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Review of A. Bell and J. B. Hooper, eds., (1978) Syllables and Segments

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Reviewed by JOHN J. MCCARTHY, *University of Texas, Austin*

One of the most exciting developments in phonology in recent years has been the burgeoning of interest in what might be called non-linear models of phonological representation. Unlike the received generative phonological theory of Chomsky & Halle 1968—in which only segments and boundaries, both represented solely as columns of distinctive features, play a role—the non-linear theories presuppose an organization of some segments into internally complex entities, and of all segments into prosodic structures like the syllable.[1] It is to this enrichment of the phonological representational apparatus that Bell & Hooper's volume is addressed.

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[1] Strictly speaking, Chomsky & Halle (241, note) did recognize a lacuna in their phonological theory that seems to require a construct like the syllable. When discussing the notion 'weak cluster', which corresponds roughly to a short vowel in an open syllable, they indicate that the occurrence of this complex entity in four separate, non-conflatable rules is problematic.

This collection contains seventeen papers, the revised versions of presentations given at a conference in 1977. Participation is broadly interdisciplinary; child-language acquisition, experimental phonetics, and neuro- and psycholinguistics, as well as phonology, are represented. B&H's introduction, 'Issues and evidence in syllabic phonology' (3–22), provides an overview of the major questions that arise if the syllable is to be incorporated into phonological theory: How are syllables represented? How do they parse segmental strings? And what sorts of evidence can be brought to bear on these questions? B&H cite much relevant literature, so that their contribution is useful for its bibliography alone. They also attempt to satisfy a need, felt throughout the book, by tying each contribution to these themes. The volume would be improved if more of the authors had addressed issues raised by the others.

Patricia Donegan and David Stampe, 'The syllable in phonological and prosodic structure' (25–34), argue that syllabification is the result of imposing a particular prosodic organization on a segmental string. Their most interesting claim concerns a further elaboration of the well-known process/rule taxonomy: processes are insensitive to segmental structure, whereas (more tentatively) rules are insensitive to prosodic structure.

Deborah Ohsiek, 'Heavy syllables and stress' (35–43), refers to work with the Stanford Phonology Archive to confirm the traditional observation that the heavy/light syllable distinction is used by stress rules in a number of languages. She goes on to seek a perceptual account of this fact. If heavy syllables intrinsically possess the acoustic properties of stressed syllables, and if light syllables intrinsically lack these properties, then we would expect that stress would migrate to heavy syllables—which already seem stressed—and would forsake light syllables, since stressing them would make them appear heavy. Ohsiek investigates this claim by comparing the F_0 and duration of stressed and unstressed light and heavy syllables in colloquial Meccan Arabic; and she finds that her hypothesis is confirmed in that heavy syllables do, even when unstressed, have a larger share of these acoustic correlates of stress.[2]

A fairly compelling criticism of this sort of perceptual explanation, at least for the rejection of stress by light syllables, has been made by Hyman 1977. He points out that a desire to avoid confusion of light and heavy syllables cannot explain the refusal of light syllables to accept the greater duration concomitant with stress, since the same stress distribution is seen in languages where heavy and light syllables differ markedly in quality as well—and in which, therefore, no such confusion would be possible. One can observe further that heavy syllables do not simply attract stress and light syllables reject it, as the perceptual account would have it. For example, Cairene Arabic and Creek use heavy syllables as the loci of rules which count even and odd strings of light syllables; in Cairene this has the surface result that some light antepenults attract the

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[2] Ohsiek's experimental design suffers from some empirical inadequacies. Her Arabic forms, though purportedly colloquial, display features of Classical Arabic, like the case desinence *u* of *ǝssalaamu*. Furthermore, though she attempts to control for intrinsic pitch and duration of segments by holding the measured vowel constant as /a/, she overlooks very striking effects of adjacent consonantism on vowel quality, as in the different realizations of phonemic /aa/ in her forms *ʔǝnsɑæɑeniiya* and *qɒɒnuun*. It may be that Meccan colloquial does in fact show the desired distinction, but the demonstration of that would require a more carefully chosen set of stimuli.

stress, while heavy antepenults reject it. It appears, then, that a more formal explanation for these observations must be found.[3]

Stephen R. Anderson's very original paper, 'Syllables, segments, and the Northwest Caucasian languages' (47–58), argues in support of a vowel-less analysis (at least in part) of Kabardian, a language well known from treatments by Kuipers 1960 and Halle 1970. Anderson claims that Kabardian consonant clusters should be represented as single complex segments, bearing one feature for the laryngeal gesture, plus an ordered set of features for point and manner of articulation.[4] With representations of syllables, and with this enriched notion of segment, it is easy to implement Kuipers' suggestion that ə be eliminated from underlying representations. Underlying vowel-less syllables can receive stress, and are subject to a rule which breaks a (possibly complex) consonant C into C + ə. A parallel analysis of the other Kabardian vowel, *a*, requires a somewhat ad-hoc designation of certain consonants as *a*-like; but Anderson correctly points out that the treatment of *a* is separable from that of ə. Much other work on less exotic systems of deletion and epenthesis has further shown the utility of representations with vowel-less or so-called degenerate syllables, along with a rule to spell out the inserted vowel (Halle & Vergnaud 1978, Kaye 1981, Lowenstamm 1979, Selkirk 1981, Broselow MS).

James Hoard, 'Syllabication in Northwest Indian languages' (59–72), makes a similar use of complex segments to account for the possibility of syllabic voiceless stops and affricates in many languages of the Northwest Coast. In addition to some valuable phonetic descriptions, he offers the hypothesis that syllabic stops are complex segments with a single set of features for point of articulation, but with ordered segment-internal feature values.

Such segments can be represented as follows:

$$(1) \begin{bmatrix} -\text{syll} & +\text{syll} \\ -\text{cont} & +\text{cont} \\ +\text{cons} & -\text{cons} \end{bmatrix}$$

The stop release is identified as the syllabic component. Hoard points out that this analysis avoids the evident absurdity of treating the release as a separate segment, and at the same time allows us to maintain the assumption that [+syll] is incompatible with [−voice, −cont]. Yet these languages would seem to constitute counter-examples to the latter assumption, rather than evidence for 1. Moreover, it is probably unnecessary to stipulate phonologically, as in 1, that voiceless syllabic stops are invariably released, since it is difficult to imagine how they would be mechanically possible otherwise.

Ilse Lehiste, 'The syllable as a structural unit in Estonian' (73–83), presents an overview of the evidence for syllables and disyllabic units. Students of her work will find this a useful summary of material published elsewhere.

Calvin Rensch, 'Ballistic and controlled syllables in Otomanguean languages' (85–92), also deals with a phonological phenomenon that is clearly controlled at the level of the syllable: the ballistic syllable is characterized by effects on

[3] For more discussion of the Creek and Cairene Arabic data, as well as a formal account of the role of heavy syllables in stress, cf. McCarthy 1979. Similar formal treatments include Halle & Vergnaud 1978, Hayes 1980.

[4] A similar proposal is made for Classical Greek in McCarthy 1977b.

duration, tone, and laryngeal features, extending from the syllable-initial consonant through the vowel to a postvocalic aspiration.

Jilali Saib, 'Segment organization and the syllable in Tamazight Berber' (93–104), presents some principles of syllabification and then elucidates the role of syllable structure in rules of epenthesis and syncope.[5] But he notes that his best case for the syllable involves the spreading of 'emphasis' (pharyngealization). Emphasis originates with one of the primary emphatic consonants, and then propagates bidirectionally to all segments, either in the same syllable or, if in another syllable, not separated by a sequence of non-geminate consonants from an emphatic syllable. Word boundary does not impede the spread of emphasis to tautosyllabic segments (syllabification often crosses word boundary), though it places some limitation on the other sort of spreading.

Although he bases his transcriptions on his intuitions, Saib concedes the difficulty of making impressionistic observations of the domain of a feature like emphasis. The usefulness of such observations is cast in doubt by the results of a careful instrumental study by Ghazeli 1977—who finds, in examining Arabic dialects that are often reported to have the syllable as the domain of emphasis, that the domain is essentially the word, with some limitations on leftward spreading. In particular, emphasis does not transcend word boundary, even in cases where the syllable does. Clearly, these data suggest the need for a re-examination of other claims for a particular domain of emphasis.

There is also an interesting formal problem in Saib's account of emphasis-spreading. His representations of words include syllable boundaries linearly interspersed between segments; but his formulation of tautosyllabic emphasis-spread (101), repeated below, seems to presuppose a less linear and more structural notion of the syllable:

$$(2) \ \text{If} \ \begin{bmatrix} \$ \\ C \\ +\text{phar} \end{bmatrix}, \text{then} \ \begin{matrix} \$ \\ [+\text{phar}] \end{matrix}$$

In fact, Broselow 1976, 1978, 1979 has argued in detail, from considerations of emphasis assimilation in Cairene Arabic, that the syllable must be recognized as an independent autosegmental unit (along the lines proposed in Kahn 1976, Goldsmith 1976).

Osamu Fujimura and Julie Lovins, 'Syllables as concatenative phonetic units' (107–20), present what may be the most interesting and articulated theory of the syllable in this volume, proposing that syllables are composed of cores and affixes. In English, an affix is a final coronal obstruent (or sequence of them) that agrees in voicing with the last element of the syllable core. Apart from these distributional characteristics, affixes are phonetically quite separable from their associated cores, lacking pronounced co-articulatory influence. F&L go on to claim that non-assimilatory processes, like the distribution of voiceless stop allophones in English onsets, are always syllable-internal. Therefore the usual heterosyllabic effects will consist either of assimilations, or of adjustments in timing at higher levels of organization.

In contrast to F&L, the next two authors are somewhat less sanguine about the phonetic prospects of the syllable. Thus Thomas Gay, 'Articulatory units: Segments or syllables?' (121–31), concludes, from several instrumental studies of lip rounding in VCV, VCCV, and VCCCV sequences, that co-articulatory

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[5] An account of Berber epenthesis in terms of vowel-less or degenerate syllables can be found in Halle & Vergnaud.

effects are bounded by major class phoneme identity rather than the edges of syllables.

Again, Leigh Lisker, 'Segment duration, voicing, and the syllable' (133–40), investigates CVCV sequences and determines that tautosyllabic durational effects are no more pronounced than heterosyllabic ones. Although no inconsistency is obvious here, it would have been helpful if each of these last three papers contained some discussion of the others' results.

David Ingram's article, 'The role of the syllable in phonological development' (143–55), will be welcomed as an extremely useful summary and interpretation of much of the data on the role of syllables in language acquisition.

Lise Menn, 'Phonological units in beginning speech' (157–71), has the ambitious goal of constructing a representational apparatus for early child language; in this she largely succeeds, using the notations of autosegmental phonology (Goldsmith 1976). If we consider a particular child's phonology—which is, at some stage, subject to constraints of point-of-articulation harmony for consonants and of CVC word structure—then, Menn argues, it is possible to represent these properties on different autosegmental tiers, with the stipulation that only one feature for point of articulation may be mentioned. It is of interest that Menn incorporates into child phonology, by this proposal, features of the autosegmental analysis of other harmony systems (Clements 1977, 1980) and of non-affixing morphological systems (McCarthy 1981).

George Allen and Sarah Hawkins, 'The development of phonological rhythm' (173–85), argue—on the basis of reduction processes operating in child phonology—that learners are innately predisposed to trochaic rhythms and alternating patterns of stress; however, their argument is weakened somewhat by their reliance on a purely segmental set of stress features. In a metrical theory of stress (like that of Liberman 1974, Liberman & Prince 1977), trochaic or iambic alternating patterns are in fact the least complex rhythmical structures. In this article (and also in Menn's) one would like to have seen some cross-reference, since A&H's preferred rhythms overlap to a large extent with Menn's word-structure tier.

Sheila Blumstein, 'Segment structure and the syllable in aphasia' (189–200), describes a number of distortions that can be ascribed to articulatory planning errors at the level of the syllable. The usefulness of her study is reduced, however, by her failure to code statistically the difference between heterosyllabic and tautosyllabic medial clusters as error loci.

Donald MacKay, 'Speech errors inside the syllable' (201–12), reports on a suggestive experimental design that serendipitously allowed the artificial production of numerous speech errors. He concludes that at least some distinctive features can be independently controlled in production.

James McCawley, 'Where you can shove infixes' (213–21), ends this volume with an entertaining discussion of expletive infixation in English. Referring to my conclusion (McCarthy 1977a) that expletives can fall only at syllable boundaries, he describes an experiment in which subjects were given forms that have close, but not coincident, syllable and morpheme boundaries. The result is apparent confusion of the two boundaries, with speakers producing forms like

refer-fuckin-ree (vs. regular *kanga-fuckin-roo*). Although I am skeptical of McCawley's conclusion that the syllabification is actually different in *referee*, this procedure could certainly be used to provide evidence for controversial morphological analyses, like the purely formal, Latinate ' = ' boundary in English.

This book was printed from camera-ready copy with unjustified right margins and a uniform, legible typeface. Here are some errors that may cause confusion: P. 21, for *hänko* read *hänkö*. P. 38, for *bətsuuf* read *bətšuuf*. P. 43, for *ssiigaara* read *siigaara*; other errors too numerous to list occur in the glosses. P. 94, for the first occurrence of *Izl* read *izi*. P. 147, for (C)V read V(C). P. 148, for 'from 1;11 to 1;4', read 'from 1;11 to 2;4'. P. 226, for 'Donegan (to appear)' read 'Donegan and Stampe (to appear)'.

In sum, this is a valuable and in some ways unique book that should stimulate thought about the interesting data and theoretical proposals it contains. Perhaps its most serious omission, though, is substantial discussion of autosegmental theories (except in Menn's and Anderson's papers) or metrical theories of segmental and syllabic organization. These theories, which are to some extent complementary, have yielded rich insights into a variety of data in a number of articles.[6] From this work is gradually emerging a fully-developed model of prosodic and segmental structure that promises to add to the important contributions made by Bell & Hooper's volume.

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[6] Besides the autosegmental and metrical treatments of syllables and segmentation cited elsewhere in this review, important references include Goldsmith 1979, Ingria 1980, Kiparsky 1978, 1979, Leben 1980, Prince 1980, and Selkirk 1980.

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Questions of intonation. By GILLIAN BROWN, KAREN L. CURRIE, and JOANNE
    KENWORTHY. London: Croom Helm, 1980. Pp. 206. £11.95.

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The research reported in this book is a careful empirical study of intonation
in Edinburgh Scottish English (ESE), based on instrumental and auditory
analysis of a large number of recorded interviews and passages read aloud.
The data presented are a useful addition to the literature—since, as the authors
(henceforth BC&K) point out, intonation in English dialects other than RP and
the ill-defined 'general American' has seldom been carefully investigated. Un-
fortunately, however, instead of concentrating on their data, BC&K devote
equal time to theoretical discussion—which, by their own admission (15),
amounts principally to raising a series of unanswered questions, and challenging
various aspects of the model of intonation and information structure given by
Halliday 1967. It is these 'questions of intonation', rather than the ESE data,
that appear intended to give the book its unity.