

1,056 words (limit of 1,100)

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RHYTHM

Introduction

The notion of rhythm is widely present in language sciences and an abundant literature ranging from acoustics to phonological theory and neuropsychology is available, leading to several – and sometimes conflicting – definitions. Nonetheless, most would agree that rhythm involves the temporal organization of speech, and results from a threefold complex interaction between:

- The nature of the rhythmic atomic constituents;
- The use of alternations between more and less prominent constituents;
- The pattern of regularity for the grouping of the constituents into longer units.

According to this definition, rhythm is fundamental to languages (it seems that no language may be defined as arrhythmic, even if the last two proposed dimensions may be irrelevant in specific languages).

In the 20th century, *PHONETICS* mainly searched for the acoustic correlates of rhythm units while *PHONOLOGY* – with the exception of metrical phonology – usually considered rhythm as a mere sequence of timing slots on which linguistic properties are

cast. In addition, cognitive science addressed distinct questions, namely why languages are rhythmic, and whether rhythm plays a role in the cognitive processing of language.

Current State of the Field

Rhythmic typology. The long lasting view that speech rhythm would consist in isochronous occurrences of some acoustic event or unit along the speech stream, popularized by Pike (1945) and Abercrombie (1967), is now widely defeated. Explaining how rhythm is perceptually salient despite the absence of objective regularity and why it seems nevertheless possible to gather languages into a few rhythmic categories is consequently a challenging issue. These categories, initially known as stress-, syllable- and mora-*timed* have been renamed stress-, syllable- and mora-*based* in (Laver 1994, 528-529). This distinction is enlightening about the change from a discrete to a continuous approach to rhythm variation across languages: rhythmic typology has to cope with languages that do not strictly match categorical prototypes and there is now general agreement that this typology better reflects tendencies rather than mutually exclusive categories (Roach 1982, Dauer 1983). According to Dauer (1983, 51), the “difference between stress-timed and syllable-timed languages has to do with differences in syllable structure, vowel reduction and the phonetic realization of stress and its influence on the linguistic system”. In other words, she states that typological differences in rhythm are side effects of the phonological characteristics of languages.

Over the last decade, the durational correlates of rhythm types have been thoroughly investigated, highlighting in particular distributional properties of vocalic and intervocalic segment durations (Ramus, et al. 1999) and the pairwise variability of these

segment durations (Grabe and Low 2002). For example, British English exhibits both vowel reduction and fairly complex syllable structure, yielding a low proportion of vocalic intervals and a high variation in the duration of consonantal intervals. On the contrary, European Spanish lacks vowel reduction and its syllabic structure is simpler, resulting in a reversed pattern with a relatively higher proportion of vocalic intervals and a lower duration variability in consonant intervals. Several experimental studies have ever since emphasized the salience of these indices in language discrimination tasks performed by human subjects (e.g. Ramus, et al. 2003), and an abundant literature followed up. However, further investigation is still needed to understand some dynamical aspects of rhythm (metric patterns, speech rate...) and the possible interaction between intensity, pitch and duration, explicitly in terms of rhythm.

Relation between rhythm, METRICS and STRESS. As Fox (2000, 86) pointed out, “[rhythm] is rarely taken into account in a formal way in phonological theory and description”. However, nonlinear approaches, and especially metrical phonology, take rhythm into consideration by investigating both the structure and the weight of rhythmic constituents (e.g. Hyman 1985, Blevins 1995) and their relation to metric and stress patterns (Hayes 1995).

Why are languages rhythmic? There is extensive evidence supporting that speech rhythmicity is fundamental for speech communication. From the production side, no uncontroversial position has emerged yet. For instance, MacNeilage (1998) proposed an evolutionary scenario deriving speech rhythmicity from cycles of mandibular oscillation during ingestion; Port (2003) proposed that neurocognitive oscillators could synchronize the production of prominent events with perceptual attention, renewing approaches

initiated in psychology (for a review, see Evans and Clynes 1986). Furthermore, quite a few experiments have assessed human awareness of rhythm differences for neonates, young infants or adults and several studies suggest that rhythm plays an important role in segmenting the speech stream and thus for language acquisition (see among others Morgan and Demuth 1996, Mehler and Nespor 2004).

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