TOWARDS A PEDAGOGICAL CONTRASTIVE PHONOLOGY

Wiesław Awedyk

Adam Mickiewicz University, Poznań

1. Since the publication of *The sound pattern of English* (Chomsky and Halle 1968) generative phonology has undergone a number of modifications and it is now represented by a variety of models like (1) Upside-down phonology (Leben 1977), (2) Atomic Phonology (Dinnsen and Eckman 1977), (3) Autosegmental Phonology (Goldsmith 1976), (4) Natural Generative Phonology (Hooper 1976; Vennemann 1974). Generally speaking, these models have drifted away from the abstract systematic phonemic level of the Chomsky-Halle type, e.g. Hooper's (1976 : 155 - 156) analyses look almost like taxonomic phonology. Similarly, Crothers and Shibatani's phonology "is closer to Praguian conception than to generative phonology" (Crothers and Shibatani 1975 : 526). The more abstract model still has its followers (cf. Kenstowicz and Kisseberth 1977) in spite of very discouraging results in the search for evidence to support the existence of abstract underlying representations (cf. Ohlander 1976). In my opinion there is enough evidence to reject the abstract systematic phonemic level as psychologically, and therefore also pedagogically, unmotivated. The model of Pedagogical Contrastive Phonology presented here is based on a more concrete phonemic representation level which finds strong support from experimental evidence.

2.1. Chomsky and Halle maintain that the abstract phonemic representations (and implicitly the phonological rules) they postulate "underlie their [i.e. the speaker and the hearer] actual performance in speaking and 'understanding' "(Chomsky and Halle 1968 : 14). Generative phonologists have presented various types of evidence to support this claim, e.g.

(a) language change (Kiparsky 1968a, 1973)
(b) the adaptation of loan words (Hyman 1970)

(c) understanding of other dialects (Chomsky and Halle 1968; Stevens and Halle 1967)
(d) orthography (C. Chomsky 1970; Chomsky and Halle 1968)
(e) metrical evidence (Anderson 1973; Kiparsky 1968b, 1972)
(f) language games (Scherzer 1970)
(g) aphasia (Schnitzer 1972)
(h) slips of the tongue (Fromkin 1971)
(i) experimental evidence (Moskowitz 1973)

The arguments of generative phonologists were discussed in detail by Linell (1974), who demonstrated that the data provided no convincing evidence for the existence of the systematic phonemic level. All the problems can be given even more plausible solutions without any reference to an abstract phonemic level (Linell 1974 : 125 - 146; cf. also Awedyk in press) and generative phonologists themselves admit that there is very little evidence to support their analyses (cf. Kenstowicz and Kisseberth 1977 : 61).

2.2. Being unable to present positive evidence, generativists often claim that a theory is confirmed if it makes correct predictions and, consequently, such a theory mirrors the psychological reality. For example, Kiparsky (1968a : : 171) stated: "For many features of universal grammar there is justification enough in the fact that without them it would simply not be possible to write grammars that account for the sentences of a language".

The "how-else" argument is expressed either explicitly or implicitly by many generativists (cf. Botha 1971 : 125 - 127 for discussion). For example, Anderson (1973) discussed ǫ/a alliterations in Skaldic verse, e.g. ǫndurr "ski"/ /landi "land" (dat. sg.). Anderson concluded that the only possibility of explaining the ǫ/a alliterations would be to represent ǫ as a in the underlying representation, i.e. to derive ǫndurr from /andur+r/ (the ǫ in ǫndurr comes from an earlier a by the u-umlaut rule). Later poets do not, however, alliterate these two sounds and Anderson was forced to give an *ad hoc* solution for this. According to him, Snorri Sturluson "lost sight of the more abstract components of the grammar" (Anderson 1973 : 11) because he was influenced by the First Grammarian's taxonomic phonemics (cf. Haugen 1950) and Snorri Sturluson in turn influenced later poets. Anderson did not answer the basic question why the First Grammarian wrote a taxonomic and not a generative phonology of Old Icelandic.

The ǫ/a alliterations were possible in Skaldic verse since those two sounds were phonetically similar: ǫ was an a-sound with lip rounding. Around 1200, ǫ changed into [œ] and from then on it was not alliterated with [a] (cf. Heusler 1950 : 13). Thus the fact that Anderson's solution explains the ǫ/a alliterations does not mean that it is correct. Linell (1974 : 147) rightly argues: "A

theory can 'account for' observable phenomena correctly and be false at the same time. Inferring the truth of the antecedent from the truth of the consequent is a very elementary logical error". Moreover, since both the input, i.e. the underlying representations postulated by generativists, and the output are given, one can manipulate the rules in such a way that the model will always account correctly for all the utterances of a language.

3.1. The discussion of the ǫ/a alliterations in the preceding paragraph shows that it is practically impossible to demonstrate the existence of the abstract underlying representation level. It was hoped that experiments would validate the abstract analyses, for example, Moskowitz (1973) performed a number of experiments to test Chomsky and Halle's theory of the Great Vowel Shift. She worked with two groups of children, one aged 5 - 7, the other 9 - 12. The children were asked to form nonsense words according to the following patterns:

(1) [āy] ~ [ĭ]
(2) [īy] ~ [ĭ]
(3) [ēy] ~ [ĭ]

The subjects were instructed to form longer words than those they heard, as in the leading example: If I say [pāyp], you should say [pĭpiti], etc. Pattern (1) involves the rules of diphthongization, vowel shift, and laxing. In pattern (2) only two rules operate: diphthongization and laxing, and in pattern (3), three rules: diphthongization and laxing as well as an incorrect vowel shift rule /ī/ → /ē/, i.e. the rules /ē/ → /ǣ/ and /ǣ/ → /ā/ were not applied.

The older children had the least difficulty with (1), and (3) was less difficult than (2) for some children, while all three patterns were almost equally difficult for the younger subjects. One of the conclusions that Moskwitz drew from her experiments was as follows: "The vowel-shift rule is not separable from rules of tensing and diphthongization..." (Moskowitz 1973 : 249). She does not, however, come to the obvious conclusion that neither the underlying representation level nor the phonological rules of the Chomsky and Halle type exist and that [āy] simply alternates with [ĭ] in cognate forms on the phonetic representation level. Thus, contrary to Moskowitz's intensions, her experiments provide evidence against abstract analyses.

3.2. Similar experiments were performed by Steinberg and Krohn (1975). Their subjects were asked to form words by adding suffixes -ic, -ity, -ify, -ian to a base word, e.g. maze+-ic/-ity. Less than 4% of all responses showed the change of the vocalic segment as predicted by Chomsky and Halle (1968 : : 188) and 90% exhibited no change of the vocalic segment in novel derived forms. Steinberg and Krohn assert that, contrary to Chomsky and Halle's

hypothesis, the Vowel Shift Rule is non-productive in Modern English and consequently the abstract underlying representations are non-existent, too. In their opinion, teaching materials and techniques cannot, therefore, be based on Chomsky and Halle's analysis of English.

In Ohala's (1974) experiment, the subjects were requested to produce derivatives from *obtain* and *pertain* with suffixes *-ion* and *-atory*. Examples of the use of each suffix were first given to the subjects. When primed with *detain ~ detention*, 18 out of 26 subjects changed the stem vocalic segment in *obtain+-ion* from [ey] to [e]. When primed with *explain ~ explanatory*, most subjects left the stem vocalic segment unchanged, but 10 subjects changed it into [æ], i.e. [əbtænətəri]. Ohala concludes that this experiment shows the invalidity of the abstract underlying representation level and that the speakers form novel derivations by analogy to the known patterns, e.g. knowing the [k] ~ [s] alternation in *critic ~ criticize*, the speaker forms in one step *sputnicize* from *sputnik* (Ohala 1974 : 374).

3.3. The above experiments raise the problem of the productivity of phonological rules. Krohn (1972) suggests that there are degrees of productivity. For example, according to the Vowel Shift Rule, the alternation in *sane ~ sanity* is regular while the alternation in *detain ~ detention* (instead of **detantion*) is irregular. In the speech of children and language learners as well as in slips of the tongue "there is absolutely no tendency for the vowel shift rule to apply to *detain-|-ion*, thereby regularizing it to **detantion*" (Krohn 1972 : 18). His conclusion is that the Vowel Shift Rule is a minor rule in Modern English.

Native speakers of English regularly apply, however, the vowel alternation rule in derived forms like *sanity* from *sane* and a grammar English must account for native speakers' knowledge of those rules. Crothers and Shibatani (1975 : 156) suggest that they simply learn the two alternating forms independently (similarly Braine 1974 : 292 - 294). According to this hypothesis, native speakers have lists of pairs of words in their lexicons marked for a particular alternation, i.e. they have to know which alternation pattern a pair of words belongs to, in order to produce correct derivations and to avoid mistakes like **detantion*. Generative phonologists have not demonstrated how their abstract representations and phonological rules may be acquired, simply because they are not learnable (cf. Ohlander 1976 : 121).

4.1. A model of phonology based on Baudouin de Courtenay's theory (1894) accounts better for the native speakers' knowledge of their language than generative phonology. According to this theory, phonemes, defined both in articulatory and corresponding accoustic terms as psychological equivalents of sounds, as well as productive ("psychophonetic") phonemes alternations in related morphemes are psychologically real. There are two basic principles of his theory of alternations [all translations are mine — W. A.]:

(1) Strictly speaking, the alternating units ... are not phonemes but morphemes as language units indivisible from the semantic point of view. ... The phonetic alternation of morphemes is reducible to the alternation of single phonemes which are phonetic components of morphemes. Thus, there is an alternation between morphemes, on the one hand, and between phonemes which constitute morphemes, on the other" (Baudouin de Courtenay 1894: 237 and 238).

(2) Such a variation or alternation is neither a phonetic change in the present nor a historical succession. It is simply a case of phonetic difference between morphemes etymologically identified" (ibid.: 249; in the original the whole text is emphasized — W. A.).

The psychological reality of the taxonomic phoneme is well motivated (cf. Ohlander 1976 for discussion) both in non-pathological, e.g. in language acquisition (cf. Skousen 1975), and pathological language behaviour, e.g. in aphasia. Dressler (1977 : 52) points out that aphasic patients may substitute one phoneme for another but never one allophone for another allophone of the same phoneme. MacKay (1970) describes an interesting phenomenon of non--pathological stuttering when one phoneme occurs twice in the neighbourhood, e.g. *muss man* may become *m-muss man*. A similar phenomenon (masking) is the omission of segments under certain conditions, e.g. *Friedrich* becomes *Friedich* (MacKay 1969).

Phoneme alternations in related morphemes form a network of patterns and native speakers must learn those patterns and the members, i.e. pairs of words, of each pattern. The division is not simply into productive and non--productive alternations but they are hierarchically ordered according to functional load, frequency, etc. (cf. Baudouin de Courtenay 1894 for his classification). **The best motivated rules of alternation are those which are phonetically conditioned (cf. Crothers and Shibatani 1975: 516 - 526) since those rules are also most easily acquired by speakers.**

4.2. **The speaker's lexicon is not, however, a register of alternation patterns and lists of words which undergo a particular alternation, but it has a complex organization.** Fromkin (1971) postulates seven sub-parts of such a lexicon:

(a) A complete list of formatives with all the features specified, i.e. phonological, orthographical, syntactic, and semantic.

(b) A subdivision of phonological listings according to the number of syllables. This is necessitated by the fact that speakers can remember the number of syllables of a word without remembering the phonological shape of the syllables. This is also suggested by the fact that one can get a subject to produce a list of one-, two-, and three-syllable words.

(c) A reversed dictionary sub-component, to account for the ability of speakers to produce a list of words all ending in a particular sound or letter.

(d) A sub-component of phonologically grouped syllables, to account for the ability of speakers to form rhymes.

(c) Formatives grouped according to syntactic categories, to account for ... the ability of speakers to list nouns, or verbs, or adverbs on command, as well as the more important ability to form grammatical sentences.

(f) Formatives grouped according to hierarchical sets of semantic classes.

(g) Words listed alphabetically by orthographic spelling.

Furthermore, it seems plausible to assume that all these components must be intricately linked in a complicated network" (Fromkin 1971 : 237 - 238).

Linell (1974 : 49) suggests "that for each speaker there is one PCIS [Psychologically Central Invariant Structuring] for each word". He does not claim, however, that all speakers have the same PCISs (the structuring may depend, for example, on the style of speaking the speaker is confronted with) or that the PCIS is the only phonological structuring of a word. Similarly, M. Ohala's (1974) experiments show that speakers may store lexical items in different forms.

Naturally, it is not known exactly in what form the words are stored in the speaker's brain and how the rules of phoneme alternation operate and interact (cf. Arnoff 1976 for recent concepts of word formation in generative phonology). Well-planned experiments are needed to discover and describe the speaker's system of grammatical rules since not all processes are deducible from surface phenomena. Linguists will certainly profit from a co-operation with psychologists and neurologists and "linguistics will become more interesting if it can be shown to be relevant for psychology (and vice versa)" (Linell 1976 : 92).

5.1. Grammars should account for the complex network of phonological, morphological, syntactic, and semantic relations in language which both native speakers and foreign language learners are confronted with. The other solution is an elegant and simple description which will not account for processes underlying first and second language acquisition (cf. Awedyk 1976 : 53 - 54; Ohlander 1976 : 113 - 120). Pedagogical Contrastive Phonology, as a part of a Pedagogical Contrastive Grammar, will serve as a basis for selecting teaching materials and techniques. It will contain two sub-components:

(1) a phonological sub-component, i.e. a contrastive analysis of segments of the languages in question and their realization in words (allophonic rules),

(2) a morphophonemic sub-component, i.e. a contrastive analysis of alternation patterns (morphophonemic rules).

The two sub-components present different teaching and learning problems, e.g. Polish speakers learning English may apply a final devoicing rule of Polish and produce *[bik] instead of [big] *big*. They are, however, very unlikely to produce *[stɔ : lz] instead of [stu : lz] (plural of *stool*) by applying a morpho-

phonemic rule characteristic for the alternation in [stuw] *stół* "table" ~[stɔwi] *stoły* "tables". Taxonomic phonology concetrated on the phonological sub-component and what is needed now are systematic contrastive studies of the morphophonemic sub-component.

5.2. Teaching materials in manuals will be systematized in such a way as to help the language learner to internalize the phonological system of a language. The learner who has been provided with the knowledge of the patterns of alternation rules will be able to produce novel forms. The possibility of making a mistake should be reduced to a minimum but wrong derivations will not be blocked completely. Even native speakers make mistakes since language acquisition is a continuos process which never ends (cf. McCawley 1968).

Language learning involves abduction: "Abduction proceeds from an observed result, involves a law, and infers that something may be the case.... The conclusions reached by abductive inference afford none of the security offered by induction and deduction" (Andersen 1973 : 768). This provides a criterion for the evaluation of grammars and that grammar will rank higher which leaves the narrowest margin between abductive inference and correct predictions.

5.3. The model of a Pedagogical Contrastive Phonology outlined here is based on the following assumptions:

(1) the phonemic level is more concrete than that postulated by generative phonologists,

(2) morphophonemic rules are not abstract, either, e.g. the Vowel Shift Rule is a one-step rule changing, for example, the diphtong of an adjectival form like *divine* into a simpel vowel in the nominal form like *divinity*.

As can be seen from the above discussion, abstract analyses postulated by generative phonologists are unmotivated either from the psychological or from the pedagogical point of view.

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