price: his system allows for anarchic lexical representations that are freed from any syllabic law and may thus accommodate monsters which, much like candidates in OT, will be disqualified by a surface filter that assures syllabic well-formedness. Also, phonological computation must be enabled to insert individual nuclei

7.6.2. *Floating suffix-initial vowels: alternating and non-alternating cases*

The alternative for the representation of vowel-initial suffixes that works with syllabically well-formed lexical recordings is a floating vowel. In this perspective, the suffixal vowel floats and must end up in the root-final empty nucleus since it causes the preceding floating melody not to associate (e.g. in *pies-k-i*). The concatenation is thus as under (21) below.

(21) a.	lexical ingredients	b.	input to phonology										
	O	N	O	N		O	N		O	N	O	N	
	x	x	x	x	–	x	x	→	x	x	x	x	x
	p ^j	e	s		e	k			p ^j	e	s	e	k

On this count, literally nothing but concatenation happens in order to get from (21)a to (21)b. This approach faces a problem, though: it cannot distinguish between suffix-initial vowels that alternate with zero (such as in *-ek*) and suffix-initial vowels that do not alternate such as in, say, the adjective marker *-ow-*. The properties of *-ow-* may be inspected on the occasion of a word such as *bez-ct-ow-y* “duty-free, adj.”: like all other suffix-initial vowels, the *-o* provokes the absence of the preceding alternating vowel (cf. *cto* — *cet* “customs NOMsg, GENpl”) and hence must sit in the final empty nucleus of the root. It therefore must float along

¹⁷ The same problem has caused deletion rather than insertion of syllabic material in earlier work: in Gussmann & Kaye (1993), a process called reduction eliminates any sequence of an empty nucleus followed by an empty onset. Hence reduction will delete the stem-final empty nucleus and the suffix-initial onset in *pies-ek* /pies₀∅_Cek/.

the lines of (21)a. On the other hand, it must be lexically associated since it does not alternate with zero itself: the adjectival NOMsg marker *-y* sits in the final empty nucleus and is thus lexically floating like all other suffix-initial vowels (cf. *pełen* — *pełn-y* “full, attributive vs. inflected form NOMsg”), but fails to provoke the absence of the *-o* (**bez-cel-ow-y*, which is not surprising since only *e* alternates with zero in Polish).

Now recall from section 7.1 that the alternating vs. non-alternating character of vowels is expressed by their floating vs. lexically associated status (see section 7.1). This means that the vowel of *-ow-* requires to be granted self-conflicting properties: it needs to be both floating (because it ends up in the final nucleus of the root) and lexically associated (because it does not alternate with zero).

If one is not prepared to give up on the prohibition of resyllabification, of deletion and insertion of syllabic constituents as well as on well-formed syllabic recordings, there is only one way out: suffix-initial vowels are floating, but they come in two varieties. One is lexically specified for associating to any empty nucleus, be the target of association governed or not, while the other can only associate to ungoverned nuclei. This contrast is depicted under (22) below.

(22) a. alternating suffix-initial vowel	b. non-alternating suffix-initial vowel																				
<table style="border: none; text-align: center;"> <tr><td>O</td><td>N</td></tr> <tr><td> </td><td> </td></tr> <tr><td>x</td><td>x</td></tr> <tr><td> </td><td></td></tr> <tr><td>e</td><td>k</td></tr> </table>	O	N			x	x			e	k	<table style="border: none; text-align: center;"> <tr><td>O</td><td>N</td></tr> <tr><td> </td><td> </td></tr> <tr><td>x</td><td>x</td></tr> <tr><td> </td><td></td></tr> <tr><td>o</td><td>w</td></tr> </table>	O	N			x	x			o	w
O	N																				
x	x																				
e	k																				
O	N																				
x	x																				
o	w																				

On this count, floating vowels are always eager to associate. The properties of the nucleus to which they can associate, however, are lexically specified: some as under (22)b associate no matter what, while the association of others as under (22)a is restricted to nuclei that are ungoverned. This does not add any specific proviso to the grammar since the distinction between alternating and non-alternating vowels may now be recast in fully general terms: alternating vowels are floating and lexically specified for target-sensitivity (they can only associate to ungoverned nuclei), while non-alternating vowels are either lexically associated or specified for target-insensitivity (they can associate to all nuclei).

This analysis is developed by Ziková (2008) for Czech, where the same pattern is found. The idea that the association of floating melody may be under grammatical (or lexical) control is not new: evidence to this end comes from French liaison (Encrevé & Scheer 2005), and also from the grammatical tradition of Semitic languages, where morphemes often reduce to the „order” that is given to a specific piece of melody to associate.

It may well be that the author has considered that dwelling on these formal and rather theoretical issues is too demanding for the general audience in a descriptive book on Polish phonology. But at least a hint at the complications, and a reference to work where they are considered, would have been welcome.

8. Conclusion

There can be no doubt that Edmund Gussmann has written an important book on Polish Phonology that concentrates a probably unprecedented wealth of data. The decisions that he has made regarding the basic design properties of the volume are all sound, but could not be anything else than a balancing act which tries to satisfy conflicting requirements: bothering vs. underfeeding the reader with theoretical background and narrative vs. analytical presentation are two general issues that were mentioned.

The book also opens a perspective on the analysis of Polish that was previously entirely unexplored. Counter to virtually all previous endeavour, maybe including structuralist accounts, the author argues that small is beautiful: his basic and somewhat programmatic project is to shrink phonology, or rather phonological computation. Not only is he anxious for the reduction of the amount of computation: he even attempts to make the remaining computation look like non-computation. That is, Edmund Gussmann is suspicious about everything that looks like a movement or a transformation, which also means that he would be happy to do away with any distinction between basic, lexical or underlying, and surface forms. In fact his system is not monostratal, though: following the classical pattern, there are objects whose lexical form is different from their surface form, both of which are related by a transformation that is due to phonological computation.

An important and actually revealing contribution of the book on the theoretical side is the demonstration, if implicit, that computation in GP works just like in OT: a set of ranked and violable constraints is applied to some input. This input is lexical, though, or the result of previously operating morpho-phonology, rather than a cloud of competing candidates.

Gussmann's small-is-beautiful philosophy that revives both structuralist and early generative thinking implies by no means hostility against abstraction, though. Unlike Natural (Generative) Phonology, Gussmann stood on the abstract side in 1980, and still does today. Only has he expelled abstractness from the phonological component of grammar: alternations may be perfectly opaque, and there is no problem with absolute neutralizations at all. These flourish in the book through inventory augmentation, but their mechanics are outsourced mostly to the phonology-phonetics mapping (i.e. downwards), sometimes to morpho-phonology (i.e. upwards). In this sense, then, the book may well be a less radical departure from regular generative practice than what the author means it to be: rather than being eliminated, computation, computational complexity and abstractness are put somewhere else in the grammar. That is, what the book proposes is a rebalancing that distributes the labour over different components of grammar, rather than the elimination of the labour itself. In any event, an interesting, for some certainly intriguing take-home message of the book is that there is absolutely no connection between the question „how much is in the phonology” and the question „how abstract is phonology”. The eventual presence of this belief among phonologists is a misconception that is related to the experience of Natural (Generative) Phonology, which cumulated outsourcing and anti-abstractness.

A number of questions, both analytic (e.g. the *mgl̥a-* and the Havlík pattern, the Polish reluctance to vocalize word-final clusters) and theoretical (nucleus-initial suffixes, allomorphy as segment-, rather than morpheme replacement), remain open at the end of the day. The reader looks forward to see how Edmund Gussmann approaches these issues, hopefully in work that will not have to pay tribute to the non-theoretical orientation of the descriptive project that he has admirably completed in this book.

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