Phonological Rule Typology and Second Language Acquisition

Katarzyna Dziubalska-Kolaczyk

0.   The aim of the present paper is to demonstrate and compare the useful-
ness of two models of phonology – cyclic phonology (henceforth CP) and
natural phonology (henceforth NP) – in explaining phonological inter-
ference in second language acquisition. In order to reliably account for lan-
guage phenomena, a phonological theory should be able to satisfy two basic
requirements:

(1)   it should allow for a comprehensive formal description of language
       (both universal and specific);
(2)   its description should be consistent with psychological reality.

The fulfilment of condition (2) depends on the way language acquisition
phenomena are treated within a theory. A phonological theory may only
claim to be psychologically adequate when it constitutes a projection of the
language acquisition process. When the tenets of a phonological model der-
ive from a mentally plausible account of first language (L1) acquisition,
they by analogy serve as guidelines towards the explanation of the acquisi-
tion of a second language (L2). The most tangible manifestation of the
difference between the mechanisms of L1 and L2 acquisition is the L1 inter-
ference in the L2 speech of the learner. Therefore, interference data, more
specifically phonostylistic[1] interference data, constitute in this paper a
background for the discussion of the adequacy of CP and NP typologies
with respect to L2 acquisition phenomena.

1. CYCLIC PHONOLOGY AND PHONOSTYLISTIC INTERFERENCE

The tenets of cyclic phonology, as presented by Rubach (1981, 1984), are
the following:

(i)   There are two classes of phonological rules: cyclic and postcyclic; these two classes of rules apply in distinct blocks.

(ii)   the blocks of rules are ordered as follows:
   1.   allomorphy and word formation rules
   2.   cyclic rules
   3.   postcyclic rules.

(iii)   the application of cyclic rules is governed by the principle of Strict Cyclicity formulated by Halle: 'A cyclic rule R applies properly on cycle j only if either (a) or (b) is satisfied: (a) R makes specific use of information, part of which is available on a prior pass through the cyclic rules, and part of which becomes available on cycle j. (b) R makes specific use of information assigned on cycle j by a rule applying before R.' (Rubach 1981, 12–13; Halle 1978).

The following tenets are implied by the principle cited above:

(iv)   a cyclic rule cannot apply on the first cycle (i.e. to the innermost constituents of words – structures internal to a cycle).

(v)   cyclic rules apply to derived forms (i.e. either when there is a morpheme boundary and/or the feeding change takes place earlier on the same cycle).

(vi)   a cyclic rule may apply on the first cycle or go back to the preceding one only under condition (v) (the feeding change taking place on the same cycle).

(vii)   the cycle is dictated by internal bracketing.

Slow speech interfering rules have been proved to be postcyclic (Rubach 1980). This fact prompts one to predict the same status for the interfering rules of casual speech. In order to verify this prediction, an experiment was designed to examine the interference of some phonostylistic nasal assimilation rules of Polish in English.

1.1. The data

1.1.1.   In casual speech English exhibits, among others, the following nasal assimilations (Rubach 1974):

(A) alveolar stops /t,d/ and a nasal stop /n/ are assimilated to the place of articulation of a following stop or nasal:

$$
\begin{bmatrix} -\text{cont} \\ +\text{ant} \\ +\text{coron} \\ -\text{lat} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{coron} \\ \alpha\ \text{ant} \end{bmatrix} / - ([-\text{seg}]) \begin{bmatrix} -\text{cont} \\ -\text{coron} \\ \alpha\ \text{ant} \end{bmatrix}
$$

e.g. *encourage, government, treatment, admire, input, ten people, London*

Bridge and the like. In cases like *can't go* /kɑːnt gəʊ/ → [kɑːŋk gəʊ] not only one segment, but a string of alveolar stops is assimilated (within a syllable).[2] In lento style the assimilation is limited to the domain of the syllable (e.g. *bank* [bæŋk]).

(B) anterior nasals /n,m/ undergo assimilation to the place of articulation of the following labiodental consonants /f,v/, and an alveolar nasal /n/ to a following bilabial /w/:

$$
\begin{bmatrix} + \text{nas} \\ + \text{ant} \end{bmatrix} \rightarrow \begin{bmatrix} + \text{lab} \\ \langle - \text{distrib} \rangle \end{bmatrix} \Bigg/ - ([-\text{seg}]) \begin{bmatrix} + \text{lab} \\ - \text{syll} \\ \langle - \text{distrib} \rangle \end{bmatrix}
$$

e.g. *nymph* /nɪmf/, [nɪɱf], *infant* /ɪnfənt/ → [ɪɱfənt], *can well* /kæn wel/ → [kæm wel].

1.1.2. The following nasal assimilations take place in casual speech in Polish

(C) a coronal nasal /n/ undergoes assimilation to the place of articulation of a following consonant within the domain of the accentual measure[3]:

$$
\begin{bmatrix} + \text{nas} \\ + \text{coron} \\ - \text{high} \end{bmatrix} \rightarrow \begin{bmatrix} \alpha \text{ coron} \\ \beta \text{ ant} \end{bmatrix} \Bigg/ \text{V} - ([-\text{seg}]) \begin{bmatrix} + \text{cons} \\ \alpha \text{ coron} \\ \beta \text{ ant} \end{bmatrix}
$$

e.g. *Pan Bóg*	/pan bug/ → [pam buk]	'Lord God'
on ciagnie	/−n t−/ → [−ɳ tɕ−]	'he pulls'
on go uderzył	/−n g−/ → [−ŋ g−]	'he hit him'
on ma	/−n m−/ → [−m m−]	'he has'
informacja	/inf−/ → [iɱf−]	'information'

The assimilation in careful (lento) speech takes place within a syllable in the environment of noncontinuant obstruents, e.g. *bank* /bank/ → [baŋk] 'bank', *piekny* /pɛnkni/ → [pɛŋk.ni] 'beautiful'.

(D) a nasal consonant is changed into a nasal semivowel glide [w̃] in the environment of continuant obstruents:

$$
\begin{bmatrix} + \text{nas} \\ \alpha \text{ ant} \\ \langle + \text{lab} \rangle \end{bmatrix} \rightarrow \begin{bmatrix} - \text{cons} \\ - \text{syll} \\ \alpha \text{ back} \end{bmatrix} \Bigg/ \text{V} - ([-\text{seg}]) \begin{bmatrix} + \text{obstr} \\ + \text{cont} \\ \langle + \text{lab} \rangle \end{bmatrix}
$$

e.g. *informacja* /inf−/ → [iw̃f−], *kunszt* 'art, craft, skill', *szansa* 'chance', *pan sam* 'you yourself, sir', *konwój* 'escort', *nimfa* 'nymph', *triumf* 'triumph', *on wyszedł* 'he left'. In lento style, gliding is constrained to apply

after mid vowels /ɛ/ and /ɔ/, e.g. *czesty* /tšɛnsti/ — [tšɛw̃sti] 'frequent', *maz* /mɔnš/ — [mɔw̃š] 'husband'.

The last rule which should be mentioned for our purposes is the obligatory rule of Vowel Nasalization, which reapplies phonostylistically whenever the proper environment is created:

$$(E) \quad V \rightarrow [+ nas] \bigg/ \underline{\quad} \begin{bmatrix} + cons \\ - syll \\ + nas \end{bmatrix} C$$

The right-hand environment implies that (E) applies before a nasal semi-vowel glide followed by a consonant. It reapplies, then, after the phonostylistic rule (D) has applied and thus produces nasal diphthongs, as in the word *informacja* /inf – / — [iw̃f –] — [ĩw̃f –].

1.2. The experiment

The above sets of Polish and English rules either demonstrate some overlap in their scope of application or differ completely. Thus, interference is expected in the predictable environments. In order to test the predictions, recordings of specially prepared texts were made of Polish speakers representing different levels of competence in English: students of English philology, students of other faculties studying English, and grammar school pupils. Another source of evidence — in fact the most natural evidence — were notes taken down while listening to Poles talking English in casual speech situations.

All the materials used in the experiment were so constructed as to divert subjects' attention from the control of pronunciation during their performance. Here are some examples:

(a)   Two sets of words and phrases to be read as quickly as possible one by one, every item being written on a separate slip of paper and chosen at random by subjects in order to prevent visual preparation for reading the next word (which is possible in the case of a list of words):

   (i)   *answerable, lenses, Bonsor, anthological, apprehension, chancery, conversational, nymph, transitional, Princeton, pence, fancy, mention, envious, comfort, emphasize, confuse*, etc. (50 words);

   (ii) *lean Negro, John needn't, fashion jeans, thin genius, ten cheers, green Neal, a plain needlework*, etc. (20 phrases).

(b)   Set (i) above was also used as a set of clues for making up sentences.

(c)   A set of Polish words for immediate translation (used only with advanced speakers): *starożytny* 'ancient', *hymn* 'anthem', *Antoni* 'Anthony', *rak* 'cancer', *sens* 'sense', *taniec* 'dance', *płot* 'fence', *ołówek* 'pencil', *rencista* 'pensioner', *czuły* 'sensitive', *spółgłos-kowy* 'consonantal', etc. (50 words).

(d)   Derivation of at least one word of the same word-family as: *emphasis, confess, present, demonstrate, transit, represent, censor*, etc. (20 words).

(e)   Noun-verb pairs to be read, where a different stress assignment decides the membership of a given word in the class 'Noun' or 'Verb':

Noun	*Verb*
transport	to transport
conflict	conflict
insult	insult
convert	convert
increase	increase

etc. (16 pairs)

(f)   Four texts to be read with different instructions in each case, e.g. a text to be read fluently but with as much understanding as possible, or a text to be read as quickly as possible.

1.3. Results

Analysis of the data thus collected indicated that generally, interference does occur in the predictable environments. One can observe, however, differences in the frequency of its occurrence. Rules (D) and (E), i.e. phonostylistic gliding and Vowel Nasalization, interfere in the most conspicuous way, e.g. in *emphasis* [ẽw̃f –], *sense, chance, transition, concentric, transport*, etc. The interference of rule (C) is of a lesser magnitude, e.g. in *thin genius* [– ŋ dʒi: –], i.e. [ŋ] as palatalized and *lean Jean*, although it is traceable. Least detectable seems to be the interference of rules (D) and (E) across word boundaries, as in *in family*.

1.3.1. Discussion of the status of the interfering rules with reference to cyclicity

First, the representation which constitutes a starting point for the operation of phonostylistic rules has to be established. One possibility is to allow the output of all obligatory phonological rules in slow, monitored and articulate speech to feed phonostylistic rules. The representation consisting of such outputs has been called a Generalized Phonetic Representation – GPR (see Rubach 1974). However, there exists another possibility which seems to be better motivated on psychological grounds. Consider the following derivation:

Underlying representation	kæmp	pınk	ın`kʌrıdʒ
Deep phonological rules			
(here intrasyllabic nasal			
assimilation)	–	pıŋk	–
Phonemic representation	kæmp	pıŋk	ın`kʌrıdʒ
Phonostylistic rules			
(style dependent)	–	–	ıŋ`kʌrıdʒ
late phonetically motivated			
rules	kʰæ̃mp	pʰĩŋk	
			⌃
Phonetic representation			ın`kʰ or ıŋ`kʰ

Both allophonic and phonostylistic rules seem to apply to the same representation – called 'phonemic' in the above derivation. While the application or non-application of phonostylistic rules is determined by the choice of style – i.e. by the tempo and casualness of speech – allophonic rules apply no matter what style has been chosen. Moreover, both allophonic and casual speech rules share the property of being postlexical, i.e. deriving phonetic outputs from phonemes (Dressler 1984, 30). Therefore, the representation symbolically called 'phonemic' is assumed to constitute a 'feeding' ground for phonostylistic rules (see Sobkowiak 1985 for an elaborated treatment of this issue).

1.3.2. The notion of 'derived environment' (Rubach 1981) refers either to the presence of a morpheme boundary or to the result of the application of an earlier rule on the same cycle. There seems to be no evidence, however, for the application of Polish phonostylistic nasal assimilation rules to derived environments (see below).

There were no data with which to test the status of the rules discussed with respect to a 'block application' principle. The comparison with obligatory (lento) rules whose status has already been determined proves the lack of any interaction or interdependence between them and the phonostylistic rules concerned. This may be confirmed by examples like the derivation of *kunszcik* (a diminutive of *kunszt* 'art, skill, craft'):

	kunszcik	
UR	– unšt + ik	
	unšt + ik	
	unštç + ik	Anterior Palatalization
Phonemic representation	unštçik	
	uw̃š	Phonostylistic Nasal Gliding
	ũw̃š	Vowel Nasalization
Phonetic representation	kũw̃štçik	

As the above example shows, the application of Anterior Palatalization, which is cyclic, does not have any influence on the application of the last two rules. The ordering of the above rules appears to be dictated by two factors:

(i)   it follows our earlier assumption about the so-called 'phonemic' representation being the input to both phonostylistic and allophonic rules;

(ii)   it is consistent with the principle of Strict Cyclicity which says that rules applying to nonderived forms (here morpheme internally) are postcyclic.

The second statement is reaffirmed by numerous examples where Polish rules (C), (D) and (E) keep applying morpheme-internally or across a word boundary:

(a)   morpheme-internally

konwencja	'convention'
– ɔnv –	phonemic representation
ɔɲv	rule (C)
ɔw̃v	rule (D)
ɔ̃w̃v	rule (E)
konferencja	'conference'
– ɔnf –	phonemic representation
ɔɲf	(C)
ɔw̃f	(D)
ɔ̃w̃f	(E)
kanwa	'ground-work'
– anv –	phonemic representation
aɲv	(C)
aw̃v	(D)
ãw̃v	(E)

(b)   across word boundary

on gimnastykuje sie[4]	'he is exercising himself'
– n##gi –	phonemic representation
ŋ##gi	(C)
ŋ##g´	Surface Palatalization
ŋ´##g´	detailed assimilation

Thus, the interfering rules of both careful and casual speech (lento and allegro) exhibit postcyclic status.

1.4.   How does CP's prediction about the postcyclic status of interfering

rules further our understanding of the mechanisms of second language acquisition?

Applying to non-derived forms, postcyclic rules do not require any knowledge of a deep morphological structure of a language (except for word boundary recognition); this is why they transfer so easily into the L2 learner's productions. This fact, however, does not permit any inferences about the mechanism or stages of acquisition. In particular, CP does not specify the manner of acquisition of cyclic and/or postcyclic rules by the L2 learner (consciously learned? automatically internalized?); it does not answer the question of whether there is any relationship between the non-interference of a native cycle and the acquisition of the foreign one; it does not say whether various types of rules working within cyclic and postcyclic blocks are acquired with an equal ease by the L2 learner (e.g. allophonic vs. phonostylistic rules within a postcyclic block). Neither does CP specify the prospects of total success in L2 acquisition.

Consequently, although cyclic phonology supplies the theory of interference with a comprehensive formal description of the interfering vs. non-interfering rules, it is not explanatory with reference to the process of L2 acquisition, the intricacies of which manifest themselves in language interference.

The above constitutes a criticism of CP only in respect of the requirements put forward with regard to phonological theories in the introduction to this paper. More specifically, CP's formal prediction concerning first language interference, namely that it is postcyclic rules that are expected to interfere, does not encourage one to draw any possible conclusions as to the way the learner copes with his native language interfering rules and new rules of a second language. As will be demonstrated below, NP appears to be a more satisfactory framework in this respect.

2. NATURAL PHONOLOGY AND SECOND LANGUAGE ACQUISITION

2.1.   The distinction underlying the NP theory is a distinction between processes and rules. Manifesting itself in language acquisition, the distinction seems to be 'naturally'[5], psychologically motivated. The child is born with the innate phonological system of natural universal processes in his mind and, consequently, is potentially able to acquire any language. Being a member of a given language community, however, and thus exposed to a given language, the child adapts his system to that language by gradual limitation, ordering or even suppression of the original universal processes. In addition to the selected processes, the mature system also contains learned morphonological and morphological rules which govern phonetically unmotivated alternations (e.g. English velar softening, Great Vowel

Shift rules, and umlaut rules of contemporary Germanic languages).

The processes are aimed at the communicativeness of language, i.e. its pronounceability and perceptibility. Therefore, they are either dissimilatory clarification processes (fortitions) serving perceptibility (for example diphthongization, insertion, lengthening and strengthening), or assimilatory obscuration processes (lenitions) serving pronounceability (for example shortening, weakening, centralization, deletion, fusion and assimilation). Processes are either prelexical or postlexical (Dressler 1984), the latter deriving phonetic outputs from phonemic representation and, thus, including (in Linell's (1979) terminology) perceptual redundancy rules and articulatory reduction rules − traditionally 'allophonic' and 'phonostylistic' rules − which correspond to postcyclic rules. As for the ordering in NP, rules apply before processes and fortitions before lenitions.

With reference to speech variation it is easily predictable that it is context-sensitive[6] obscuration processes that are expected to apply in casual speech: in casual situations speakers do not aim at perceptibility so much as in formal settings.

2.2. The theoretical framework sketched above is easily applicable to the situation of an adult L2 learner. His phonological system is much reduced in comparison with that of a child, and comprises only selected processes and underlying representations together with learned rules. It is this native system that is confronted with foreign language requirements. Native processes are subconsciously applied by the learner to L2 strings, which results in interference unless a native process happens to be identical with one selected to operate in L2. When the L1 system of the L2 learner lacks some process operating in L2, he has to learn it, just as he learns the L2 rules.

The above acquisition procedure refers both to formal and casual speech situations, the only difference being that phonostylistic processes are more prone to interfere as they are phonologically less constrained and applicable to the most natural and least controlled style of speech.

2.3. Both Polish and English phonostylistic assimilations are assimilatory obscuration (lenition) processes. Similarly, both languages manifest prelexically a context-free dissimilatory clarification (fortition) processes of vowel denasalization which is responsible for the lack of nasal vowel segments in the underlying representation of these languages.

Lenitions tend to generalize in casual speech since it is then that they best fulfil their aim to ease articulation. This is also the case with the nasal assimilations concerned, which are generalized versions of corresponding slow speech processes (some of them possibly expressing phonotactic constraints). For example:

English

process (A)	Lento	bæŋk		inˈkʌrɪdʒ
	Allegro	bæŋk	but	iŋˈkʌrɪdʒ
process (B)	Lento			nɪmf
	Allegro	–		nɪɱf

Polish

process (C)	Lento	baŋk		pan buk
	Allegro	baŋk	but	pam buk
processes (D)	Lento	tʃɛ̃w̃sti		ʃansa
and (E)	Allegro	tʃɛ̃w̃sti	but	ʃãw̃sa

In accordance with theoretical predictions, the following behaviour is demonstrated by the Polish phonostylistic nasal assimilations in the L2 learner's performance of English:

(i)   process (C) derives correct outputs before stops and nasals, which happens to form the environment of English process (A); the remaining environment of (C) leads to interference in English;

(ii)   processes (D) and (E) interfere in their whole domains, as there is no corresponding process operating in English;

(iii)   the correct output of the English process (B) may be partly obtained due to (C) (labiodental fricatives in the environment), although most frequently (C) is immediately followed by Polish (D) and (E), causing interference;

(iv)   as for the bilabial semivowel /w/ in the environment of (B), there is no corresponding process in Polish in such an environment, the result of this gap being negative interference – the Polish learner does not apply the process not present in his system (unless of course he manages to learn it).

3. COMPARISON OF THE TWO APPROACHES WITH REFERENCE TO SECOND LANGUAGE ACQUISITION

3.1. Does NP answer questions concerning L2 acquisition which are not addressed by CP?

NP's formal prediction concerning the interference of first language processes, and not rules, into the L2 productions of the learner immediately

leads to a statement about L2 learner's behaviour in the course of acquisition: the learner has to learn L2 processes which are absent in his native system, and to suppress interfering native language processes. Still more importantly, the above statement appears to be falsifiable within the framework of NP itself on the basis of external evidence, i.e. on functional grounds. There is some evidence, for instance (cf. Dziubalska-Kołaczyk 1984), that L2 processes do apply in a learner's slips of the tongue in L2 speech. This should not be the case in the light of the basic NP prediction: even if the learner is quite successful in consciously learning L2 processes, he cannot control their application in unconsciously made slips.

The data on slips prompts one to hypothesize a different explanation of the L2 acquisition process than that originally suggested within the NP model. It might be argued, for instance, that some of the processes which potentially exist in the child's brain and become latent when first language acquisition is finished, may be either reactivated in the adult's brain by his persistent and conscious learning, or naturally disinhibited (suppressed). The question is, which processes are susceptible to reactivation? Those, perhaps, which have a 'universal' phonetic conditioning, i.e. which originate from process types which are not totally suppressed in the two languages in question?

Another possibility is that the learner learns an L2 process as a rule, and his success is complete, so that he applies the process correctly in all contexts. This, however, is not very convincing.

A further possibility is that an L2 process, although reactivated in the learner's brain, is incorrectly constrained by him in L2 speech.

The answer will depend on the results of an extensive programme of contrastive research, which has been started by the present author using Polish-English material.

3.2. Let us have a brief look at Rubach's (1983) analysis of the interference of some Polish palatalizations in English, in order to see whether the cyclic explanation is indispensable here.

The clusters /ni/ vs. /ti/, /di/, /si/ are rendered differently by Polish learners of English: /ni/ is replaced by [ɲi] in words like *university, need, morning*, while /ti/, /di/, /si/ remain unchanged (except for some traces of surface palatalization in for example *teacher, seem, deem*). This phenomenon is accounted for by Rubach as follows.

In Polish, prepalatals in words like:

cichy	/tɕix + i/	'silent'
dziko	/dʑik + o/	'wildly'
zima	/ʑima/	'winter'
siwy	/ɕiv + i/	'bold'

are underlying segments, and not derived by Anterior Palatalization (the

standard generative phonology view) like those in

  bacik   [batɕ+ ik] from /bat + ik/   a diminutive of 'whip'
or *lisi*   [l'iɕ+ i]   from /lis + i/   'foxy'
This is because Anterior Palatalization is cyclic and thus does not apply
morpheme-internally.

[ɲi] in *nigdy* [ɲigdi] 'never', however, also assumed to be derived by An-
terior Palatalization by standard GP, is according to Rubach due to the ap-
plication of Nasal Palatal Assimilation[7]:

$$
\begin{bmatrix} +\text{nas} \\ +\text{coron} \\ +\text{ant} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{high} \\ +\text{ant} \end{bmatrix} \Bigg/ - \begin{bmatrix} +\text{high} \\ +\text{son} \\ -\text{back} \end{bmatrix}
$$

which turns /n/ into [ɲ] in front of /ɲ/, /i/ and /j/. Being postcyclic, the
rule is the source of interference in English *university, need*, etc., as opposed
to cyclic Anterior Palatalization which cannot interfere in *teach, deem,
seem*. NP might posit in this case a different explanation which is nearer to
psychological reality. Nasal Palatal Assimilation (like Surface Palataliza-
tion) is an assimilatory process which represents a constraint on pronounce-
ability and, as such, is automatically transferred into English. Prepalatals
in Polish *cichy, dziko, siwy*, and *zima* are not due to any constraint on
pronunciation (or perception), as Poles can simultaneously produce *tik* [tik]
'tick', *Tirana* [tirana] 'Tirana', *TIR* [tir] (abbr.), *dinozaur* [di –]
'dinosaur', *sinus* [si –] 'sinus' and *Zinn* [zi –] (a proper name). The exis-
tence of prepalatals morpheme-internally in Polish is, then, the effect of
learning. Therefore, they do not appear in English *teach, deem*, etc. in
Poles' productions.

4. We may conclude that, firstly, phonological rule typology is of a prime
importance in building up a theory of second language acquisition, and, se-
condly, the framework of Natural Phonology is found superior to the cyclic
model of phonology in this respect.

NOTES

1. The term *phonostylistic* is used here to denote the type of speech used in casual situations
(thus informal and, usually, fast). However, the author is aware that casual speech need not
be fast (Zwicky 1972) and that the degree of formality and the tempo of delivery are the most
indicative but by no means the only parameter of this type of speech (which is assigned differ-
ent names in the literature, viz., 'casual', 'rapid', 'fast', or 'allegro' speech).
2. Cf. Stampe (1979, note 21).
3. An accentual measure, as defined by Donegan and Stampe (1978), extends from a primary
or secondary stress to the end of the word or up to the next stress.

4.   The order of Surface Palatalization, which is postcyclic, and rule (C) is irrelevant: the output will not change.

5.   See Dressler (1981) for possible definitions of this term.

6.   Processes are either context-free (e.g. vowel denasalization), or context-sensitive (e.g. vowel nasalization). Their contrary teleologies are manifested in the ordering: it is mainly context-free processes that govern UR, and context-sensitive ones that govern the surface; this order maximizes the paradigmatic distinctness of underlying segments and minimizes syntagmatic difficulty in connected speech (see Stampe 1979).

7.   Rule (13) in Rubach (1983).

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