Letter to the Editor

COGNITIVE RHYTHMS RELUCTANTLY REVISITED

SABINE H. KOWAL
Technical University Berlin
DANIEL C. O'CONNELL
Loyola University of Chicago

In response to the Power (1983) – Beattie (1984) controversy, a more general critique of the construct of cognitive rhythms is presented. It is argued that the term itself is a misnomer, that the relevance of articulation rate has been neglected, that fluent and hesitant phases of cognitive rhythms have been assessed both subjectively and intuitively, that the speech-production model underlying the concept is simplistic, and that the empirical evidence is based on an extraordinarily small corpus which has been described inadequately in the research literature.

For some years now, we have been uneasy about the scientific cogency of the evidence for cognitive rhythms. We were therefore pleased to read Power's (1983) experimental critique. In the meantime, however, the discussion has taken on an all too *ad hominem* tone (Beattie, 1984; Power, 1984). The reader will have to decide whether we are beating a dead horse or a sacred cow that for many reasons refuses to die.

Let us return for a moment to the basic terminology. There is no legitimate sense in which the iterations referred to as cognitive rhythms can appropriately be referred to as rhythms. The principle of iterative regularity essential to a rhythm is completely lacking in these phenomena. They are simply not rhythmical. Furthermore, great pains have been taken to establish the reliable assessment of these cycles, without cogent evidence that they validly reflect cognitive processes. The cognitive element has been assumed as a necessary consequence of the fact that during speech, hesitant phases sometimes alternate with fluent phases. Hence, cognitive rhythms have not been shown to be either rhythmical or cognitive.

The relevance of articulation rate has also been completely neglected. There is basically no way in which any kind of meaningful iterative speech chronometry can be computed without some reference to articulation rate. It is, for example, quite possible for a speaker to articulate the same number of syllables in a given (hesitant) phase with much pausing as in an immediately following (fluent) phase. In fact, Dickerson's (1971) evidence of such a possibility has been neglected in discussions to date. The magic is accomplished very simply by dramatic variation of articulation rate.

Cognitive rhythms have been identified by visual inspection of pause-time/speech-time graphs. But there is no way of objectively and validly deciding, by visual inspection alone, that a given slope reflects a hesitant or fluent phase. The size of the unit remains com-

pletely subjective and intuitive, both in its "measurement" and in its inferred function. The very first example of a hesitant phase in Figure 1 of Henderson, Goldman-Eisler, and Skarbek (1965, p. 238), which has been reproduced in two subsequent publications (Henderson, Goldman-Eisler and Skarbek, 1966; Goldman-Eisler, 1967), is an excellent example of this subjectivity. The initial hesitant phase could obviously be further subdivided quite plausibly into a hesitant–fluent–hesitant sequence. What the actual spoken text in question might suggest in this regard has never so much as been mentioned.

Butterworth and Goldman-Eisler (1979) have described the model of speech production on which the concept of cognitive rhythms relies as consisting of two identifiable stages, planning and execution, corresponding to the hesitant and fluent phase of a cycle: "*Stage 1:* A plan is formulated . . . *Stage 2:* The plan is executed" (p. 211). But it is quite possible that a given phase of hesitancy reflects, for example, retrospective thinking. The model is obviously too simple. Butterworth and Goldman-Eisler's identification of cognitive rhythms in oral reading is also problematic in view of this model. In oral reading, hesitancy obviously reflects rhetorical intent rather than planning; the text to be communicated is given, not something to be planned or formulated.

What is to be said of the corpus from which the evidence for cognitive rhythms has been derived? First of all, it is extraordinarily small. It is literally impossible to say how small it is, because the operational descriptions of data have been so poorly presented. For example, one cannot decipher from Henderson *et al.* (1965) whether the study is actually a within-subject ($N = 5$) or a between-subject ($N = 10$) study. Cross references to subjects from one study to another are also quite confusing, e.g., between Butterworth and Beattie (1978) and Beattie (1980).

Nowhere in the extant literature have we found any convincing evidence of cognitive rhythms as a useful scientific concept as claimed by its proponents. Conceptualization of the temporal macro-structure of oral discourse remains a challenge for psycholinguistic research.

REFERENCES

BEATTIE, G.W. (1980). The role of language production processes in the organisation of behaviour in face-to-face interaction. In B. Butterworth (ed.), *Language Production:* Vol. 1, *Speech and Talk* (London), pp. 69-107.

BEATTIE, G. (1984). Are there cognitive rhythms in speech? – A reply to Power (1983). *Language and Speech,* **27,** 193-195 (Letter).

BUTTERWORTH, B.L. and BEATTIE, G.W. (1978). Gesture and silence as indicators of planning in speech. In R.N. Campbell and P.T. Smith (eds.), *Recent Advances in the Psychology of Language: Formal and Experimental Approaches,* Vol. 4b (New York), pp. 347-360.

BUTTERWORTH, B.L. and GOLDMAN-EISLER, F. (1979). Recent studies on cognitive rhythm. In A.W. Siegman and S. Feldstein (eds.), *Of Speech and Time: Temporal Speech Patterns in Interpersonal Contexts* (Hillsdale, NJ), pp. 211-224.

DICKERSON, W. (1971). Hesitation phenomena in the spontaneous speech of non-native speakers of English. Doctoral Dissertation, University of Illinois at Urbana-Champaign.

GOLDMAN-EISLER, F. (1967). Sequential temporal patterns and cognitive processes in speech. *Language and Speech,* **10,** 122-132.

HENDERSON, A., GOLDMAN-EISLER, F. and SKARBEK, A. (1965). Temporal patterns of cognitive activity and breath control in speech. *Language and Speech*, **8**, 236-242.

HENDERSON, A., GOLDMAN-EISLER, F. and SKARBEK, A. (1966). Sequential temporal patterns in spontaneous speech. *Language and Speech*, **9**, 207-216.

POWER, M.J. (1983). Are there cognitive rhythms in speech? *Language and Speech*, **26**, 253-261.

POWER, M.J. (1984). Are there cognitive rhythms in speech? – A reply to Beattie (1984). *Language and Speech*, **27**, 197-200 (Letter).