

DE GRUYTER
MOUTON

Eugeniusz Cyran

**BETWEEN
PHONOLOGY AND
PHONETICS**

POLISH VOICING

STUDIES IN GENERATIVE GRAMMAR

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Preface

For decades, the voicing system of Polish has been at the centre of a heated theoretical debate concerning laryngeal phonology. This is due to two factors. Firstly, Polish features a number of phenomena that constitute the core of the debate, such as Final Obstruent Devoicing, Regressive Voice Assimilation, Progressive Voice Assimilation, dialectally distributed external sandhi voicing in pre-sonorant context, and other instances of special behaviour of sonorants with respect to practically all the above mentioned processes, leading to interesting cases of variation. Secondly, Polish data have had very good ambassadors, such as Christina Bethin, Edmund Gussmann, and Jerzy Rubach, whose theoretical work was always at the forefront of the advances in laryngeal phonology, from linear to non-linear accounts, from binary to privative representation of voice, and from the days of the brute force of phonological rules to non-derivational frameworks seeking to uncover the mechanisms of laryngeal distribution, which would stem directly from the general design of phonological representations or grammar.

This book, however, is no less a tribute to the great Polish linguists of the previous century whose work is still highly inspirational. Jan Baudouin de Courtenay draws our attention to the similarity between the external sandhi voicing in Cracow-Poznań Polish and similar facts in Sanskrit, thus broadening horizons and prompting a universalist, or at least a comparative perspective on voicing issues. Tytus Benni's generalizations attempting to incorporate Progressive Voice Assimilation into a uniform system of assimilations, rather than seeing them as an exception to Regressive Voice Assimilation, are echoed in most modern analyses. Kazimierz Nitsch provided many insights into the nature of the external sandhi voicing in Cracow-Poznań Polish and Progressive Voice Assimilation. Finally, Zdzisław Stieber proposed a still valid structural and systemic explanation of Progressive Voice Assimilation, while his inspirational comments about the relationship between phonology and phonetics contributed greatly to the model of the Sound System, which underlies the analyses of Polish voicing in this book.

The database used in this book is a combination of well-established facts presented in previous modern and earlier analyses, with recent experimental results, which point to greater variation in all the processes mentioned above than formal approaches assumed, or were ready to admit. Gradient phenomena and variation are difficult to express in formal descriptions, especially if they do not envisage a clear division between what is phonological and what is not phonological in the phenomena under study. On the other hand, when phonology is relieved of most of the explanatory responsibility, the implementational and indeed purely phonetic factors, as well as their relationship with phonology proper, needs to be spelled out, especially in models which eschew phonetic grounding in phonology. This book attempts to do that, and more. The model presented here is

one in which phonology, phonetic interpretation and phonetics find a home, rather their respective homes, in fact. Paradoxically, by separating these three levels of description, we wish to integrate the disparate threads of modern research of sound patterns into one sound system. For example, we take seriously the major results of laboratory phonology research, which gives us insight into how production and perception shape sound patterns, as well as seemingly competing theories of phonological organization. An example of the latter, would be the inspiring hypothesis of Licensing by Cue (Steriade 1999), which, although couched within Optimality Theory, does not contradict our own proposals stemming from a representation-based theory of Government in phonology. Since OT attempts to model the grammar with a view to arriving at the end point of 'derivation', that is, the optimal surface forms, it is by definition closer to implementational and phonetic aspects of sounds systems. The theories of representations, then, are not by definition incompatible with theories of constraint interaction. The question is how phonetic and implementational patterns can be incorporated into the computational module of phonology, and how much of this type of information fits in. At any rate, as research into laryngeal phonology progresses on various fronts, it becomes more and more obvious that a large portion of the phenomena in question have phonetic, or implementational conditioning, thus limiting the role of phonology even further. One of the aims of this study is to show the nature of what is left, and must remain.

The phonological model used in this study is a minimalist representational approach stemming from the research programme, which is generally referred to as Government Phonology (Charette 1991; Harris 1990, 1994; Kaye 1990, 1994; Kaye, Lowenstamm and Vergnaud 1985, 1990). The exact version of that theory will be that proposed in Cyran (2010), which follows the view that phonological representation is formally organized by a series of CVs, as well as lateral relations of Government and Licensing (Lowenstamm 1996; Polgárdi 1998; Rowicka 1999; Scheer 2004). The representation of melody in this book follows the main tenets of the Element Theory (Harris 1990, 1994; Harris and Lindsay 1993, 1995), of which the most important ones are as follows. Melodic representations are privative. Non-specified members of oppositions do not receive further specification during derivation. They are interpreted phonetically as such. With respect to voicing oppositions, Laryngeal Realism (Harris 1994; Honeybone 2002, 2005; Iverson and Salmons 2003a) will be used as a starting point of reference.

The discussion here takes a slightly different course than usual, in that the central aspects of Polish voicing such as Final Obstruent Devoicing (FOD) and Regressive Voice Assimilation (RVA) are given less focus than Cracow-Poznan sandhi voicing (CPV) and Progressive Voice Assimilation (PVA). In this sense, we adhere to the early descriptions of Polish in which these 'fringe' phenomena drew more energy and analytic effort because they are more difficult to deal with. The usual course of action in more recent analyses has been to establish a model which accounts for the major phenomena, that is, FOD and RVA, and then try to demonstrate, with varying degrees of success, how the model applies to PVA and CPV. The net result has almost invariably been a postulation of a separate rule, c

particular extrinsic rule ordering which contradicted the original intuition that these phenomena are intrinsically connected.

The book is organized as follows. Chapter 1 contains preliminary information concerning the Polish voicing data and discusses the main theoretical issues connected with laryngeal phonology. The model of Laryngeal Realism is introduced and applied to the data with a view to demonstrating its failure with respect to CPV. Chapter 2 introduces a modification of the above mentioned model, which will be referred to as Laryngeal Relativism. The new model is placed in a broader perspective of a Laryngeal System, which, like any Sound System based on arbitrary relations between phonological and phonetic categories, is composed of three levels of description: phonological, implementational (phonetic interpretation) and phonetic. The chapter contains definitions of various types of voicing found in natural languages and argues for a new type: enhanced passive voicing, which, it is claimed, occurs in Cracow-Poznań Polish. Chapter 3 provides a new analysis of CPV, in which no new rule or rule ordering is necessary. The phenomenon is claimed to be purely phonetic and interpretational. The analysis, however, works under one condition: the phonological representation, and therefore the phonetic interpretation conventions, are the opposite of what is found in Warsaw Polish. In other words, two different systems generate almost identical sound patterns, with the same series of voiced and voiceless unaspirated obstruents and the same phenomena such as FOD and RVA, except that in external sandhi the interpretation of the neutral obstruents must be voiced in Cracow-Poznań and voiceless in Warsaw Polish for systemic reasons. Chapter 4 contains a rather lengthy discussion of Progressive Voice Assimilation, in which an attempt is made to explain the phenomenon by devoting close attention to the distinction between phonological, interpretational and phonetic conditioning. The chapter enforces a reinterpretation of such phenomena as obstruent obstruentization and obstruent devoicing, as well as the sometimes automatic connection which is made between friction and obstruency. With the new results it is possible to demonstrate that PVA is not an exception to RVA because it has completely unrelated conditioning. The concluding Chapter 5 is a collection of issues that either have been left unexplored in the previous discussion, or had to be left to this point in the book for presentational reasons. The reader will find a detailed proposal of a uniform formal source of laryngeal licensing, which is at the same time amenable to micro-shifts leading to the observable variation in data. A section is devoted to the behaviour of Polish prepositions and prefixes. We also return to the problem of sonorant behaviour with respect to spreading processes and the relationship between phonology and phonetics. One of the consequences of the model presented in this work is that subsegmental primes – here elements – can be viewed as devoid of phonetic substance. The chapter ends with a brief reference to two languages in which the overall laryngeal system seems to resemble that of Cracow-Poznań Polish. We look at possible analytical consequences of this.

I wish to express my gratitude to the following friends and colleagues for their generous assistance and comments at various stages in the writing of this book.

First and foremost, many thanks are due to my phonology teacher and friend, the late Edmund Gussmann. He did not have a chance to see any of this book, but I am sure his comments would have changed it a lot. I am also extremely grateful to Jonathan Kaye and Tobias Scheer, who spent time talking to me about phonology including laryngeal phonology. I am not sure if we fully agree, but their encouragement allowed me to press on with my ideas. Thanks are also due to Sławek Zdziebko, who looked at the manuscript in great detail, to Robert Looby for proofreading the text, and to Katarzyna Bednarska, Ewa Pająk and Krzysztof Jaskuła for providing other comments. Last but not least, I would like to thank the anonymous reviewer and Harry van der Hulst for all their help and comments. I take full responsibility for the errors that remain.

Last but not least, I would like to thank my wife Marta and daughter Jadzia for their patience and support. This book is dedicated to them.

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Chapter 1

Preliminaries

1 Introduction

In this chapter, we look first at the least controversial and best known voicing facts from Polish, which include the type of laryngeal contrast utilized in this system as well as the two core phenomena, namely Final Obstruent Devoicing (FOD) and Regressive Voice Assimilation (RVA) in obstruent clusters. This brief survey will not include details connected with the behaviour of sonorants, prefixes and prepositions, or the so called Progressive Voice Assimilation (PVA). These issues will receive attention in separate chapters once the new model of description is introduced in [Chapter 2](#). The data discussed below will serve the purpose of allowing us to set the scene in terms of basic facts and theoretical choices that need to be made in order to grasp the entire voicing complex of Polish. As a starting point to a more detailed theoretical discussion we introduce the approach called Laryngeal Realism and apply it to the data with a view to demonstrating better the theoretical and analytical problems that Polish data pose especially of privative models of laryngeal representation. The chapter ends with an introduction of one of the most complicated problems of the Polish voicing complex, namely, the Cracow-Poznań sandhi voicing before sonorants. It will be shown that Laryngeal Realism is unable to provide an explanatory account of this phenomenon.

2 The basic Polish voicing facts

The basic facts of the Polish voicing system are well known,¹ both from the traditional phonetic studies (e.g. Benni 1964; Wierzchowska 1971), but especially from a number of generative and post-generative analyses (e.g. Bethin 1980, 1992; Gussmann 1992, 2007; Rubach 1996, 2008; Michalski 2009). Polish has a two-way voicing contrast among obstruents, which is typically depicted as fully voiced versus voiceless unaspirated. The system has also been described as fortis versus lenis (Benni 1964: 19, Wierzchowska 1971: 149), but unlike in German or English in which the fortis series is accompanied by aspiration in stops, as well as a number of other cues, the distinction along the articulatory strength parameter does not seem to have any consequences in Polish.² The relatively stronger constriction in the voiceless unaspirated series is assumed to be a natural phonetic consequence of the lack of voicing.³ The data in (1) illustrate some minimal pairs with the voiced / voiceless contrast.

(1)

pić	[pʰit͡ɕ]	‘to drink’
bić	[bʰit͡ɕ]	‘to hit’
plotem	[pɔt͡ɕɛm]	‘fence, instr.’
blotem	[bɔt͡ɕɛm]	‘mud, instr.’
rysa	[rʲisa]	‘scratch’
ryza	[rʲiza]	‘ream’
oknie	[ɔkɲɛ]	‘window, loc.’
ognie	[ɔɣɲɛ]	‘fire, pl.’

The contrast is neutralized in two contexts: before an obstruent and word-finally. Examples of FOD are given below and include devoicing of obstruent clusters, as well as obstruents followed by sonorants.⁴

(2)

Final Obstruent Devoicing

<i>waga</i>	[vaga]	/	<i>wag</i>	[vak]	‘scale, nom.sg./gen.pl.’
<i>stogu</i>	[stɔgu]	/	<i>stóg</i>	[stuk]	‘haystack, gen.sg./nom.sg.’
<i>żaba</i>	[ʒaba]	/	<i>żab</i>	[ʒap]	‘frog, nom.sg./gen.pl.’
<i>koza</i>	[kɔza]	/	<i>kóz</i>	[kus]	‘goat, nom.sg./gen.pl.’
<i>gwizdżę</i>	[gvʲiʒd͡ʒɛ]	/	<i>gwizdź</i>	[gvʲiʃt͡ʃ]	‘I whistle/whistle, imp.’
<i>mózgu</i>	[muzgu]	/	<i>mózg</i>	[musk]	‘brain, gen.sg./nom.sg.’
<i>gwiazda</i>	[gvʲazda]	/	<i>gwiazd</i>	[gvʲast]	‘star, nom.sg./gen.pl.’
<i>blizna</i>	[blizna]	/	<i>blizn</i>	[blisn]	‘scar, nom.sg./gen.pl.’
<i>dobro</i>	[dɔbrɔ]	/	<i>dóbr</i>	[dupr]	‘goodness, nom.sg./gen.pl.’
<i>kadra</i>	[kadra]	/	<i>kadr</i>	[katr]	‘personnel, nom.sg./gen.pl.’

Word-final devoicing results in surface ambiguities. For example, a surface form [stuk] may have two lexical sources, that is, *stóg* ‘haystack’ with final devoicing, or *stuk* ‘a knock’, with a lexically voiceless obstruent.

As observed in (2) above, obstruent clusters which were lexically voiced, e.g. *gwiazda* [gvʲazda] ‘star, nom.sg.’, become voiceless as a whole in *gwiazd* [gvʲast] ‘star, gen.pl.’. This brings us to the other context in which voicing cannot be used contrastively, and illustrates the general phonotactic pattern found in Polish clusters of obstruents. Either they statically agree in voicing as in (3a), in which case we are dealing with a Voice Agreement, or they become uniform in voicing b

assuming the value of the right-hand obstruent. This phenomenon is called ~~Regressive Voice Assimilation~~ and occurs inside words (3b), across morpheme boundaries (3c), and across word boundaries (3d).

(3)

Static voice agreement

- a. kto [ktɔ] 'who' *kd, *gt gdy [gdɨ] 'when' *kd, *gt
brzask [bʒask] 'dawn' *bʃ, *pʒ, *zk, *sg
ksiądz [kɕɔntɕ] 'priest' *kʒ, *gɔ
krtań [krtɔɲ] 'larynx' *krd, *grt
drgać [drgatɕ] 'tremble' *drk, *trg

Dynamic voice agreement (assimilation)

- b. dech [dex] / tchu [txu] 'breath, nom.sg./gen.sg.' wieś [vʲɛɔ] / wsi [fɔ]
'village, nom.sg./gen.sg.'
wesz [veʃ] / wszy [ffɨ] 'louse, nom.sg./gen.sg.'
- c. prosić [prɔɕitɕ] / prośba [prɔʒba] 'to ask/a request' ryza [rɨza] / ryzka [riskɔ]
'ream/dim.'
mędrak [mendrek] / mędrka [mentrka] 'smart-aleck/gen.sg.'
- d. kwiat begonii [kʲiɔd begɔɲji] 'begonia flower' litr bimbru [lʲidr bʲimbru]
'litre of moonshine'
sad śliwkowy [sat ɕlʲifkɔvɨ] 'plum orchard'
szyb kopalni [ʃɨp kɔpalɲi] 'mine shaft'

The data in (3) require some comments. Firstly, the stem-internal alternations of voice in dech / tchu (3b) are extremely rare in Polish, which is why the forms in (3b) are quoted in almost every analysis of voicing facts in Polish. One reason for the special status of such forms is the fact that, two obstruents of opposite voice value must additionally be separated by a vowel that alternates with zero. Thus, when the vowel disappears, as in tchu, wsi, or wszy, the two obstruents become adjacent and their opposite voice value needs to be brought in line with the Voice Agreement condition. Interestingly, there seems to be no example of the reverse type of assimilation, that is, to a voiced obstruent.⁵

Similarly restricted are the assimilations across morpheme boundaries, as in (3c). This is due to the existing list of suffixes in Polish. Here, the assimilation to a voiced obstruent is basically limited to the fairly unproductive nominalizing suffix -ba, e.g., prosić [prɔɕitɕ] 'to ask' vs. prośba [prɔʒba] 'request', and the context before the clitic -by, rósłby [ruz(w)bɨ] 'would grow'. On the other hand, the assimilation to a voiceless obstruent is generally limited to the suffix -ek/-ka.

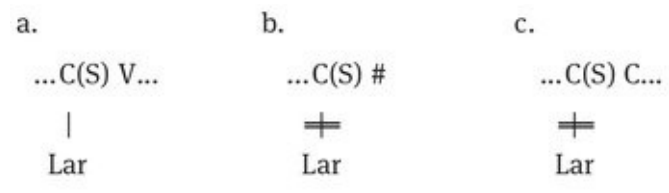
There are two data sets which to some extent compensate for this deficiency. Firstly, there is a relatively high incidence of forms involving the static agreement in sequences of two obstruents, as in (3a). And secondly, there are numerous cases

of assimilation to a voiced obstruent across a word boundary, as illustrated in (3d) e.g., kwiat begonii [kʰiɔd begɔɲji] ‘begonia flower’. Here, unlike with the root-internal and word-internal situation, the increased incidence of such cases is directly related to the number of words that begin with voiced obstruents in the Polish lexicon.

The data in (3d) include instances of assimilation across word boundaries which appear to be cases of voicelessness spreading, e.g., szyb kopalni [ʃɨp kɔpalɲi] ‘mine shaft’. Since the lexical voiced obstruent in the word szyb [ʃɨp] ‘shaft’ is devoiced word-finally anyway, it remains to be seen if we are dealing with assimilation here. A better example of regressive assimilation to a voiceless obstruent involves prefixes or prepositions followed by words beginning with a voiceless obstruent, e.g., pod kopalnią [pɔt kɔpalɲɔ̥] ‘under the mine’. Polish prefixes and prepositions do not undergo FOD if not used in isolation, which can be seen in the forms where the following word begins with a vowel, e.g., pod oknem [pɔd ɔknem] ‘under the window’, or a sonorant consonant, e.g., pod mostem [pɔd mɔstem] ‘under a bridge’ (Booij and Rubach 1987). Thus, clearly, in pod kopalnią, the devoicing of the preposition-final obstruent is due to the voiceless object at the beginning of the following noun. Thus, we can conclude that at least in surface terms, we are dealing with a symmetrical phenomenon of voice agreement in obstruent clusters: that is, both to a voiced and to a voiceless trigger, a point that will be returned to in the following sections.

Given the basic data above, the distribution of the voicing distinction, expressed by the ability to maintain the laryngeal distinction (Lar), is easily captured in descriptive terms. The voice contrast is maintained before vowels ‘_V’ and before sonorant consonants followed by vowels ‘_(S)V’. The two contexts can be schematically merged into one ‘_(S)V’ as shown in (4a). The contrast is neutralized word-finally, whether the sonorant is present or not ‘_(S)#’ (4b),⁶ and before other obstruents (4c).

(4)



C = obstruent, (S) = optional sonorant, Lar = laryngeal specification, V = vowel

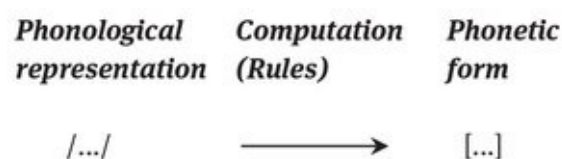
Having seen the basic data concerning the distribution of the voice contrasts in Polish, we now turn to some theoretical preliminaries leading to the specific choice of a representational model that will be a starting point to our own proposal in [Chapter 2](#).

3 Representing voice

For any phonological model which recognizes a distinction between phonology and phonetics, and that concerns most models, the following simplified scheme (paradigm) applies. However, the difference between individual approaches may produce quite a range of possibilities: from full incorporation of phonetic grounding into phonology to substance free phonology.

We limit the discussion of the phonological representation only to the relevant melodic aspect, that is, laryngeal specification. There are a few fundamental choices that may be made here, and the particular options greatly influence the rest of the paradigm.

(5)



One such decision is whether the distinctive features are binary, for example, $[\pm\text{voice}]$, $[\pm\text{spread glottis}]$, $[\pm\text{constricted glottis}]$, $[\pm\text{stiff vocal folds}]$, $[\pm\text{slack vocal folds}]$, or whether the laryngeal contrasts should be expressed privatively. In the latter case, only the marked segments contain a particular feature, for example, $[\text{voice}]$, and the unmarked segments do not have any laryngeal specification underlyingly.⁷

One of the consequences of the above decision is the way basic phonological phenomena related to voice will be described. For example, Final Obstruent Devoicing (FOD) in Polish as in *żaba* / *żab* [ʒaba ~ ʒap] 'frog, nom.sg./gen.pl.', will receive quite disparate analyses. In a binary model, the phonological rule may take the following form (e.g., Hayes 1984: 319).

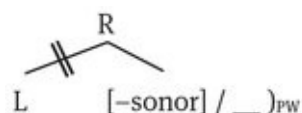
(6)

Final Devoicing

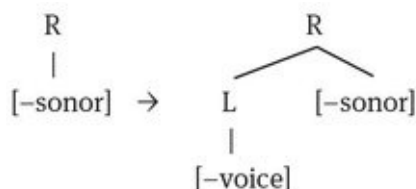
$C \rightarrow [-\text{voice}] / _ \#$

Problems with rules of this type concern their purely descriptive adequacy and arbitrariness. If both $[\text{+voice}]$ and $[-\text{voice}]$ are available in computation, then such rules as in (6) do not explain, for example, why an obstruent is devoiced and not voiced in that environment. This is because the representational symmetry predicts a computational one. The analysis is partly improved by breaking the rule in (6) down into two separate ones, as in Rubach (1996: 77).

a. Final Devoicing



b. Voice Default



One rule delinks the laryngeal node of the obstruent in word-final position regardless of whether it had [+voice] or [-voice] (7a). Thus, technically speaking, is a delaryngealization and not merely a devoicing rule. The other rule is universal default, which reintroduces the laryngeal node on unspecified obstruent at a later stage in the derivation and fills it in with [-voice]. Here, one of the results of the improvement is the introduction of rule ordering, where (7a) feeds (7b). The other consequence is that the derivation has intermediate stages at which, next to the phonetically observable voiced and voiceless obstruents, a third object is created. It is an unspecified obstruent, which cannot be interpreted phonetically unless it receives some specification in further derivation. The universal tendency for obstruents to be voiceless rather than voiced is built-in in the Voice Default but we are still dealing with mere descriptive adequacy because rule (7b) only formalizes the observation and does not explain it.

Privative models assume that in a two-way contrast system like Polish only one series of obstruents carries laryngeal specification. Typically, it is assumed that the voiced series contains the feature [voice]. The models differ, however, with respect to how the unmarked series is treated in further derivation. In the approaches in which phonological derivation is meant to bring the phonological representation closer to the stage at which it becomes phonetically interpretable – systematic phonetic level – the underlyingly unmarked segments receive their respective laryngeal features by means of various defaults. Universally, sonorant consonants and vowels become [+voice], while obstruents become [-voice]. We find nothing wrong with defaults as long as they are mere phonetic interpretation statements and the filled values do not participate in any phonological computation. Unfortunately, they do in a number of accounts of the Polish voicing system (e.g. Bethin 1992). In this sense, it is difficult to maintain that we are indeed dealing with a privative system.

A more radical proposal is made, for example, within the Element Theory of Government Phonology (GP). Instead of underspecification, GP talks about non-specification of the unmarked objects and assumes that the segments receive

phonetic interpretation without any feature filling devices (Kaye, Lowenstamm and Vergnaud 1990; Harris 1990, 1994). Phonological representations in the model are phonetically interpretable at any stage of the derivation. This does not mean that there are no phonological processes or computation. To the contrary. However, the computation does not bring the phonological representation any closer to the level at which they would be more pronounceable. The representations are pronounceable both before and after phonological processing, and the systematic phonetic level of representation is dispensed with (Harris and Lindsey 1993, 1995).

As a starting point, we assume the position called Laryngeal Realism⁸ (Harris 1994; Honeybone 2002, 2005), which is a privative approach with non-specification rather than underspecification. We review this approach below, concentrating on how the privative view accounts for basic phenomena such as FOD and Voice Assimilation (VA), as well as on the question of what is a possible phonological rule (computation).

4 Laryngeal Realism

Laryngeal Realism (Honeybone 2002, 2005) is an approach to laryngeal phonology whose main assumption is the privativity of the representation of voice coupled with non-specification and direct phonetic interpretation of the unmarked segments familiar from the Element Theory of Government Phonology (e.g., Kaye, Lowenstamm and Vergnaud 1985, 1990; Harris 1990, 1994). It is based on two important observations from the realm of universal phonetics and translates them into phonological systems.

The first observation is that there are three major phonetic categories which are regularly utilized by languages to express laryngeal contrasts.⁹ These categories can be illustrated along the so called VOT continuum (Lisker and Abramson 1964; Lieberman 1970; Keating 1984), i.e., i) long lead (negative VOT, which is found in fully voiced stops), ii) short lag (voiceless unaspirated stops), and iii) long lag (voiceless aspirated stops). The symbols used below are taken from Honeybone (2002).

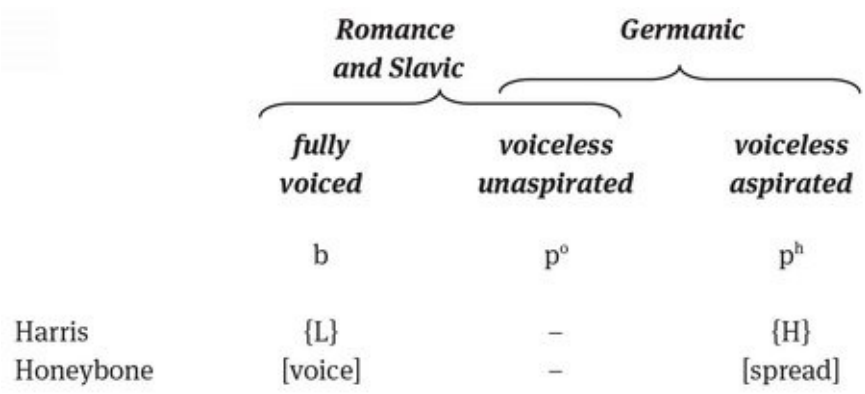
(8)

fully voiced	voiceless unaspirated	voiceless aspirated
b	p ⁰	p ^h
d	t ⁰	t ^h
g	k ⁰	k ^h

The other observation, this time concerning mostly European languages, is that among languages possessing a two-way laryngeal contrast, one can observe two groups of languages according to the different kinds of laryngeal distinctions they use. The first group is said to be represented by most Germanic languages and is characterized by a fortis / lenis distinction, which translates into voiceless aspirated vs. voiceless unaspirated in surface terms. The other group, represented by Romance and Slavic languages, has an opposition between fully voiced and voiceless unaspirated stops. Additionally, the two groups tend to exhibit different patterns of assimilation. Languages with full voicing seem to spread that property in assimilation processes, e.g., Polish rendition of football as [fudbɔl] vs. English [fʊtbɔ:l].

Laryngeal Realism takes these facts as evidence that the two groups of languages cannot have the same phonological representations of the contrast that would be based on the feature [voice], and proposes two different types of representation.¹⁰

(9)



The Germanic languages are viewed as 'aspiration' systems in which the marked feature, or in fact element, is high tone {H} for Harris (1994), and [spread] for Honeybone (2002).¹¹ The Romance and Slavic languages are assumed to base the opposition on [voice], which translates into the low tone element {L} for Harris and the element [voice] for Honeybone. Note in the graph above that in both systems the voiceless unaspirated objects symbolized with /p^o/ are neutral, i.e., non-specified. Given the presence of a non-specified object in both systems, Harris (1994: 135) derives a more general typology of phonation systems based on this fact and on the use of two laryngeal elements, which he has at his disposal. Thus in a pre-contrast system - which only has one series of obstruents - no laryngeal specification is employed at all. An unmarked series is also present in two-, three- or even four-way contrast languages. The growing complexity of the systems is directly correlated with the number of laryngeal elements used and whether they themselves may combine, as in Gujarati.

(10)

	representation		examples		
<i>Hawaiian</i>		{ }			p
<i>Polish</i>	{L}	{ }			b p
<i>English</i>		{ }	{H}		b p ^h
<i>Thai</i>	{L}	{ }	{H}		b p p ^h
<i>Gujarati</i>	{L}	{ }	{H}	{L-H}	b p p ^h b ^h

Returning now to the non-specified obstruents, it should be remembered that one of the distinguishing factors among the privative models is the treatment of the unmarked series. Thus, in some traditions it is lexically underspecified but receives phonetic content (features) in derivation (e.g., Iverson and Salmons 1995, 2003; Bethin 1992). In the Laryngeal Realism tradition (Harris 1994, 2009; Honeybone 2002, 2005), on the other hand, no systematic level of phonetic representation is postulated at which more concrete representations are derived. The unmarked segment is non-specified and it is directly interpretable on a language specific basis. Nevertheless, the two privative traditions are similar in exhibiting a strong phonetic bias with respect to the analytical decision as to what actual phonological representation stands behind the observable surface facts. For example, the presence of full voicing is taken to be the indication of the presence of the element [voice], or {L}, while aspiration leads to the postulation of [spread], or {H}.

Typically, the authors do correlate the respective representations also with phonological phenomena such as presence or absence of a particular type of assimilation. However, while phonetically correct, it is not impossible to provide alternative and equally valid analyses, as we will see below. It is often argued within privative frameworks that assimilation is possible only if the active feature element is spread. If we talk about phonological assimilation only, this is correct. However, the fact that assimilation as a phonetic fact can be symmetrical, that is both to voiced and to voiceless segments in e.g., Polish, suggests that either privativity is on the wrong track, or that there is also a phonetic or interpretational assimilation, which has little to do with active phonological categories. We will see examples of such analyses presently.

Not only assimilations can be given alternative analyses. Harris (2009) convincingly argues that not every case of final devoicing is in fact phonological delaryngealization. All the above points strongly suggest that an analysis of a particular voicing system should do much more than look at the acoustics and the presence of assimilation and devoicing. We will return to this point in our further discussion. If the division into H- and L-systems could be done so easily on the basis of observable VOT values, half of the analytical job would be done by looking at the spectrograms. We would also expect little variation between the actual phonetic details in individual systems. On the other hand, not only do such details differ, but also they are difficult to understand under the view that VOT lead languages are L-systems, and VOT lag languages are H-systems. At least, as will be demonstrated presently, it would not be so difficult to understand the laryngeal system of Polish. Let us look at how the basic voicing facts from Polish are handled by Laryngeal Realism with a view to demonstrating how this model works on actual

5 Laryngeal Realism and Polish voicing

Let us begin the discussion by clarifying the notation to be used as shorthand for full representations. Following the arguments laid out in Harris (1994), and especially in Honeybone (2002: 141-142), we will use two types of symbols for Polish obstruents depending on their lexical laryngeal specification. It will be recalled from the previous section that Honeybone uses a system of three symbols /p^o, p^h, b/ to refer to neutral, voiceless aspirated and fully voiced stops respectively in the two groups of languages, that is, Germanic and Slavic. We adapt this notational system a little to fit the Polish system, and especially to facilitate the modification of Laryngeal Realism, which will be proposed in the following chapter. In short, when referring to obstruents in some abstraction the symbols /C^o, C^h, C/ will be used, corresponding to Honeybone's /p^o, p^h, b/. On the other hand, when referring to concrete examples, we will use, e.g., /p^o/ to refer to the lexical neutral (voiceless unaspirated) [p], as in pić /p^oić/ > [p^hić] 'to drink', and /b^L/ to refer to a lexically voiced [b], as in być /b^Lić/ > [bić] 'to be'.¹² Thus, in discussing phonological representations, the symbols will always be accompanied by some diacritic, that is, /p^o/ or /b^L/. Understandably, in the actual phonological representation, the zero diacritic does not correspond to any reality. Throughout this book, the symbol '>' will be used to mean 'phonetically interpreted as'. Phonological processes, or any change, on the other hand, will be marked with '→'.

As mentioned in the previous section, for Laryngeal Realism, a language like Polish, which has a phonetic contrast between fully voiced and voiceless unaspirated obstruents, and in which assimilation to a voiced obstruent is observed, should be represented by the presence of the element {L} in the voiceless series, while the voiceless unaspirated obstruents are lexically non-specified. Recall that in the non-neutralizing context, that is, '_(S)V' (4a), these values remain unchanged by any phonological processing and are phonetically interpreted as voiced and voiceless unaspirated, e.g., /t^oɔm/ > [tɔm] tom 'volume' vs. /d^Lɔm/ > [dɔm] dom 'house'.¹³ More examples are given below.

(11) ...C(S)V... C retains its lexical laryngeal specification

#C ^o V	/p ^o ić/	>	[p ^h ić]	pić 'to drink'
#C ^L V	/b ^L ić/	>	[bić]	bić 'to hit'
#C ^o SV	/p ^o wót ^o em/	>	[pwót ^h em]	plotem 'fence, instr.'
#C ^L SV	/b ^L wót ^o em/	>	[bwót ^h em]	blotem 'mud, instr.'
VC ^o V	/ris ^o a/	>	[risa]	rysa 'scratch'
VC ^L V	/riz ^L a/	>	[riza]	ryza 'ream'
VC ^o SV	/ɔk ^o ɲe/	>	[ɔk ^h ɲe]	oknie 'window, loc.'
VC ^L SV	/ɔg ^L ɲe/	>	[ɔg ^h ɲe]	ognie 'fire, pl.'

The actual theory internal explanation for the survival of the laryngeal

specification in ‘_(S)V’ will be provided in [Chapter 5](#). As a preview of that analysis we may use the concept of licensing, which is compatible with the mechanism employed in the Element Theory in Government Phonology (e.g., Gussmann 2007, Harris 1990, 1994). In syllabically oriented analyses of Polish voicing (e.g., Bethin 1984, 1992; Gussmann 1992), this context corresponds to the onset position, or the head of a complex onset. And conversely, the neutralization of delaryngealization context has been identified as the coda.

A delaryngealized (neutralized) lexical /b^L/ will be referred to as /b^o/, where the superscripted symbol is a mere transcriptional trace of the object we are dealing with lexically. Its phonetic interpretation, however, will be identical to that of /p^o/, e.g. /ʒab^La/ > [ʒaba] żaba ‘frog’ vs. /ʒab^L/ → /ʒab^o/ > [ʒap] żab ‘frog, gen.pl.’. Note, that a phonological process has applied in the genitive plural form, by which /b^L/ becomes /b^o/.

Since the phonetic interpretation of a neutral obstruent in Polish is identical to that of voiceless unaspirated object, /b^o/ will have exactly the same interpretation as a lexical /p^o/, namely, [p]. Thus, the phonetic interpretation takes into account only the superscripted value in our phonological transcription. Phonologically speaking, a delaryngealized /b^o/ and a lexical /p^o/ are identical objects.

We saw in (4b,c) that the laryngeal contrast in Polish is suspended word-finally and before another obstruent. The former situation leads to FOD, while the latter effects Voice Assimilation. FOD results in surface ambiguities. For example, the surface form [stuk] may have two lexical sources. It is either stóg [stug^L] ‘haystack’ with final devoicing (cf., stogi [stɔji] ‘haystack, nom.pl.’), as in (12a), or stuk [stuk^o] ‘a knock’ (cf., stukanie [stukaɲe] ‘knocking’) with a lexically voiceless obstruent (12b). Below, only the relevant consonants are given the superscripted diacritics.

(12)

<i>Lexical representation</i>		<i>Phonological representation</i>		<i>Phonetic interpretation</i>
<i>L-delinking (FOD)</i>				
a. /stug ^L /	→	/stug ^o /	>	[stuk]
b. /stuk ^o /	=	/stuk ^o /	>	[stuk]

Since the element {L} does not survive in word-final position, it is delinked in stóg (12a). This derivation illustrates another aspect of GP. The lexical representation, which is in fact a fully interpretable phonological representation, may be subject to phonological computation. Here, we are dealing with the delinking or deletion of the laryngeal category in a hostile environment ‘_#’ (14). What remains in that position is a delaryngealized object which is identical to the non-specified series in that system, and must receive the same phonetic realization, that is, voiceless unaspirated. It is important to note that a potential absence of L-delinking would still produce a fully interpretable representation. The obstruent would then have to be pronounced as voiced. On the other hand, in (12b), the lexical representation is not subject to any processing, and its interpretation is obvious. To repeat, the

difference between /b⁰/ and /p⁰/ is not phonological. Phonologically they are the same, except that /b⁰/ is an output of delaryngealization.

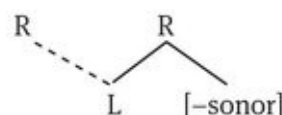
Turning now to the phenomenon of Regressive Voice Assimilation (RVA), we recall that, unlike FOD, it appears to be symmetrical in Polish. That is, we witness assimilations to a voiced and to a voiceless obstruent. In systems using binary features (e.g., Gussmann 1992; Rubach 1996), the analysis is straightforward. First, the left-hand obstruent must lose its laryngeal specification, and then the [+voice] or [-voice] spreads leftwards from the following one. Let us illustrate this point with the rules proposed in Rubach (1996: 78).¹⁵

(13)

a. **Obstruent delinking**



b. **Spread**

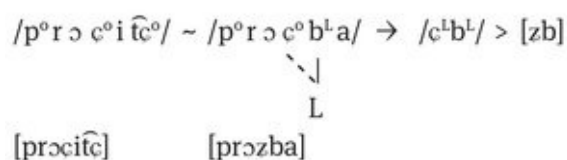


Rule (13a) consists in the delinking of the laryngeal node in an obstruent if the node is adjacent to the laryngeal node of the following obstruent. The laryngeal nodes contain either [+voice] or [-voice]. Thus, whichever feature is present in the laryngeal node of the second obstruent will eventually spread to the preceding one.

Privative models, when confronted with symmetrical assimilation, must distinguish between a phenomenon which is a result of spreading of the active laryngeal category, in this case {L}, as in, e.g., *prosić* / *prośba* [prɔɕit͡ɕ ~ prɔzba] ‘to ask a request’, and one which is quite different in kind. Since Polish, under this view, utilizes only the element {L}, the assimilation to a voiceless obstruent as in *dech* / *tchu* [dex ~ txu] ‘breath, nom.sg./gen.sg.’ must be viewed as non-assimilatory in nature. Rather, it is a case of neutralization (delaryngealization) similar to word-final devoicing. The two types of assimilation are shown below.

(14)

a. **Assimilation as L-spreading Interpretation**



b. Delaryngealization Interpretation

$$\begin{array}{ccc} /d^L \epsilon x^0/ & \sim & /d^0 x^0 u/ & \rightarrow & /d^0 x^0/ > [tx] \\ | & & \neq & & \\ L & & L & & \\ [d\epsilon x] & & [txu] & & \end{array}$$

It appears then that surface symmetrical assimilations can be given an asymmetrical account. This has at least three very important consequences. Firstly, it becomes obvious now that the term 'assimilation' is a mere cover term describing the phonetic (surface) facts, which need not have a direct analog in phonologically speaking. If that is correct, then a mere observation of the presence of voice assimilation can no longer be taken as evidence for a particular phonological representation (e.g., van Rooy and Wissing 2001). Secondly, reversing the first observation a little, it is important to realize that assimilations need not involve element or feature spreading. This is particularly instructive because, as mentioned earlier in this chapter, the existence of voice assimilation is often taken as an argument that a particular system has to possess the relevant category in the first place. The third consequence concerns the predictions that such a privative analysis makes. It was noted in Lombardi (1995a: 54) that the privative analysis of voicing predicts that in the absence of delaryngealization – in our terms this would mean no L-delinking in a system like Polish – one should expect the absence of FOD and only one type of voice assimilation in obstruent clusters. In other words, $/C^L/$ would survive in the two contexts (4b) and (4c) allowing for word-final voiced obstruents as well as clusters of obstruents which would disagree in voicing. To be precise, $/C^L C^0/$ would be found, but $/C^0 C^L/$ would have to become uniform $/C^L C^L/$ because L-spreading is a different rule from delinking. This is exactly what seems to be found in Ukrainian in which voiced obstruents are found word-finally, e.g., [hryb] 'mushroom' vs. [hryp] 'grippe', while clusters of obstruents assimilate only to a voiced one, e.g., [proz'ba] 'request' (compare with the parallel Polish *prośba* [prɔʂba] 'request'), and not to a voiceless one, e.g., Ukrainian [ridko] 'rarely' vs. Polish *rzadko* [ʒatko] 'rarely'. The correlation between FOD and RVA to a voiced obstruent is not impossible to express in binary feature systems. It is enough to eliminate the rule of delaryngealization. However, that move would also affect [-voice] obstruents and render them immune to [+voice] spreading from the following obstruent. This is a wrong prediction. Thus, the privative systems fare better in dealing with cases like Ukrainian. Of course, rule-based approaches could still rescue the analysis of Ukrainian by specifying the rule of delaryngealization as delinking only [-voice]. This however, does not add to the explanatory value of such analyses.

Returning now to Polish, it seems to allow for two configurations of obstruent clusters in phonological representation (15).

(15)

a. $C^0 C^0$

They may be lexical or ‘derived’ by element spreading (/C^oC^L/ → /C^LC^L/) or element delinking (/C^LC^o/ → /C^oC^o/).¹⁶ Gussmann (2007: 291) captures this regularity by means of a Voice Adjustment principle.

(16) **Voice Adjustment**

The tonal specification of the last obstruent controls the laryngeal tier of the sequence.

This principle is meant to account not only for cases of dynamic voice assimilation – which can be observed as processes – but also for the static phonotactic patterns found in, e.g., *kto* ‘who’, *gdz* ‘when’, etc. Later in this book, we will propose a slightly different formulation, which is based on contextual tone licensing.

The conclusion we can draw from the above discussion is that the basic Polish voicing facts can be easily handled by Laryngeal Realism, allowing for interesting predictions which follow from privativity and non-specification. The three aspects of Polish voicing discussed above, that is, the distribution of contrast, final devoicing and voice agreement in obstruent clusters are common to the two major dialect groups in Polish. There is, however, one phenomenon that sets the two main dialects of Polish apart. Unfortunately, this phenomenon is inexplicable under the Laryngeal Realism view in which Polish is an L-system. One of the major problems is that sonorants appear to need a voicing property to spread in one of the dialect groups of Polish.

6 The problem of Cracow-Poznań sandhi voicing

As mentioned earlier in this chapter, Polish exhibits voicing agreement also in obstruent clusters which result across word boundaries. The agreement involves what appears to be voice spreading in, for example, *kwiat begonii* [kʲɫad begɔɲi] ‘begonia flower’, in which the final obstruent in the first word is lexically voiceless, cf., *kwiaty* [kʲɫati] ‘flower, pl.’, as well as in the ambiguous cases in which a lexical voiced obstruent, e.g., in *szyb kopalni* [ʃɨp kɔpalɲi] ‘mine shaft’ is followed by a voiceless obstruent. From the point of view of Laryngeal Realism, the analysis of *kwiat begonii* would be parallel to that of *prośba* in (14a) above, while *szyb kopalni* corresponds to *tchu* (14b). This is illustrated below in (17a) and (17b) respectively, where only the relevant consonants carry the specification symbols.

(17)

a. **Assimilation as L-spreading** **Interpretation**

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