

PRACTICAL THEORY:
EFFECTS OF POSTLEXICAL RULES ON
SECOND LANGUAGE PRONUNCIATION*

Thomas Purnell

For some time, the literature on the subject of language teaching has pointed out that language teachers have a tendency to shy away from linguistic theory (Tarone, 1987; Grabe, 1992). Like Hammerly's (1973) assessment of generative phonology, linguistic theory has put on a face of abstractness that appears to be irrelevant to language teachers and learners. Even if one does allow linguistic theory to impact language teaching, one will observe that the theories employed are fairly dated, (Grabe, 1992). Nevertheless, this paper will propose that current linguistic theory does assist in targeting and improving teaching methods. (See Hironymous (this volume) and Leahy (1980) for examples of theory impacting teaching methodology.)

One theory of present interest to linguists is the theory of prosodic features or rules of postlexical phonology. Consider the English words in (1) said in isolation.

- (1) [æD] add
[æt] at

Spoken in a some select environments by a native speaker of English in conversational speech, *at* becomes [æD], as in (2).

- (2) [æD] ease
[æD] all
[æD] open windows
[æD] umbrellas
[æD] ice
[æD] owls

*[æD] toys
*[æD] boxes
*[æD] cars
*[æD] some windows
*[æD] lone sharks
*[æD] no time

If native speakers know when to flap and if it is a goal of non-native speakers to use native-like pronunciation whenever possible, then teachers would teach postlexical rules, such as flapping. It is the claim of this paper that a knowledge of prosodic feature theory can significantly impact teaching pronunciation of items like those in (2). First, the theory of prosodic or postlexical rules of phonology will be summarized. This will be followed by an examination of the issues in second language pronunciation that pertain to teaching pronunciation, and finally, methodological predictions will be made.

Postlexical phonology

Postlexical phonology is often considered to be the component of phonology that deals with phrasal rules and constructions, in contrast to the lexical component which is often the realm of word formation rules. By way of an overview of postlexical phonology, one must know what distinguishes the postlexical rules from lexical ones. Three groups of characteristics provide the necessary differentiation: rule environment attributes, qualities of

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rule output, and the nature or application method of rules.

First, rule environment attributes of the phonology of all languages, as the theory currently stands (cf. Kiparsky, 1982; Mohanan, 1982; Selkirk, 1984; Kaisse, 1985; Halle & Mohanan, 1985; Rubach, 1985; Nespor & Vogel, 1986; Rice, 1990; Vogel, 1991), can be divided into several prosodic divisions: the syllable (σ), the foot (Σ), the phonological word (ω), the clitic group (C), the phonological phrase (ϕ), the intonational phrase (I), and the utterance (U) (3). These domain classifications can be grouped into a lexical component (domains through the phonological phrase) and a postlexical component (domains through the utterance).

(3)		
syllable		[place] _σ
foot		irre[placeable] _Σ
phonological word		[irreplaceable] _ω
		[outboard] _ω motor
clitic group		[haven't] _C
phonological phrase		[haven't seen] _φ
		[John's [outboard motor] _φ] _φ
intonational phrase		[haven't seen John's outboard motor] _I
utterance		[[[several] _φ [potential buyers] _φ][[haven't seen][John's outboard motor] _φ]] _U

Rules affecting both segmentals and suprasegmentals apply with respect to the domains within both subcomponents of phonology in three ways (Selkirk, 1980; Nespor & Vogel, 1986). First, *domain span* rules apply within domains, as in (4) (=Nespor & Vogel's [10]). Secondly, *domain juncture* rules apply across domains, as in (5). Finally, *domain limit* rules apply at the edge of domains, as in (6).

- (4) Domain span:
 $A \rightarrow B / [\dots X _ Y \dots]_{\omega}$
 e.g. Glottalization (optional)
 $t \rightarrow ?$
 $[bo[?]le]_{\omega} \sim [bo[t:]le]_{\omega}$
- (5) Domain juncture:
 i) $A \rightarrow B / [\dots [\dots X _ Y]_{\omega} [Z \dots]_{\omega} \dots]_{\omega}$
 ii) $A \rightarrow B / [\dots [\dots X]_{\omega} [Y _ Z \dots]_{\omega} \dots]_{\omega}$
 e.g. Flapping
 $t \rightarrow D / _ [-cons]$
 $[[a[t]]_{\omega} [ease]]_{\omega}]_{\phi} \sim [[a[D]]_{\omega} [ease]]_{\omega}]_{\phi}$
- (6) Domain limit:
 i) $A \rightarrow B / [\dots X _ Y]_{\omega}$
 ii) $A \rightarrow B / [X _ Y \dots]_{\omega}$
 e.g. Aspiration
 $[-voice, -cont, +cons] \rightarrow [+asp] / [_ \dots]_{\omega}$
 $[[t^h]ick]_{\omega}, [p^h]ick]_{\omega}$

Because some postlexical rules appear to apply within a word, it can be difficult to

conceptualize the division between lexical and postlexical domains. The current theory claims that rules are not classified as solely lexical or postlexical, but are classified by the last domain in which they apply. Rules are available for application at the most restricted, or smallest, domain prior to any derivations. While no new rules can be added to the derivation, rules can cease to apply at any time. This aspect of rule application has been labeled the Strong Domain Hypothesis (SDH), spelled out in (7).

- (7) *Strong Domain Hypothesis (SDH)*: The grammar may stipulate merely where a rule ceases to apply. All rules are potentially applicable at the first level of the lexicon, and apply there provided only that the principles of the grammar permit it; at lower levels of the lexicon and in the postlexical phonology rules may be *turned off* but no new ones may be added (Kiparsky, 1984; Rice, 1991).

The advantage of the SDH is that rules such as voicing assimilation (8) which apply in both the lexical and postlexical components can be accounted for. The rule commences at the outset of the derivation process (9a) and continues into the postlexical component (9b). Flapping, in (1) and (2), may appear to violate the SDH in that the rule only occurs postlexically; however, a word such as *lattice* (la[D]ice) shows that flapping applies lexically as well as postlexically.

- (8) *Voicing Assimilation*
[-son] → [αvoice] / [... [αvoice] ____ ...]_b

- (9) a. cat[s] b. Matt'[s] here.
 mall[z] Bill'[z] here.
 nos[ɪz] Rose'[ɪz] here.

Second, postlexical rules can be distinguished from lexical rules by their output. The resultant form that a word or phrase takes is distinctive as to whether or not the output is a lexical exception, and whether or not its structure was maintained. Postlexical rules prohibit lexical exceptions. For example, the English aspiration rule in (6) will always yield the same phonetic result, application after application. Structure preservation is a claim that only phonological forms included in the initial inventory of sounds will be used in the lexicon. However, it is possible for a novel form to be created in the postlexical stage. For example, flapping in (5) is a postlexical rule in English, since a flap [D] is not a part of the initial phonetic feature set.

Third, phonological rules of the lexicon are separated from the postlexical rules in the nature or application method of the rules. In both the lexicon and postlexicon, phonologists have observed distinct levels on which rules apply. Ordering is typically the method by which rules are discussed with respect to levels (Halle & Mohanan, 1985), probably due to the ease with which some rules block other rules (bleeding) or set up an environment for another rule to occur (feeding) (Kiparsky & Menn, 1987). Although it is not within the scope of this paper to deal with lexical processes, it is important to note that the lexical levels have been shown to correspond to morphological activity. This lexical relationship between morphology and phonology can be characterized by two kinds of cycles: those within a stratum and those between stratum. Looping within stratum, or intrinsic cyclicity, accounts for the occurrence of multiple lexical rules within one layer (e.g. $\Phi \rightarrow M \rightarrow \Phi \rightarrow M \rightarrow \text{etc.}$, Kaisse & Shaw, 1985:20), contributing to the Strict Cycle Condition, as formulated in (10) (=Kiparsky's, 1985 [47]).

(10) *Strict Cycle Condition (SCC):*

a: Cyclic rules apply only to derived representations.

b: Def.: A representation ϕ is *derived* with respect to rule R in cycle j iff ϕ meets the structural analysis of R by virtue of a combination of morphemes introduced in cycle j or the application of a phonological rule in cycle j.

This rudimentary method of dividing the rule domains between the lexical and postlexical components by considering that only the domains from the phonological word down to the syllable can be impacted by morphological affixes, and thus, by the SCC, leads to the assertion that postlexical rules apply in a non-cyclic manner. Where phonology responds to morphology in the lexicon, syntax influences the postlexical stratum, although the domains are not necessarily isomorphic with the phrasal syntax. Even though postlexical rules are noncyclic, after the rules apply the phrase formation process proceeds to the following stratum, erasing any residual brackets of previous morphological applications.

Prior to proceeding, one additional comment needs to be made regarding the different types of postlexical rules. The primary distinction between phonological rules in the postlexical subcomponent is that some rules are non-obligatory. For instance, pausing can separate domains and prevent domain juncture rules from applying. This rule attribute divides the corpus of postlexical rules into a group that applies obligatorily (e.g., English Aspiration in (6)) and those rules that are non-obligatory (e.g., English Glottalization in (4)).

In sum, postlexical rules of the phonological component can be distinguished from those rules of the lexicon in a number of ways. Postlexical rules are phonological rules which apply in domains up through the utterance, do not permit lexical exceptions, do not have to preserve segmental or suprasegmental structure, and may be non-obligatory.

Language acquisition

In order for second language learners to successfully acquire postlexical rules, an effective means of examining the effect that postlexical rules have on second language acquisition, and the other way around, is by looking at a speaker's performance and competence. Intuition and research support the claim that performance and competence are not identical in both first and second language learners (Brown, 1987; Goodluck, 1991).

Performance is everything. To some speakers, native-like pronunciation improves their self image as they successfully communicate with others, while to other speakers who prefer not to generate native-like speech, production is a key to distinguishing their identity (Tarone, 1987). To listeners, improved production increases understanding and communication (Hinofotis & Bailey, 1980).

While good speech production has a positive effect on the language learner, the implications of the Critical Period Hypothesis (CPH) seems to discourage the teaching of pronunciation. The CPH claims that after puberty native-like pronunciation is impossible (Scovel, 1969; Seliger, 1978). Although some researchers have attempted to debunk the theory (Flege, 1987; Neufeld, 1980), the CPH is widely accepted. Above all, in spite of the CPH and a host of other factors, the learner's success is primarily dependent upon him/herself.

The CPH, though, should not daunt one's efforts to teach pronunciation. Although native-like speech may be impossible, it is not unapproachable. Several studies show, and teaching materials reinforce, that pronunciation should hold a prominent place in a teacher's repertoire (cf. Leahy, 1980; Neufeld, 1980; Dickerson, 1983; Pica, 1985; Stevick, 1988; Celce-Murcia & Goodwin, 1991; Leather & James, 1991). Near-native-like production is attainable due primarily to the learner's competence.

All other things being equal, a second language learner's competence is characterized by his/her learning strategies and the speech production process. Dickerson (1983) claims

that most adult learners of English can, and are used to using, some form of linguistic metalanguage.¹ Consciousness of the rules of language is indicative of adult language abilities rather than of child language. As Brown (1987) points out, adult learners use whatever tools are made available to them. Some available tools are developed while learning a first language. For example, Bailey, Madden and Krashen (1974) claim that second language morpheme acquisition mirrors first language morpheme acquisition (Brown, 1973; de Villiers & de Villiers, 1973; Dulay & Burt, 1974).

First language cognitive strategies assist second language learners (Crookes, 1991). Fromkin (1971) established that a language learner undergoes a process or progression leading to phonological realization from the utterance to intonation to derived lexical items to morphology, as in (11). This claim is supported by the observation that children can use correct intonation while exhibiting problems with segments (Goodluck, 1991).

- (11) *Utterance generator* (from Fromkin, 1971:50)
- Stage 1: Meaning is conveyed.
 - Stage 2: Meaning is syntactically structured.
 - Stage 3: Intonational contour is applied.
 - Stage 4: Lexical units are assigned.
 - Stage 5: Morphology is added.
 - Stage 6: Articulation.

Implications

Postlexical phonology is impacted by a second language learner's competence and performance. Specifically related to the second language acquisition of postlexical rules, first language phonology rules have been shown to interfere with second language phonology rules. Rubach (1984) found that first language obligatory rules which do not permit exceptions (i.e., rules found in one subsection of the postlexical phonology) may cause interference with similar rules in the second language. For instance, Polish speakers learning English pronounced *tours* as [tuwers] as a result of applying the late postcyclic rule in Polish of Glide Insertion to their second language (1984:46). Fortunately enough, this interference has been found to predominate at the beginning of the second language learning process but begins to decrease later on (Major, 1987). In addition, there have been several studies regarding speech rate and intonation, both postlexically governed attributes.

First, speech rate impacts second language acquisition in that the slower the speech (as a result of attention to formality) the less interference becomes a factor (Major, 1987). Intuitively, at least, lenitions (i.e., segment deletions for the purpose of ease of articulation) would be more likely to occur at a faster rate than at a slower rate of speech. Research by Griffiths (1990) supports intuition, showing that a moderately fast rate of speech impedes comprehension. One example of conflicting research, probably due to faulty implications,

¹This point is not to be taken lightly. Hammerly discounts the effectiveness of generative phonological theory on a second language student because, as he claims, "the second language student who wants to acquire good pronunciation needs ... not to speculate about the mental processes involved in the production of sounds" (1973:488) and that "exercises in derivation are useless for the second language learner, who need not concern himself with underlying or base phonological forms ..." (1973:489). While it is possible to acquire a great deal of language without the assistance of rules, bringing rules to students' attention is not counter-productive. Sherri Purnell (personal communication) informs me that her four- and five-year old kindergartners use diacritics (a form of linguistic metalanguage) in learning to distinguish between short and long vowels. It would seem not only conceivable but appropriate, then, to teach adult second language learners pronunciation using linguistic metalanguage.

has claimed that speech rate is not a factor in second language acquisition. Blau (1990) makes the claim that varied speech rates, either mechanically or naturally controlled, do not affect acquisition. While the findings of this particular study only support mechanized rate fluctuations, there is some evidence, as Weinberger (1992) point out, that a faster speech rate may actually assist second language acquisition.

Second, intonation, which is suprasegmentally layered over syntactic and semantic structures, has been found to influence second language learning in a critical fashion (Lepetit, 1989). Both, Backmann (1977; cited in Tarone, 1987), and Leather and James (1991) claim that intonation goes beyond first language interference and into the interlanguage of a learner's postlexical phonology that does not belong to either the first or second languages.

Since postlexical phonology is impacted by a second language learner's competence and performance, postlexical phonology also impacts second language teaching methodology. First of all, if teaching rules is useful (Dickerson, 1983), and if teachers should begin with suprasegmentals to set the stage for segments (Morley, 1987; cited in Murphy, 1991), then a teacher instructing students on rules of prosodic domains would, it is surmised, begin to be more effective in pronunciation drills.

The progression for teaching pronunciation rules, then, should follow Fromkin's progression in (11), beginning with utterance level rules, then intonational rules, phrasal rules, and so on to the morphology, as in (12).

(12) *Order for teaching pronunciation rules.*

- Stage 1: UTTERANCE LEVEL: Meaning is conveyed.
- Stage 2: INTONATIONAL LEVEL: Meaning is syntactically structured and intonational contour is applied.
- Stage 3: PHONOLOGICAL PHRASE LEVEL: Lexical units are assigned.
- Stage 4: WORD-INTERNAL LEXICAL LEVELS: Morphology is added.
- Stage 5: SEGMENT LEVEL: Articulation.

This model would follow a progression from the largest domain to the smallest domain, thereby prioritizing postlexical rules over lexical ones. Consequently, flapping would be taught prior to rules which deal with the addition of morphology. The model, though, is wholly untested, and one would need to assume that some lexical rules would be included in the postlexical rules since they apply until they are turned off, that some segmental instruction may be necessary, such as minimal pair drills.

Since interference occurs between first and second postlexical phonological rules, teachers are at a methodological advantage if they are aware of the rules in their students' first and second languages. As Celce-Murcia and Goodwin (1991) point out, possessing knowledge of the students' first language(s) and performing a simple contrastive analysis between the first and second languages can assist in matching the most effective teaching method with the students' level of second language development. An added benefit of being aware of what is happening in both first and second languages can, as Vogel (1991) observes, is that second language phonology can provide information into first language phonology.

This paper has suggested that possessing a knowledge of linguistic theory can make language teaching methods more effective. Although the model in (12) appears to be bent in the right direction, it needs to be thoroughly tested. As Leather and James (1991) point out, most research has been done with regard to morphophonemics. Hopefully, this paper has demonstrated that research should be conducted on second language and interlanguage postlexical phonology.

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