RHYTHMICAL STRUCTURES IN POETRY READING.

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ABSTRACT

Our study is concerned with the reading of metrically structured verse. We find an apparent tendency of an integration of pauses within and across verse lines to maintain a rhythmical continuity of mean interstress intervals. Similar rhythmical traits have earlier been found in prose reading but with a greater variability of the duration of boundary spanning intervals. Meter specific temporal patterns of strong and weak syllables have been found to comply with expectations. Thus, a main difference between realizations of iambic and trochaic patterns is the relative shortness of the iambic weak syllable. This trend in part reflects a difference in syllable complexity, the average number of phonemes in the iambic weak syllable being less than that of the trochaic weak syllable.

1. INTRODUCTION

Rhythm in the reading of a poem may be looked upon both as a literary and as a linguistic phenomenon. The analysis must handle aspects and tools from metrical as well as prosodic points of view. Important are the concepts of meter and rhythm.

Today metricians try to distinguish between meter and rhythm in poetry. Meter is the abstract, pure pattern of the alternation of weak and strong syllables. Rhythm in poetry, then, is the product of a delicate interplay between this abstract pattern of meter and the normal rhythm of language in prose. Thus, in the reading of a poem, meter can only be realized in an incomplete way because of the resistance natural language makes when it will accommodate itself to the regular pattern of the meter. This also implies that the natural prosody of language can be more or less perturbed when it is squeezed into the metrical scheme. As a result a tension appears - often very fruitful - between the meter and the rhythm of language, [4, 5, 1].

Consequently, in order to investigate the rhythm in poetry reading, we need to use both methods from literary metrical analysis, starting out from syllables that form metrical feet, and methods from the analysis of the natural prosody of language with a segmentation into interstress intervals, in Swedish headed by stressed vowel onsets. These we refer to as phonetic feet.

The major problems of the present study are the following:

(1) To what extent is isochrony maintained in reading?

(2) How do pauses within and between lines maintain a rhythmical continuity?

(3) What are the characteristic features of trochaic and iambic patterns as they appear in reading? Are weak and strong syllables in an iambic foot (weak + strong) different from those in a trochaic foot (strong + weak)? If so, to what extent are these differences attributable to metrical grouping effects, and to what extent are they implicit in meter specific word and syllabic structures?

2. EXPERIMENTAL PROCEDURE

We have approached the problems outlined above in three steps. One is through sequences of nonsense syllables representing prototype iambic and trochaic rhythmical patterns. The next step was to construct "lab poems" of strict iambic and trochaic meter, based on almost the same word material, enabling a minimal contrast in composition. Finally we turned to the study of traditional Swedish poetry.

As subject served a trained speaker, ÅJ, a language expert of the Swedish Radio, and a few of our laboratory staff. All of

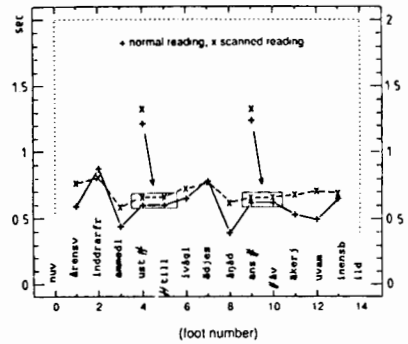

Fig.1 Interstress intervals in a "lab poem". Normal reading, +, and scanned reading, x.

them were well acquainted with traditional Swedish poetry. The recorded material was subjected to our routine data bank processing, involving segmental analysis from spectrographic records. We accordingly measured durations of individual speech sounds, syllables, pauses and interstress intervals, the latter measured from the onset of a stressed vowel to the next stressed vowel. Mean interstress durations were calculated for feet not spanning a pause or otherwise marked syntactic boundary. We also measured interstress intervals spanning pauses and line junctions to determine a possible rhythmical coherence with mean interstress durations.

In order to study durational correlates of specific meter types we performed a segmentation in terms of conventional syllables labelled as weak, W, and strong, S. An iambic foot thus contains a sequence of W+S and a trochaic foot the syllable sequence S+W. Average durations of such syllable based feet are not necessarily the same as average interstress intervals but usually serve as good approximations if averaged over a sufficiently long reading. We have also tested the consequences of relating the S and W component of a metrical foot, not to proper syllables but to vowel-to-vowel units with segment boundaries at stressed as well as unstressed vowel onsets. However, although such an analysis gave similar results it was discarded as a less reliable basis for the study of rhythmical structures.

3. RHYTHMICAL COHERENCE

We shall here report on some of the main results. A more detailed account will be given in [2]. The issues of isochrony and rhythmical coherence of pauses are illustrated in Fig.1, which pertains to a three-line iambic "lab poem":

"Nu vårens vind drar fram med lust,
till liv och glädje sång och dans
och väcker ljuva minnens bild."

Each line contains four feet of the metrical structure W+S. However, for the purpose of bringing out a regularity of interstress intervals it was segmented at stressed vowel onsets. The duration of each interstress interval is plotted vertically against the foot number with the foot text included below. Two versions are included, a normal reading and a scanned reading. One may observe that interstress intervals tend to vary in length with the number of associated phonemes. This is less so in the scanned reading. In the normal reading mode the regularity of syllable sequences, implied by the meter, limits the variability of foot durations and thus preserves some degree of isochrony compared to prose reading. All the same we occasionally encounter large local variations of foot length.

Pauses occurred at all line junctions of the "lab poem", Fig.1. The interstress intervals, from the vowel onset of the last stressed vowel in one line to the onset of the first stressed vowel in the next line, are prolonged by about one mean interstress interval. The pause absorbs a silent beat. Accordingly, the line junction spanning feet have been divided into two parts of equal duration placed at the end of one line and at the beginning of the next line, which brings out the rhythmical continuation.

The same tendency of rhythmical coherence across pauses was observed in the reading of traditional Swedish verse and with greater consistency than in prose reading. Our most detailed data are from two poems, the trochaic "Näcken" (The Water Sprite) by E.J.Stagnelius and the iambic "Kung Karl" (King Charles) by E.Tegnér. The trochaic poem contains five stanzas, each of four lines of four feet each. Most of the pauses occurred at line and stanza junctions. Pause spanning interstress intervals formed a regu-

lar pattern of preferred durations of approximately m=1,2,3,4 or 5 times a quantal module of To=525 ms. Out of the 21 occurrences, 12 were found on the m=2 level, 4 on the m=3 and m=4 levels, and one m=5. The quantal base, To=525 ms, is somewhat smaller than the average interstress interval, Ta=580 ms. We do not claim an exact synchrony.

The iambic verse is made up of four line stanzas, normally with three complete (W+S) iambic feet per line with a regular occurrence of an extra weak syllable (hypercatalectic) at the end of each odd numbered line. Pauses were generally shorter after the odd lines than after even numbered lines, which tended to secure an overall regular timing of all line junction spanning interstress intervals to approximate 2Ta. In other words, at the end of the odd lines the pause acts as a supplement to the hypercatalex, completing a foot. In the even numbered lines the pause alone adds a silent foot.

The concept of rhythmical continuity across a pause or a line junction can be given two slightly different formulations. One is an invariance of a measure of pause duration plus the associated prepause final lengthening, which tends to approximate a measure of nTa. This seems to hold rather well for rhythmical reading of prose. In poetry, on the other hand, we found a more consistent trend of the entire spanning interstress intervals to comply with a measure of mTo. This is what we could expect from a higher demand for rhythmical regularity in poetry reading. In a situation where To=Ta and both models fit the data, we can expect m=n+1, i.e. one rhythmical unit is contained in the physical sound segments of the spanning foot.

4. METER SPECIFIC PATTERNS

Our next problem has to do with rhythmical patterns of read poetry in relation to metrical patterns. If the W of the iamb does not differ significantly from the W of the trochee, and the same would be the case for the S of the iamb and the S of the trochee, the sole difference would be whether a line started with a strong or a weak syllable and also how a line was terminated. It has been claimed in the literature, [6],[7], that the S/W durational ratio is larger for iambic than for trochaic verse. This we have verified in the reading of our "lab poems" where an iambic version has the same text as the corresponding trochaic version with a weak upbeat syllable, "anacrusis", added. However, these readings merely demonstrate that consistent, meter specific patterns could be produced, but they do not have a general proof value concerning unbiased performance.

In the reading of true poetry the situation was different. The subject was a trained reader but lacked any preconcept of a specific meter implied rhythm. However, the results from these readings supported our expectancy. We found that the duration of the strong syllable in the iamb, S=375 ms, was only slightly longer than the S=355 ms of the trochee. A great difference was found in the weak syllables with W=150 ms for the iamb compared to W=225 ms for the trochee. However, it is important to consider that this in part reflects differences in syllable complexity. The average number of phonemes per weak syllable was 2.55 for the trochee and 2.15 for the iamb. The average duration of a syllable is approximately proportional to the number of phonemes, [3]. About half of the 75 ms difference between the W of the trochee and the W of the iamb, i.e. 35 ms, is thus attributable to the difference in syllable complexity, whilst the remaining 35 ms represents a true meter determined effect. The difference in strong syllable duration comparing the iamb and the trochee may entirely be explained by the slightly higher average number of phonemes in the iambic S than the trochaic S. The main durational difference thus lies in the weak syllable, which is shorter in the iamb than in the trochee.

How do we explain these differences? First of all, the durational patterns we have found merely constitute one part of a complex pattern also carried by intonation and intensity contours that contribute to the lively character of an iambic reading compared to the more level trochaic reading. We may expect that the meter imposes a grouping effect in the read poem so as to enhance the final syllable of the foot, the W in a trochee and the S in an iamb. This would especially be the case of a terminal lengthening at the end of a line, which would enhance a trochaic W and an iambic S.

We have also looked into meter specific choice of language material. We have found a predominance of monosyllabic words in iambic as well as in anapestic poems, whilst trochees and dactyls show a relative predominance of disyllabic words. It remains to be seen to what extent word inherent stress patterns condition durational patterns in poetry reading.

We plan to compare our data above with data from the same poems read as prose. Meanwhile, we gain some support from our earlier analysis of prose reading [3], where we have developed models of how stressed and unstressed syllable durations increase with the number of phonemes contained. If in these regression equations we insert the number of phonemes per W and S syllables of the read poetry we arrive at a S/W ratio of 2.4 for an iambic pattern and 1.9 for a trochaic pattern to be compared with the observed S/W=2.5 for the iambic verse and S/W=1.6 for the trochaic verse. This simple prediction of how language structure might impose constraints on poetry reading supports what we have already seen, that the contrast between the iambic and the trochaic durational patterns is greater than implied by a language model derived from prose reading.

5. GENERAL DISCUSSION

We have dealt with two major aspects of temporal organization. One is the tendency of pause and line spanning interstress intervals to synchronize on a multiple of a basic rhythmical module close to an average free foot interval. In prose reading similar rhythmical traits were observed, but here the pause plus prepause lengthening is a more stable unit than the duration of the pause spanning interstress interval which varies with the number of phonemes contained.

The other main problem concerns meter specific rhythmical patterns. The strong syllable appears to be of about the same length in iambic and trochaic verse, whilst the weak syllable is significantly longer in trochaic verse than in iambic verse partly as a consequence of a smaller number of phonemes in the weak iambic syllable. The remaining difference could also in part be related to other meter specific selections of word and accent types. However, the durational patterns we have observed appear to reflect a specific grouping within a metrical foot to comply with a poetic mode of reading, e.g. the relative liveliness of the iamb. In this respect we may claim that specific iambic and trochaic patterns are not "metrical myths" [6], but a reality as proposed by earlier investigators, [7],[8].

A large number of problems remain to be tackled, e.g. the integration of other stress attributes such as F0 and intensity variations into an overall model of poetical performance. Now, in the age of free verse these problems might seem antiquated. However, there is a recent trend in poetry writing of rediscovering the poetical virtues of metrical structures.

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