
VOWEL, CONSONANT AND SYLLABLE RE-EXAMINED

KLAUS KOHLER*

Hosts of phoneticians have attempted to define, in phonetic terms, the fundamental division which we recognise between *vowels* and *consonants*. K. L. Pike, in the 6th chapter (Classification Criteria) of his *Phonetics* (Ann Arbor 1944, p. 66ff) examines these various definitions critically, and replaces them by a different one of his own. "All vocoids are simultaneously *vowels* at the time that they are functioning as syllable crests... All contoids while functioning as non-syllabics are *consonants*." (ibid. p. 145) He introduces a functional view into the discussion and contrasts his purely phonetic terms *vocoid* and *contoid* with the traditional terms *vowel* and *consonant*, which in his definition now refer to the role they play in the syllable.

J. D. O'Connor and J.L.M. Trim ('Vowel, Consonant and Syllable—A Phonological Definition'. *Word* 9 (1953), 103ff) as well as G. F. Arnold ('A Phonological Approach to Vowel, Consonant and Syllable in Modern French; *Lingua* 5 (1955—6), 253ff) went one step further and, although still aiming at a phonological rather than a phonetic solution, freed themselves from the syllable as a prerequisite for such a definition. Instead they investigated the distributional properties of phonemes in English and French words and found that there are characteristic groupings in both languages the basic one of which corresponds closely to the traditional vowel-consonant distinction.

But these conclusions which were reached after an empirical examination of a very limited corpus of data is only valid for English and French, whereas the general assumption is that we need vowels and consonants in the description of all languages. As we cannot hope to investigate some 3000 languages spoken on this planet as to their phoneme distribution in words in the near future only a general theoretical reflection about the characteristics of natural languages will bring us nearer the goal.

As a child is able to "extract", in an extraordinarily short time, the structural laws of a language from the corpus presented to him the relevant data must be of such a size that the child can really be confronted with it. If now in a language phonemes can be combined in any possible way to form formatives the number of different combinations (even without repetitions of phonemes) takes on unmanageable values once the

* Institut für Phonetik und Kommunikationsforschung, Bonn, W. Germany.

set of phonemes goes beyond a certain limit. If there are 7 phonemes the result is 13692, which means that the child must come across at least 13692 formatives in the first six or so years of his life to discover the combinatorial laws. This is impossible. Therefore a language must possess less than 7 phonemes if all the combinations are to be possible, but a language of this very simple kind is not known. Thus the simplest combinatorial rule finds no application in natural languages because it would in fact make the pattern extremely complex and phonologically irregular. It can be proved mathematically that the simplest and most efficient set-up is reached if there are always two groups of phonemes such that the combinations *between* the groups are very little restricted, whereas fairly strict and regular limitations are imposed on combinatorial possibilities *within* the groups, the *degree* of restriction depending on the particular language in both cases, but being always lower in the former than in the latter. We can now call that group *consonants* that contains the stops, the other *vowels*, and have thus arrived at a definition of a substantive universal for all natural languages.

The next question is whether something similar holds for the *syllable*. Like the previous two terms it has been given a great many different definitions, phonetic and phonological. The surveys by B. Hála (La syllabe, sa nature, son origine et ses transformations, *Orbis* 10, 1961, 69ff), G. Laziczus (Lehrbuch der Phonetik, Berlin, 1961, 156ff) and A. Rosetti (Sur la théorie de la syllabe, s'Gravenhage 1956) illustrate this diversity of theories. Like the other two terms the syllable has also been regarded as a substantive *phonological* universal, but it can be demonstrated that the syllable is either an *unnecessary* concept, because the division of the speech chain into such units is known for other reasons, or an *impossible* one, as any division would be arbitrary, or even a *harmful* one, because it obscures underlying structures.

If the syllable has any real status in phonology its boundaries must be discernible. A grammatical formative in any language can be rewritten as a sequence of elements like

$$GF \rightarrow C_1VCVC\dots CVC_2$$

where C_1 stands for any non-arbitrary pre-vocalic consonant (cluster), C_2 for any non-arbitrary post-vocalic consonant (cluster) and C for any consonant (cluster) between vowels. Any part to the right of the arrow may be zero.

C can now be rewritten as

$$C \rightarrow C_1, C_2, C_3, C_2C_1$$

($C \rightarrow C_1C_2$ is impossible by definition).

If $C_1 \neq C_2$ and if $C \rightarrow C_1, C_2, C_2C_1$, a non-arbitrary syllable division is possible but implicit in the definitions for C_1 and C_2 : the syllable is therefore an *unnecessary* concept.

If some $C_1 = C_2$ there are cases where a syllable division is not determinable, and the syllable is therefore an *impossible* concept. The same applies to $C \rightarrow C_3$, i.e. a con-

sonant (cluster) that can only occur intervocalically and can, therefore, not be uniquely determined as pre- or post-vocalic.

If in any language the division into syllables obscures underlying phonological structures the concept of the syllable is *harmful*. English provides an example.

There intervocalic consonant sequences are of any degree of frequency only if they are either pre- *and* postvocalic at the same time (*butter, master*) or if one consonant is ambivalent, i.e. is part of a C_1 *and* part of a C_2 simultaneously (*mattress, belfry*). If there is clear separation between C_1 and C_2 the sequences are rare (*aesthetic, Norway*). The underlying structure of di-vocalic words in English therefore depends on syllabic indeterminacy; the introduction of the syllable into the analysis can only obscure this fact.

In languages in which a non-arbitrary syllable-division is always possible because it is implicit in the consonant clustering and in which this division does not obscure the underlying structure it is still possible to use the syllable as a unit for quick reference, although it is not necessary because the syllable is then not an independent entity. In all other languages the syllable has no place in the phonology, and it is, consequently, not a phonological universal.