Relational and Nonrelational Aspects of English Stress

András Cser

0 The purpose of this paper is to investigate two aspects of stress, namely relational *vs.* nonrelational, in the framework called metrical grid theory, in which stress is represented in grids, that is, in matrices of pulses assigned to the syllables in an utterance. We shall investigate to what extent the assignment, functioning or realization of stress involves reference within the grid or outside the grid, since this is essentially what the terms *relational* and *nonrelational* mean in this context.

One of the fundamental differences between the theory of stress expatiated in Selkirk (1984), the book on which this paper is based, and the theory advocated in Liberman & Prince's 1977 article is that in Liberman & Prince stress is a fully relational concept, whereas in Selkirk stress is partly relational, partly nonrelational. The exposition of this difference is to be found in Selkirk (1984 : 16–17). Let us summarize the points of these paragraphs: stress is relational in the sense that (i) it is non-local, *i.e.* the way stress is assigned or is affected by rules depends "on the presence of some other(s) [stresses] within the same grid" and (ii) non-primary stress is syntagmatic, *i.e.* "whether or not a syllable bears a certain 'degree of stress' is a function, in part at least, of the 'degrees of stress' of syllables in the surrounding context". Stress, however, is also nonrelational in the sense that (i) "an individual syllable may be stressed [...] regardless of whether its neighbors are stressed" and (ii) "a syllable with 'main word stress' is always more prominent than a syllable that is merely 'stressed' ". She argues that the metrical tree theory does not offer anything that her theory would not, furthermore, the two aspects of stress are implicitly present in Liberman & Prince too: "a metrical/prosodic tree theory expresses relational concepts by labeling trees with *s* and *w*, and nonrelational concepts by means of the organization of the tree into prosodic constituents", whereas "the metrical grid theory of stress [...] gives a uniform representation of both the relational and the nonrelational aspects of the stress patterns of words (and phrases)".

It is evidently not Selkirk's purpose to give a full and exhaustive treatment of the relational and nonrelational aspects of stress (*i.e.* when mechanisms of stress, whether it be assignment, manifestation or rule-application, make reference only to other stresses and their configurations [=grid structure, grid-internal factors] or also to the segmental/physical properties of the syllables [=grid-external factors]; this can actually be taken as a definition) in these paragraphs, so it may be a worthwhile effort to methodically collect the points pertaining to this question. I shall go through the levels of stress as the grid is built up (as stress is assigned to syllables) and then take a look at the rules that affect stress (movement, deletion *etc.*) and also the way stress manifests itself on the given syllable from this point of view. We shall see that stress phenomena display an intricate interplay of relational and nonrelational factors and we shall also see to what extent Selkirk's theory manages to capture these two aspects of prosody.

1 The first level and "below"

The metrical grid is defined as a representation of pulses on different (horizontal) levels; a *pulse,* in turn, is one of a series of regularly recurring, precisely equivalent stimuli. What matters here is evidently not the material nature of the stimulus: abstracting away from stress in language, it can be anything, including sound, light, colour, or waves on water. The important feature is the *regular* recurrence of *equivalent* stimuli, *i.e.* the time that elapses between each of the pulses is equal and the "strength" of the individual stimuli is also equal. This key word sheds light on the purely relational notion of pulse, since pulses are defined as such only in comparison with each other and with nothing else. Since pulses are, in a way, preexistent to stress and the grid in the theory, the concept of being relational has to be understood in a somewhat different sense with respect to them. A pulse is *relational* because it can only be interpreted *in contrast with its own absence:* a continuous, uninterrupted stream of noise is not a series of pulses.

The next term, *rhythm,* is defined as the measurement of weak pulses between the regularly recurring strong pulses (strong pulses are pulses made conspicuous for perception). Here we see that there is no definition of strength or weakness; these are notions that can only be understood with reference to each other, not in themselves (there is no absolute strength, only "stronger than" and "weaker than"). Therefore we are still faced with a purely relational concept within the theory of stress.

This situation changes when we introduce the *demibeat,* the lowest level of the metrical grid.[1] Though demibeats are analogous to pulses in the sense that both are a kind of "neutral" layer underlying and carrying every stress phenomenon, the term *relational* has a different meaning in the case of the demibeat, because it is already a theory-internal (and grid-internal) notion (the definition of *relational* here is already that given in the introductory section). A demibeat cannot contrast with its absence (as opposed to a pulse), since each and every syllable is associated with one, therefore it cannot be relational: *within the grid* a demibeat has a status but *it has no alternative*. Furthermore, its presence is only bound to already existing syllables (its assignment naturally makes reference outside the grid) and it cannot be deleted or shifted, therefore it is almost "material" in a way. This is still true if we include silent demibeats in the description.

2 The second level

Beats on the second level (basic beats) are produced, on the one hand, by basic beat rules which align every syllable of a certain compositional or positional type with a beat, on the other, by beat addition rules which aim to achieve an alternating stress pattern on this level.[2] Basic beat rules make reference to the "content" of the syllables (their weight and vowel quality), or their position; thus they clearly introduce nonrelational aspects of stress. Beat addition, however, only applies with respect to the succession of syllables, regardless of their content or position; the stresses distributed in this way seem to be governed by purely relational principles. A nonrelational aspect of these stresses is shown by the fact that they can manifest themselves in the quality of the vowels (full *vs.* reduced) in the affected syllables[3] (and vowel quality is, of course, a grid-external factor).

3 The third level and above

On the third level, stresses are introduced by Main Stress Rule in the first place.[4] Main stress manifests itself in the relative loudness of the syllable, which is a nonrelational aspect. This may seem to be a contradiction in terms, but in fact it is not: since there is no absolute loudness (I am now using this term for the complex notion of *prominence*), a stressed syllable is always only louder than the surrounding syllables, which means that loudness in itself is relational. Within the theory of stress, however, a stress that manifests itself in the physical properties of the syllable it is assigned to, in this case loudness, that is, it makes reference in its interpretation outside the grid, is nonrelational in accordance with the definition of the term given in the introductory section.

Beats on this level are added by Beat Addition rules too: these have been discussed in the section on stress phenomena on the second metrical level. An exceptional feature of the third level is, however, that the stresses added by beat addition rules are not equal to the stress produced by the

Main Stress Rule; the Textual Prominence Preservation Condition requires that main stress (since it was assigned to the relevant syllable by a Text-to-Grid Alignment Rule[5]) be always minimally more prominent than any other prominence on the given cyclical domain. Therefore, if a stress is added by the Beat Addition Rule on the third level, the stress assigned by the Main Stress Rule is automatically promoted to the fourth level.[6] This shows that main stress is partly relational too: once it has been assigned to a syllable, its status will depend on the presence or absence of other stresses on the same level.

Other rules and constraints operating on this level (such as the Montana Filter[7]) are nonrelational in that they make reference to the content of syllables and relational in that they also make reference to the metrical grid they are part of. The same applies to destressing rules (which can also eliminate second-level beats), which display an intricate interplay of relational and nonrelational features. Destressing rules make reference to the segmental content and/or the weight of syllables (*e.g.* the Abracadabra Rule[8]) and position of the syllable within the domain (Initial, Medial and Final Destressing[9]) but are constrained by requirements regarding the configuration of the grid (*e.g.* Alternation Maintenance Condition[10]). The stresses assigned by phrasal rhythmic prominence rules behave in the same way with respect to relational and nonrelational qualities as main stress.

Pitch Accent is different in that it can be assigned to several of the syllables which have stress on the third level (but only one on each occasion) and that it manifests itself in pitch change, a phenomenon that can easily be defined purely in terms of physical properties of the syllable. It is therefore a kind of stress in which nonrelational aspects dominate. It is also interesting that the Pitch Accent Prominence Rule can override Nuclear Stress Rule or Compound Stress Rule and give preference to a syllable that was not assigned nuclear stress.[11]

4 Conclusion

I hope to have shown how subtle an interplay there exists between relational and nonrelational aspects of stress in its assignment as well as realization and the way stress is affected by rules. Different levels of prominence are sensitive to the two sides of this distinction, but they nevertheless seem to be interwoven at several points in grid construction, interpretation and transformation. There is no doubt that any theory of stress that seeks to provide a competent, natural and uniform treatment of prosodic phenomena with sufficient explanatory power, as Selkirk's does, has to take into account and handle satisfactorily this two-faced nature of its object of investigation.

NOTES

[1] The assignment of demibeats is the first step of grid-construction. Every syllable is automatically assigned with a demibeat, *e.g.*

```
×   ×   ×  ×  ×  ×
re  con ci li a  tion
```

(The examples given in the notes are from Selkirk (1984). The exact formulation of the rules will not concern us.)

[2] The Initial Basic Beat Rule assigns every initial syllable with a beat on the second level, *e.g.*

```
×
×   ×   ×  ×  ×  ×
re  con ci li a  tion
```

The Heavy Syllable Basic Beat Rule assigns every heavy syllable with a beat, *e.g.* the second syllable in *shampoo:*

```
 ×    ×
 ×    ×
sham poo
```

Beat Addition adds beats on the same level roughly on every other syllable:

```
×       ×     ×
×   ×   ×  ×  ×  ×
re  con ci li a  tion
```

[3] *Cf.* the full vowel in the last syllable of *parallel* as opposed to the schwa in the second.

[4] The Main Stress Rule assigns the rightmost second-level beat with main stress, *i.e.* stress on the third level:

```
              ×
×       ×     ×
×   ×   ×  ×  ×  ×
re  con ci li a  tion
```

[5] Text-to-Grid Alignment Rules are distinguished from Beat Addition, Beat Movement and Beat Deletion, which make no reference to the text in their operation.

[6] Beat Addition in the case of *reconciliation* associates the first syllable with a stress. In order for its prominence to be preserved (TPPC), the × of the main stress is promoted to the next level, so we get

$$\begin{array}{cccccc}
 & & & & \times & \\
\times & & & & \times & \\
\times & & \times & & \times & \\
\times & \times & \times & \times & \times & \times \\
\textit{re} & \textit{con} & \textit{ci} & \textit{li} & \textit{a} & \textit{tion,}
\end{array}$$

which is the actual surface stress pattern of this word (203010).

[7] The Montana Filter disallows the (partial) grid-configuration

$$\begin{array}{ccc}
\times & & \\
\times & \times & \\
\times & \times & \times
\end{array}$$

(compulsorily if the first syllable has a short vowel). The word *Montana* is an example, hence the name; this is the rule that prevents *Montana cowboy* (320 13) from being turned into (230 13) despite the more favourable rhythmic pattern of the latter.

[8] The Abracadabra Rule deletes a stress in the following manner:

$$\begin{array}{ccccccc}
\times & \times & & & \times & & \\
\times & \times & \times & \longrightarrow & \times & \times & \times \\
\sigma & \mathrm{CV} & \mathrm{CV} & & \sigma & \mathrm{CV} & \mathrm{CV}
\end{array}$$

This is why the word *abracadabra* has schwa in the second syllable instead of a full vowel. The beat that is deleted by the Abracadabra Rule was, in this case, assigned by second-level beat addition.

[9] Initial Destressing destresses the first syllable of *ally* (V), *America,* Medial Destressing the medial syllable in *Mozambique, conversation,* Final Destressing the last syllable in *tempest, inheritance etc.*; this is the reason why these syllables have reduced vowels.

[10] The Alternation Maintenance Condition blocks beat deletions if they would result in a succession of two weak syllables.

[11] In the word *kingfisher,* for example, main stress is located on the first syllable in accordance with the Compound Stress Rule, but the second syllable can get pitch accent under special circumstances, *e.g.* if we want to contrast the word with *kingpin* (*I said kingfísher, not kingpín*).

REFERENCES

Liberman, M. and A. S. Prince (1977) 'On stress and linguistic rhythm'. *Linguistic Inquiry* **8.** 249–336.

Selkirk, E. O. (1984) *Phonology and Syntax: The Relation between Sound and Structure.* Cambridge, MA and London: The MIT Press.