Warsaw Studies in English Language and Literature
Edited by Jacek Fisiak

Error-Based Evidence for the Phonology of Glides and Nasals in Polish with Reference to English

Hanna Dziczek-Karlikowska

University of Social Sciences
Warsaw

PETER LANG
Internationaler Verlag der Wissenschaften

12

Chapter One

Introduction

1.1. Goals of the study

This study examines the spelling and pronunciation errors, which are assumed to be evidence for phonological generalizations. The focus is on the phonology of glides and nasals in Polish and English. In the first place, the evaluation of the incorrect written outputs containing Polish glides and nasals is carried out. It is assumed that the spelling mistakes stem from the young learners' intuitions concerning a particular sound. In the second place, the pronunciation errors exhibited by the Polish speakers of English are evaluated. The evaluation addresses the environments in which the phonological processes under consideration take place in both languages. The purpose of this analysis is to demonstrate that phonological interference finds its source in the phonological rules of the native language having no correspondents in the target language or in the differences in the treatment of diphthongs by both languages.

Standard Generative Phonology and Optimality Theory have been adopted as the theoretical frameworks for the analysis of errors of both types. The analyses run simultaneously in both frameworks aim to state generalizations and make predictions. The rule-based phonology, where the intricacies of gliding and nasalization are resolved by the application of the fully productive rules, gives a coherent analysis of the investigated body of data. Similarly, the constraint-based phonology, where the solution is offered by the system of universal constraints, successfully accounts for the examined phenomena. However, for the generalizations concerning the insertion of the back glide, standard Optimality Theory does not produce a straightforward account. This study proves that the introduction of a two-level evaluation, as envisaged by Derivational Optimality Theory (DOT, hereafter), satisfactorily handles the ongoing changes. This modified version of OT is provided, among others, by Kiparsky (1997, 2000) and Rubach (1997, 2000a, 2000b, 2003). Additionally, the derivational approach is shown to adequately deal with the data whose erroneous rendition is due to the Kurpian dialect.

1.2. Theoretical background

This section presents the fundamentals of Standard Generative Phonology (section 1.2.1) and Optimality Theory (section 1.2.2) in the scope relevant for the purposes of the present work. Since the rules and the constraints are formulated with recourse to syllable structure, section 1.2.3 introduces the key concepts of syllable structure and syllabification. The theoretical information provided in the ensuing sections is interspersed with some descriptive data from Polish and English. These include the inventories of consonants and vowels used for various analyses in the present study. The data are generally considered well known and uncontroversial. They have been taken from the standard sources, such as Wierzchowska (1971, 1980), Biedrzycki (1971), Reszkiewicz (1984), Rubach (1984a), Gimson (2001), Sobkowiak (2001), Wells (2000), and Ladefoged (1993).

1.2.1. Standard Generative Phonology

The key concepts of Standard Generative Phonology derive from *The Sound Pattern of English* (Chomsky – Halle 1968; SPE, hereafter). The standard generative model recognizes two levels of representation: underlying structure and surface structure. Surface representations are derived by phonological rules, which form an ordered set. The ordering of rules is linear, that is, rule A precedes rule B, B precedes C, etc. Each constituent of a given word is derived separately, i.e. phonological rules reapply in the same order at each successive step in the derivation.

The most significant post-SPE development of Standard Generative Phonology is Lexical Phonology (Mascaró 1976, Halle 1978 and Kiparsky 1982, 1985). According to Lexical Phonology, phonological rules fall into two classes: cyclic and postlexical.[1] The phonological concept of a cycle is used as a principle which governs the mode of rule application, that is, rules apply in cycles. The cyclic model of generative phonology imposes severe restrictions on the operation of phonological rules and reduces considerably the abstractness of underlying representations (UR, hereafter). An underlying representation contains the unpredictable features of pronunciation for each lexical item. The information that is predictable is added by rules in the course of phonological derivation. A given phonological rule operates on the basis of the information contained in the UR of a given phonetic segment. Rules specify contexts in which they are applicable. There are language-specific inventories of underlying

1 This assumption was developed further by Booij – Rubach (1987), who propose that, in addition to the distinction between cyclic and postlexical rules, Lexical Phonology should recognize the class of postcyclic lexical rules.

segments, including vowels and consonants. Thus, in the inventory of underlying consonants, Polish has the following segments: labials //p, b, f, v, m//, alveolars //s, z, t, d, ts, dz, r, l, n//, postalveolars //š, ž, tš, dž//, prepalatals //ć, ź, t̡, d̡//, and velars //k, g, x//. In Polish, all consonants are either [–back] or [+back]. The former feature occurs with prepalatals and with palatalized consonants, which are dubbed 'soft'. The remaining consonants, including postalveolars, are [+back] and are dubbed 'hard'. The contexts for the occurrence of a given segment are language-specific. For instance, a segment may occur or be banned in initial, medial or final position in a word, as the English /ŋ/ which is not allowed word-initially, or as the English inherently oral vowels, which remain oral if followed by a nasal consonant.[2]

The objective of generative phonology is to arrive at rules (generalizations) that cover the possibly widest range of inputs in the widest range of environments permitted by the data. To establish such generalizations, it is essential to have the knowledge about the rules and about the underlying representations of the language under discussion. The required information is established by a study of alternations in a paradigm. To exemplify the point, we construct the paradigms of words to look for regular alternations in the phonetic shape of the stem. When affixes are added, the realizations of the morphemes change, depending on the actual environment. The occurrence of such changes is conditioned by the operation of context-sensitive phonological rules (see section 1.3 below). If the alternations are regular, it is assumed that the morpheme has a unique underlying representation. For instance, Polish has a late allophonic rule of Surface Palatalization. The rule is entirely exceptionless, i.e. automatic, and applies before /i, j/, palatalizing any consonant inside words and across word boundaries. The operation of this automatically applying rule is shown by the alternations in *szkol+e* [l] 'school' (loc.sg.) → *szko*l̡*+i+ć* [l'] (inf.), where [l] is palatalized to [l'] in the context of /i/.[3] The rule of Surface Palatalization is cited after Rubach (1984a).

(1) Surface Palatalization

[+cons] → [+high, –back] / _ ([–seg]) [–cons, +high, –back]

Surface Palatalization palatalizes not only [l] but also other segments, such as [p'] in *pisk* 'scream'and *chłop idzie* 'the farmer is walking', [s'] in *pas jest* 'the

2 Note that English vowels can undergo nasalization in the bilateral context of nasal consonants but only in the rapid speech variant. For a detailed description of nasality in such a context, see Chapter 4.

3 See Chapter 2, where the derivation of *szkoła* 'school' - *szkole* (loc.sg.) - *szkolić* (inf.) is presented in (24).

belt is', [t'] in *tiara* 'tiara' and *brat i siostra* 'brother and sister', [r'] in *ring* 'ring' and *wieczór jest* 'the evening is', [š'] in *Chicago* and *masz je* 'you have them', and [č'] in *Chile* and *zobacz je* 'see them'.

The list in (2) below contains a selection of other phonological rules which operate in Polish and which play a role in explaining the intricacies of errors examined in this stydy. The rules are stated semi-formally and they use the traditional SPE feature framework.

(2) a. Coronal Palatalization
[+anter, +coron] → [+high, –anter, –back] / _ [–cons, –back]

b. Lateral Vocalization
[+later, +back, +high] → [–cons, –later, –coron, –anter]

c. Final Devoicing
[+obstr] → [–voice] / _ #

d. Voice Assimilation
An obstruent assimilates in voicing to the following obstruent.

e. Nasal Assimilation
A nasal assimilates to the point of articulation of the following stop or affricate.

The rule of Coronal Palatalization formulated in (2a) turns the anterior coronal consonants to prepalatals before front vowels and glides. Thus, for instance, //s// is changed to [ɕ] in *głos* 'voice' – *głosie* [ɕ+ɛ] (loc.) – *głosić* [ɕ+i+tɕ] (inf.) and //n// is changed to [ɲ] in *dzwon* 'bell' – *dzwonie* [ɲ+ɛ] (loc.) – *dzwonić* [ɲ+i+tɕ] (inf.).[4] Similarly, Coronal Palatalization changes the anterior coronal //ɬ// to the prepalatal /l'/ as in the already cited *szkoła* 'school' – *szkole* (loc.sg.) – *szkolić* (inf.). Lateral Vocalization formulated in (2b) changes the underlying //ɬ// to [w] if //ɬ// is not placed in the palatalizing context. This is exemplified by the word *szkoła* 'school', where //ɬ// → [w]. Note that the segment /l'/ appears phonetically either as [l'] before the high vowel /i/ or as [l] elsewhere.[5] Final Devoicing, given in (2c), devoices obstruents if they occur in word-final position, as in *chleb* 'bread', where the final /b/ is changed to [p]. However, if the voiced stop, e.g. /b/, appears in the bilateral environment of voiced sounds, as in *chlebek* 'bread' (dim.), /b/ remains voiced. Conversely, if /b/ appears in the environment of a voiceless obstruent, e.g. /k/, as in *chlebki* 'bread' (dim.pl.), /b/ is devoiced and the word surfaces as [xlɛpk'i]. The last two instances, i.e. *chlebek* and *chlebki*, are evidence for the operation of the Voice Assimilation rule applying inside words. Voice Assimilation applies also

4 See Rubach (1984a) for further analysis.
5 The issue of [l] - [w] alternation is pursued in Chapter 2 further.

across word boundary as in, for instance, *bez sensu* 'with no sense', where the final /z/ in *bez* surfaces as [s] agreeing in voice with the following voiceless /s/ of *sensu*.[6] Finally, the operation of the rule of Nasal Assimilation in (2e) is exemplified by the change in, for instance, *kępa* //kenpa// 'cluster', where the underlying //n// changes to [m] in the context of the bilabial stop.

1.2.2. Optimality Theory

Optimality Theory (Prince – Smolensky 1993, McCarthy – Prince 1993, 1995) is an approach to phonology based on the ranked system of violable constraints. At the heart of OT lies the idea that the constraints are universal and intrinsically conflicting in the sense that the compliance with one constraint incurs a violation of another. This conflict between constraints is regulated by the mechanism consisting in the ranking of these constraints. While constraints are universal, the rankings vary, which contributes to the cross-linguistic variation. Universal Grammar (UG) provides a set of constraints (Con); grammars consist of an ordered ranking of the members of Con. A component of UG, Generator (Gen), generates a range of possible output forms for each input. The Evaluator (Eval) assesses the possible outputs and selects the optimal (most harmonic) candidate, i.e. the candidate that incurs the least serious violation of a set of constraints, taking into account their hierarchical ranking. There are five architectural principles regulating the operation of the UG components, i.e. Con, Gen and Eval.[7]

(3) a. *Universality*:
Constraints reflect universal linguistic tendencies.

b. *Ranking*:
Constraints are ranked hierarchically, so that the higher-ranked constraints have priority over the lower-ranked ones.

c. *Violability*:
Constraints are violable but the violation should be the minimum needed to comply with higher-ranked constraints.

d. *Inclusiveness*:
This principle prevents Gen from being unduly selective in producing candidate outputs.

e. *Parallelism*
All constraints pertaining to some type of structure interact in a single hierarchy.

---

6 For a detailed description of Voice Assimilation in Polish, see Rubach (1996).

7 See Prince – Smolensky (1993) for a more formal presentation.

OT recognizes two types of constraints: markedness constraints and faithfulness constraints. Each individual constraint evaluates one specific aspect of markedness or faithfulness. The notion of markedness in sound systems means that certain segments, segment combinations, or prosodic structures are favoured over others. It means that the segments or structures have two values, one of which is 'marked', the other 'unmarked'. Markedness constraints state preferences for the unmarked types of output structures. They are blind to input and their job is to require that the output forms meet some criterion of well-formedness. The examples of markedness constraints follow in (4).

(4) a. Syllables must have onsets.
b. Syllables may not have codas.
c. Vowels must not be nasal.

Universality, for markedness constraints, means that the constraints satisfy at least one of the following criteria: typological and/or phonetic. The constraints should be typologically grounded, i.e. they should express preferences for certain structures which reoccur in sound systems, and/or the constraints should be phonetically grounded in some property of articulation or perception.[8]

The major force counterbalancing markedness is faithfulness, understood here as the combined grammatical factors preserving lexical contrasts. Faithfulness constraints assess both input and output forms with respect to some featural opposition. To put it differently, faithfulness requires that outputs preserve the properties of their basic (lexical) forms, i.e. the input and the corresponding output forms must be identical. The examples of faithfulness constraints follow in (5).

(5) a. The output must preserve all segments present in the input.
b. Output segments must have their counterparts in the input.
c. Output and input segments must share values for [voice].

As it has already been mentioned, the status of optimality consists in being most harmonic with respect to a set of conflicting constraints. Principally, the selection of an optimal output involves setting priorities, as conflicts are resolved by domination. Domination means that the higher-ranked of a pair of constraints takes precedence over the lower-ranked one. The ranking of constraints is

8 Note that the exclusively typology-based definition of universality is inadequate. As reported by Maddieson (1984), such an understanding of universality runs the risk of circularity. This means that certain properties are dubbed 'unmarked' simply because they occur in languages with greater frequency than the 'marked' properties. Hence, the second (non-circular) criterion of phonetic grounding.

schematically shown in a constraint tableau, as demonstrated in (6) below. The constraints are listed horizontally, in a descending ranking from left to right. Dominance relation is shown by a solid vertical line separating two constraints. Dashed lines, used in the ensuing chapters, show that the ranking is not essential. The cells contain violation marks '*', meaning that a given output candidate violates the constraint heading the column. An exclamation mark '!' denotes a candidate that fatally violates a constraint and, as such, it is eliminated from further evaluation. The optimal candidate is marked by an arrow.

(6) //input//

	Constraint A	Constraint B
⇒ a. candidate a		*
b. candidate b	*!	

Candidate (6a) is the winner in spite of the fact that it violates constraint B. The reason is that this constraint is ranked lower than constraint A, so its violation is less costly. Candidate (6b) violates the high-ranked A, so it is excluded from further assessment. In spite of the fact that both candidates violate some constraint, candidate (6a) comes out optimal, as there is no other candidate available that fares better, i.e. that satisfies both constraints at the same time.

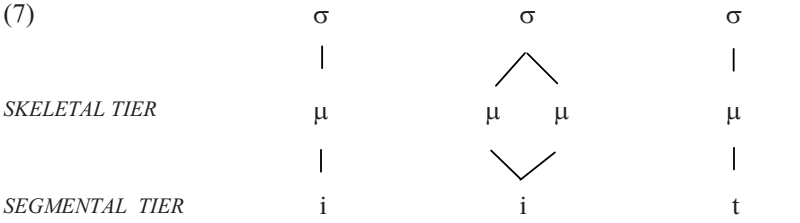
1.2.3. Syllable structure and syllabification mechanisms

This section surveys the basic concepts relating to the syllable and syllabification. In the first place, the moraic theory implemented in this study is reviewed. In the second place, the concept of the core syllable and its structure is developed. Finally, the syllabification procedures both in Standard Generative Phonology and Optimality Theory are presented.

The moraic theory adopted in this study is based on the work of Hyman (1985), McCarthy – Prince (1986) and Hayes (1989). The notion of a mora expresses the idea that a light syllable consists of a single unit of quantity, i.e. it is monomoraic, while a heavy syllable contains two units, i.e. it is bimoraic. The mora expresses the length contrasts in vowels, i.e. a short vowel is linked to a single mora, while a long vowel is linked to two moras. And lastly, single consonants are moraless while geminates are moraic. As generally accepted, the

moraic structure is encoded in the lexicon and as such, it is represented by the mora (μ) in the underlying representation. The three representations are illustrated in (7) below.

(7)



a. short vowel b. long vowel c. geminate

The segmental tier is composed of root nodes which define a given segment in terms of features. These features are grouped and such groupings along with the restrictions on feature combinations are organized in a hierarchical tree structure known as feature geometry (Clements 1985). In this study, the Halle-Sagey Articulator Model of feature geometry has been adopted (Sagey 1986, Halle 1992, 1995, Halle – Vaux – Wolfe 2000).[9] The internal structure of the syllable

9 This model's leading idea is that features are organized around six articulators. Certain features are assigned to a particular articulator (articulator-bound features) and some are not dedicated to any particular articulator (articulator-free features). Articulator-free features fall into two groups: the major class features [consonantal] and [sonorant] and the stricture features [continuant], [strident], and [lateral]. The Halle-Sagey model accepts McCarthy's (1988) proposal that [±consonantal] and [±sonorant] form the root of the feature tree. The root features define three major segment classes: obstruents are [+consonantal, –sonorant], sonorant consonants, i.e. liquids and nasals, are [+consonantal, +sonorant], and [–consonantal, +sonorant] defines the class of vocoids, i.e. vowels and glides. There are certain restrictions on the combinations of the root features with particular articulators. [+consonantal] segments can be distinguished by one of the three articulators: Labial, Coronal, and Dorsal. The Labial, Coronal, and Dorsal are grouped into the class called 'Oral Place'. This organization implies that the pharyngeal and laryngeal segments are grouped together as [–consonantal] glides. Vowels, which are syllable heads, are required to choose the Dorsal articulator because the vowel quality features [high], [low], and [back] are dependents of Dorsal. By contrast, [–consonantal] segments that are not syllable heads are unrestricted with respect to articulator. The manner features [continuant], [strident], and [lateral] depend directly from the root and, as it has been mentioned earlier, are articulator-free. [±continuant] freely combines with Labial, Coronal, and Dorsal to generate stops and fricatives at each of the three major oral places of articulation. The Halle-Sagey model listing the articulators, the features that depend on them, and the higher-order structure of the feature tree (based on Halle 1992) is presented below. Note that ATR stands for Advanced Tongue Root, RTR stands for Retracted Tongue Root, gl stands for glottis, and vf stands for vocal folds.