

THE STUDY OF RHYTHM IN RELATION TO METRICS

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ABSTRACT

It is argued that the majority of experiments into what is called rhythmical or metrical speech has no actual bearing on the study of metre. The question is raised whether it is at all useful to make metrical verse the object of experimental research.

INTRODUCTION

Rhythm

In the strictest sense of the word, *rhythm* is the perception of groups in a series of stimuli. Instead of being merely successive, the stimuli appear to be organized into groups on the basis of a difference in prominence between the stimuli. Rhythm is an everyday phenomenon for everyone who is in the happy possession of an old-fashioned clock instead of an electronic time indicator. The name 'subjective rhythm' is given to the phenomenon that in a series of equidistant stimuli that are acoustically identical, people hear the stimuli as grouped, with a prominent stimulus either beginning (falling or trochaic rhythm) or ending (rising or iambic rhythm) the group. The term 'objective rhythm' applies to cases in which the stimuli are objectively different, either by nature or because the experimenter makes them so. Provided that the interval between the most prominent syllables does not exceed an upper or lower threshold, the events will appear to be grouped in the same way as in the case of subjective rhythm.

The recurrent theme in the study of rhythm is the question whether the perception of rhythm is the result of 'the arrangement of durable elements, or [...] the succession of more or less intense elements [...]' [1]. Any attempt at an analysis of rhythm has to steer a middle course between overemphasizing the temporal aspect or the succession per se and the difference in prominence between the elements. No matter which one is chosen, the notion of isochrony is central to the notion of rhythm.

Subjective rhythm hinges on the idea that some stimuli are perceived as prominent because they fall at isochronous intervals. Objective rhythm depends on the claim that intervals between stimuli that differ in prominence will appear isochronous if these stimuli follow one another in more or less regular alternation.

Being a perceptual phenomenon, rhythm looks back on a long history of experimental research. One only

has to open a few back numbers of Perception and Psychophysics to see that rhythm is still a hot issue in the field of psychology.

Metre

Whereas the perception of *rhythm* is spontaneous, *metre* is recognized on a cognitive basis rather than perceived on a sensory basis. By using metre, poets can try to induce the sensation of rhythm in their audience. Whether they succeed depends on a great number of factors, the willingness of the audience to comply with the poets' intentions being one of them. Poets and audience should share a familiarity with certain metrical schemata and other literary devices responsible for structure, such as alliteration and rhyme. This shared knowledge makes it possible for poets to deviate from strict regularity: the aesthetic effect of metre exists by virtue of the tension between the strict pattern and its realization through the medium of language. The realization differs from the pattern, not only because the poet consciously inserts a deviation from the norm (e.g. a trochaic foot in an otherwise iambic line) but also because speech does not easily allow itself to be put in a straightjacket of strict regularity. Both concrete and abstract properties of speech will rebel against the notion of strict regularity. By the term 'concrete properties' we mean measurable parameters, such as, for example, the duration of speech segments. Here, strict regularity is made impossible by the fact that individual speech segments have an inherent duration. By 'abstract properties' we mean the syntactic and semantic organization of speech, which also asserts itself at the concrete level, for instance by affecting the values of individual speech segments.

Problem

In this paper the question is raised whether anything can be gained by applying the principles and methodology of rhythmical research to the study of metre. Three positions in the study of metre suggest themselves:

- 1) Metrical speech is subject to the same regularities as tone sequences and should be investigated in the same way; this approach denies speech its own character.
- 2) Metrical speech is subject to a tendency towards rhythmic structure in that the latter imposes a regularity on the speech material that is otherwise absent in the acoustic signal.
- 3) Metrical patterns manifest themselves in speech material by totally abstract means, which elude

any experimental approach.

In this paper it will be taken for granted that the first position is untenable. The article hopes to demonstrate that the second position will also prove unfruitful and that new research paradigms are merely begging the question. One seems to be forced to accept the third position, even if this may have unattractive implications for an empirical discipline.

THE INFLUENCE OF RHYTHMIC STRUCTURE ON SPEECH MATERIAL

The metrical foot as a prosodic unit

Let us assume for the sake of the argument that a metrical line of verse may give rise to the perception of rhythm.

In the line

sweet day, so cool, so calm, so bright

an iambic rhythm will be perceived. What seems to be primarily responsible for the division of the line into groups of two syllables is the linguistic structure, which may be called abstract in that it can be recognized in writing. Let us assume, however, that on top of that linguistic structure there is a contribution of concrete measurable parameters. This assumption is given support by the repeated claim that lines in iambic metre "sound different" from lines in trochaic metre. If this is true, metrical feet are not merely the conventions handed down to us by the Classical writers, but they may also have a perceptual reality.

At the outset of our investigation we hypothesized that the metrical foot behaved as a prosodic unit, very much like a phrase or a clause. As such, it would show the prefinal lengthening characteristic of these larger prosodic units [2]. This idea was tested in a number of experiments, two of which will be mentioned briefly.

We started with nonsense syllables [də da:] read either with a falling rhythm or with a rising rhythm. The hypothesis predicted that the stressed element in the iambic line (foot-final syllable) and the unstressed syllable in the trochaic line (also foot-final) would be longer than their foot-initial counterparts. In the experiment involving nonsense syllables we found some evidence for prefinal lengthening in metrical feet, in perception as well as in production. Although this effect was only found when we asked our reader to scan the nonsense syllables (i.e. read them slowly and with emphasis) and although only non-naive listeners were able to ignore the actual opening of the line (stressed versus unstressed) we did find evidence for the metrical foot as a prosodic unit.

In the case of meaningful material, the set-up necessitated manipulating lines in such a way that they could be read as iambic (with an unstressed word at the beginning) or trochaic, depending on the metrical context.

The line was inserted as the second in a four-line stanza, the first line containing two-syllable words corresponding to the metrical pattern: trochaic in

a trochaic stanza, iambic in an iambic stanza. The following will serve as an example (rather than giving a translation I will give a paraphrase in which there is a coincidence between metrical structure and language comparable to the Dutch instance; it should be noticed that in the Dutch example the critical second line only differs in the addition of an unstressed word at the beginning):

| | |
|-----------------------------------|----------------------------------|
| trochaic | |
| dreigend door het duister | threatening through the twilight |
| <i>sprak een stem tot Piet</i> | <i>spoke a voice to Pete</i> |
| handen in de hoogte | better stop your talking |
| stilte of ik schiet | silence, or I'll shoot |
| iambic | |
| opeens bewoog een tak | at once the air resounds |
| <i>er sprak een stem tot Piet</i> | <i>a voice to Peter speaks</i> |
| ga heen en kijk niet om | obey the voice you hear |
| je weet dat ik dan schiet | behave or I shall shoot |

Of each line the individual segment durations were compared in their iambic and trochaic reading. No systematic difference between foot-final elements and their foot-initial counterparts was found [3]. Presumably, in the meaningful material a possible temporal organization of the material in terms of metrical feet was overridden by other prosodic regularities, governed by the syntactic organization of the material.

The above example should be read as an instance of how the many interactions in speech may override a possible rhythmic structure. In this example, as in all other variations upon this theme, metrical feet coincide with word or phrase boundaries in one type of rhythm, but, as a logical consequence of the opposition between rising and falling rhythm, never with the other kind of rhythm. If we want to investigate the interaction between syntactic and morphological structure on the one hand and metre on the other, we are faced with the problem that, in the majority of cases, it is impossible to vary the one and keep the other constant. This renders it impossible to make syntactic and morphological structure the object of experimental investigations into metre.

Isochrony revisited

The claim that in metrical speech prominent syllables should be separated by isochronous intervals is considered unrealistic in view of the fact that at a suprasegmental level the duration of speech segments is affected by many more influences than metre. If the claim of strict isochrony is considered naive, would not a more sophisticated interpretation of the notion be feasible? Two lines of research into the rhythm of speech have been developed in which the notion of isochrony plays a central part. The question should be considered whether these approaches might prove fruitful for the study of metre.

Rhythm is predictability. Martin [4] argues that the rhythmic structure of speech enables listeners to generate expectancies concerning later events in real time on the basis of the perception of earlier

events. The notion of isochrony is inherent in Martin's model in that the hierarchical organization of accent patterns depends on the notion of relative timing. Over time, rhythm has become more or less synonymous with predictability. In a series of experiments the influence of a disruption in the temporal structure on the predictability of a certain phoneme has been investigated, e.g. [5]. Rather than suggesting an application of this experimental design to the study of metrical speech, which is not unthinkable, we should like to argue that this interpretation of rhythm is misguided. Although it is true that rhythm entails predictability, predictability does not necessarily entail rhythmicity. Predictability may be the result of so many factors other than temporal structure that the question whether speech is predictable seems to have little bearing on rhythm.

Isochrony and perceptual centers. If not between the onset of syllables, vowel or words, isochrony is claimed to exist between 'perceptual centers' [6]. Perceptual centers correspond to the locus of the 'stress beat'. It has been demonstrated that P-center aligned digits are perceived as more isochronous than randomly aligned digits. Buxton [7] even reports on an experiment with meaningful material in which subjects found it easier to tap the rhythm to P-center aligned words than to randomly aligned words. It would not be difficult to think of an experiment into metrical speech in which the claim of metrical speech being isochronous could be tested. However, the location of the P-center has been proved to be so indeterminate that one wonders at the ease with which Buxton seems to have constructed her material. P-centers seem to be dependent not only on the nature of the initial consonant but also on the duration of the medial vowel and final consonant of a CVC sequence ([8], [9]).

CONCLUSION

In our own work, we have been unable to demonstrate that rhythm imposes a regularity on speech material at a concrete level. Rhythmic structure was supposed to manifest itself in the form of metrical feet. In various recent publications, the term 'rhythm' has become little more than temporal structure per se, or mere predictability. If we cast our net so wide as to include these interpretations of the terms, there is no end to our investigations into metrical speech. If we adhere to the more orthodox meanings of the words rhythm and metre, however, we will have to conclude that, no matter how much their interaction will continue to interest us, its precise nature can only be speculated on, and cannot be investigated with the means we now have at our disposal.

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