

# INTONATIVE STRUCTURE AS A DETERMINANT OF WORD ORDER VARIATION IN DUTCH VERBAL ENDGROUPS

Marc Swerts

IPO, Center for Research on User-System Interaction, Eindhoven, The Netherlands  
swerts@ipo.tue.nl

## ABSTRACT

This paper looks into the question to what extent intonative structure determines word order variation in a particular type of syntactic structures in Dutch. Certain subordinate clauses in this language may contain verbal groups consisting of an auxiliary (aux) and a participle (part) that appear in sentence-final position. The order of these verbal elements is fundamentally free so that both aux+part and part+aux combinations occur. Analyses were based on a set of thirty spontaneous monologues, which contained 71 clauses with verbal endgroups, with the two orders about equally balanced. Distributional analyses revealed that prosodic features both inside the verbal group and in the immediately preceding and following contexts play a role in the choice for the two orders. First, a pitch accent on the participle mostly leads to a part+aux order. Second, an accent on the word immediately preceding the verbal endgroup under certain conditions favours an aux+part order, whereas a prosodic boundary after the endgroup favours a part+aux order. Results are discussed in terms of particular push principles, from the left and the right.

## 1. INTRODUCTION

In his recent book “Intonational Phonology”, Ladd (1996) argues that some languages exhibit strong dependencies between word order variation and specific rhythmic patterns. For example, Catalan, Italian and a few Slavic languages are characterized by a rigid intonative structure that very strongly determines that the most principle accent occurs in sentence-final position. As a result, speakers of such languages will adapt word order such that “focal” words will appear in an ideal accent position, i.e., at the end of a sentence. Other languages, such as English, are called “plastic” (after Vallduví, 1990), because the relation between word order and accentuation is weaker, so that words in non-final position may also carry the main sentence accent.

Dutch would normally also be classified as a plastic language in which word order and intonative structure are only loosely connected. However, there may at least be one exception to this general trend, namely in one type of syntactic constructions where word order is more flexible than elsewhere in the linguistic system. That is, as a result of an underlying SOV structure subordinate clauses in Dutch may have certain verbal elements, such as an auxiliary (aux)

and a past participle (part), in final position. If such a verbal endgroup consists of more than one element, the order of the different components is fundamentally free. The Dutch linguistic literature (Pardoen, 1991; de Schutter, 1996; Haeseryn, 1990) usually distinguishes between a so-called “green” (part + aux) and “red” (aux + part) order. Examples are given in (1), together with English glosses between brackets:

- (1) a. hij zei dat hij het boek gelezen (=part) had (=aux)  
(he said that he the book read had)
- b. hij zei dat hij het boek had (=aux) gelezen (=part)  
(he said that he the book had read)

Some normative linguists would maintain that the green order is less felicitous than the red one, partly because it would sound too German, but corpus studies have shown that there is actually not much evidence to support this claim: though there are some differences between dialects, both orders occur about equally often.

Whereas others have looked at semantic-pragmatic factors (e.g. Pardoen, 1991), de Schutter (1996) and Haeseryn (1990) have investigated to what extent intonative structure could be a determinant of the choice between green and red order. In de Schutter factors both inside and outside the verbal endgroup are taken into account. First, he finds that an accent on the participle usually leads to a green order. An accent on the word immediately preceding the endgroup often pushes the participle to the right, in this way resulting in a preference for red order. From the literature, the effect at the right side of the endgroup is less clear; according to de Schutter, extraposition usually tends to elicit green order, but this is not supported by Haeseryn’s findings. Given that these two studies do not provide detailed analyses of intonative structure, the purpose of this paper is to see whether empirical, phonetic evidence can be found for the claim that rhythm may determine word order variation in Dutch verbal endgroups.

## 2. DATA - LABELING

The research was based on analyses of a set of spontaneous monologues, that were originally elicited by Beun (1991) for research of discourse structure. He asked five Dutch speakers (two male; three female) to describe six different paintings. From the thirty monologues in total, those subordinate clauses were selected for further

analysis that had a verbal endgroup consisting of a participle and an auxiliary. A few examples from the corpus are given below:

- (2) ...een VEER die daar ongetwijfeld voor gebruikt is ...  
(... *a feather which for that undoubtedly used is* ...)
- (3) ...die dan nog vrij sumMIER zijn AANgegeven | ...  
(... *which then still rather briefly are indicated* ...)

The different utterances were put on DAT-tape and played to two phoneticians, both experts in the field of intonative research, who were not informed about the purpose of the research. In written out versions of the monologues, they were asked to mark - independently from each other - those words that carried a pitch accent and those places where they perceived a prosodic boundary. The utterances were presented without punctuation but with a minimal context of one or two sentences. In the first place, those accents and boundaries on which the two labelers agreed were used as input for further analyses. If they did not agree, the choice for the occurrence of a prosodic event was determined on the basis of the author's labelings, whose transcriptions of the data were established independently from the other two. Sentences (2) and (3) above show some examples of such consensus labels where capitalized words represent perceived accents and vertical lines the perceived prosodic boundaries.

In the following, the research will primarily focus on relations between word order and one major prosodic variable, intonation (speech melody). In the view of the IPO school of intonation ('t Hart et al., 1990), this melody plays a major role in signaling prosodic accents and boundaries. In their theory, the strongest "beats" in an utterance are marked by means of particular pitch movements that can be specified in terms of a few parameters. For instance, movement "1" is an prominence-lending rise which is functionally different from the "continuation rise 2", which does not mark an accent but signals an upcoming boundary. The two have some common formal characteristics (e.g. comparable excursion size and duration), but differ in their timing: rise 1 starts relatively early in the syllable (average: 70 ms before vowel onset), whereas rise 2 is late in that its end coincides with the end of voicing. More details about these and other pitch movements can be found in 't Hart et al (1990).

Though speech melody serves to cue accents and boundaries, it is of course not the only suprasegmental marker of such phenomena. On the one hand, while intonation may be the most important prosodic device for lending prominence, accents can also be achieved by variation in duration and loudness, but the latter type of accents are usually perceived as less powerful, thus representing secondary accents. On the other hand, intonation is a weaker cue for boundaries than pause, but pausal breaks tend to be accompanied by melodic markers of boundaries (de Pijper and Sanderma, 1994).

### 3. RESULTS

#### 3.1. Non-prosodic factors

Before embarking on the prosodic data, a few words have to be said about potential non-prosodic factors determining word order vari-

ation in the endgroups. In total, the database contained 71 clauses with verbal endgroups, with 33 with a red and 38 with a green order. This result in itself already indicates that - at least in the present corpus - neither of the two orders is special or marked, since globally they occur about equally often. If the distribution is sub-specified for the different speakers, however, it appears that some of them have clear preferences (see table 1). Interestingly, speakers favouring a green order (JW, LK, MM) happen to be female, whereas the two "red order" speakers (EF, KD) are male. Future sociolinguistic or related studies with larger sets of data should reveal whether such sex differences are really systematic.

**Table 1:** Number of green and red word order as a function of the different speakers

Speaker	green	red
EF	6	14
JW	16	7
KD	2	8
LK	9	4
MM	5	0
Total	38	33

Table 2 gives countings of green and red order for the different auxiliaries: "hebben" (to have), "zijn" (to be) and "worden" (to become). It appears that "zijn" prefers green order, whereas the other two are mostly red. It is interesting to connect these findings with earlier remarks by Pardoën (1991) who argued that a speaker - in using a red order - wants to highlight the "dynamic" aspect of an action, whereas a green order tends to be reserved for marking its "static" nature. One could indeed argue that "zijn", generally used as an auxiliary for the passive mode, refers to the result of an action, whereas the verbs "hebben" and "worden" are more indicative of process-related aspects of an action. Again, more data are needed to support these claims.

**Table 2:** Number of green and red word order as a function of auxiliary

Aux	green	red
hebben (to have)	3	7
zijn (to be)	34	23
worden (to become)	1	4
Total	38	33

#### 3.2. Prosodic factors

Phonetic analyses in this section first concentrate on accent structure within the verbal endgroup. Then, the potential effects of prosodic variables in its immediate context are investigated. Finally, combinations of features are studied to see whether "ideal rhythmic constellations" indeed lead to strong preferences for either of the two orders.

De Schutter (1996) already suggested that there may be a relation

between the choice for green or red order and the presence or absence of an accent on the participle. Table 3 confirms this observation, showing that a majority of the clauses have green order if the participle is accented, whereas most of them are red when it is not. This distribution is marginally significant ( $\chi^2=3.820$ ,  $df=1$ ,  $p=0.05$ ).

**Table 3:** Number of green and red word order as a function of the presence/absence of an accent on the participle

Accent on participle	green	red
no	19	24
yes	19	9
Total	38	33

In a next step, the effect of accentuation of the participle was combined with a possible influence of the prosodic context of the verbal endgroup. First, the left context of the endgroup was considered, i.e., whether or not the immediately preceding word was made intonationally prominent. Table 4 gives the distribution of green and red as a function of the presence or absence of an accent on the participle, combined with the presence or absence of an accent on the preceding word. Looking at the extreme values of this continuum at the bottom and the top of the table reveals that the preference for green or red is the strongest if only one of the two words, the participle or the preceding word, are made prominent. If only the participle carries an accent, the order is part+aux in 77.3% of the cases, which is only true for 30.8% of the cases if solely the preceding word is accented. The preference for green increases a little if both components are accented, but is much stronger if neither of the two is.

**Table 4:** Number of green and red word order as a function of the presence/absence of an accent on the word immediately preceding the verbal endgroup and of the presence/absence of an accent on the participle

accent on preceding word?	accent on participle?	green	red	% green
yes	no	8	18	30.8
yes	yes	2	4	33.3
no	no	11	6	64.7
no	yes	17	5	77.3
Total		38	33	

As noted in the introduction, there is less consensus about the possible effect on word order at the right side of the verbal endgroup. Preliminary observations on our data, however, suggested that a potential determinant on green or red order was whether the endgroup was immediately followed by a prosodic boundary. Table 5 gives the distribution of the two orders as a function of the presence or absence of an accent on the participle, combined with the (non)occurrence of a following prosodic boundary. The table indeed brings to light that the preference for green order is comparatively higher when the endgroup is followed by a prosodic break.

From the preceding it appears that there is indeed a relation between

**Table 5:** Number of green and red word order as a function of the presence/absence of an accent on the participle and presence/absence of a prosodic boundary immediately after the verbal endgroup

accent on participle?	prosodic boundary following?	green	red	% green
no	no	10	15	40.0
no	yes	9	9	50.0
yes	no	8	4	66.7
yes	yes	11	5	68.8
Total		38	33	

word order in the verbal endgroup and prosodic-rhythmic characteristics, both inside the endgroup as in its immediate context. One could also consider combinations of features that - on the basis of the results above - are expected to result in a very clear preference for either of the two orders. If only those clauses are taken into account where simultaneously the participle in the endgroup carries an accent, the preceding word does not, and there is a prosodic boundary immediately after the endgroup, then 11 utterances remain, 9 of which (=81.8%) have a green order versus 2 with a red order. Conversely, if one looks at cases where the preceding word does carry an accent and there is no pitch accent on the participle and no boundary after the endgroup, one gets 16 cases, 13 of which (=81.2%) have a red order. In other words, these results indicate that there is indeed a correlation between word order and particular rhythmic patterns.

## 4. DISCUSSION

This section will first start with a discussion of the results presented last, concerning the effect of an intonative break after the verbal endgroup. Previous research by e.g. de Pijper and Sanderman (1994) has shown that pauses are optimal indicators of major prosodic boundaries. Their study also revealed that such pauses are usually accompanied by other prosodic boundary markers. Pauses following clauses that do not occur in sentence-final position are generally preceded by specific melodic boundary tones, such as a “very late” rise that does not lend prominence to the syllable on which it occurs. Similarly, clauses of which does coincide with the end of a (declarative) sentence are generally marked with an extra low pitch register on the final syllables (Swerts et al. 1994). To enable a speaker to maximally realize such melodic boundary markers, he or she needs some “prosodic space”. A situation in which a prosodic boundary is immediately preceded by an accented participle is less ideal, because then intonation needs to serve a double goal on the same word, i.e., to lend prominence and to mark a break. In the case of part+aux, however, a speaker has one or more syllables to presignal a break melodically.

The phenomenon sketched above can be illustrated with figure 1, in which two non-final clauses with a green (a) and a red (b) word order are visualized with comparable intonation contours. The “pointed” hat marks an accent, whereas the final rise represents a so-called continuation rise, i.e. a melodic boundary tone which does not lend prominence to the syllable on which it occurs. Both intonational



**Figure 1:** Two sentences with a green (a) and a red (b) order on which each time an intonation contour is visualized. Further explanations in the text. Accented syllables are capitalized.

realizations are “grammatically correct”, but the one in a) seems to be rhythmically better because the component that marks the accent is better separated from the part that signals the following boundary.

From the above, it may be clear why endgroups with an accent on the participle are predominantly green. That order guarantees that the final auxiliary can be reserved for the realization of a final or non-final melodic contour which signals an upcoming boundary. According to de Schutter (1996), there would be a preference for the order to switch to red if the endgroup is preceded by an accented word. An explanation for this would then be that a speaker wants to keep enough distance between two consecutive beats. Our data, however, do not fully support this finding in that the order only changes from green to red if the participle itself is not accented. Yet, de Schutter’s earlier explanation may still hold if one takes into account that the participle is likely to be provided with a secondary accent (if it doesn’t carry a primary accent), since the participle is generally semantically more informative than the auxiliary. So then one may argue that the order switches as a result of a speaker’s concern to keep some distance between a primary accent in the preceding word and a secondary accent in the verbal endgroup.

In a sense, the latter result about the push principle from the left is comparable to what has been reported earlier about stress patterns within English words. Shattuck-Hufnagel et al (1994), among others, have done research into “iambic reversal”, which refers to the phenomenon that due to a stress clash the stress in a polysyllabic word may shift. For instance, the main stress may move from third to first syllable in a word such as “absolutely” when it is followed by a word with initial stress (“Absolutely Fabulous”). Comparably, speakers of Dutch can adapt the order of part and aux in verbal endgroups because of rhythmic considerations. The main difference of course is that in Dutch speakers do not keep word order constant and shift accent position from part to aux, or vice versa, but rather move the words themselves which carry the accent.

## 5. CONCLUSION

The goal of this article was to find empirical, phonetic evidence to support the claim that in Dutch particular rhythmic patterns may determine word order in verbal endgroups in subordinate clauses. Prosodic features both inside the endgroup and in the preceding and following contexts were influential. The results could be interpreted in terms of particular push principles. At the right side, a prosodic break usually elicits a green order to enable a speaker to bet-

ter realize a melodic boundary tone. At the left side, a primary accent on the preceding word pushes the participle to the right, yielding an aux+part order, though this effect is blocked when the participle already carries a primary accent itself. Obviously, one should not exclude the possibility that other factors may also be important, since the data investigated here already indicate that order may be dependent on particular semantic-pragmatic or sociolinguistic elements, too.

The introduction referred to the literature in which Dutch would generally be classified as a “plastic” language, because in this language, just as in English, intonative structures usually do not have the same strong effect on word order as is the case in languages such as Italian, Catalan and a few Slavic languages. This article, however, showed that there is at least one exception to this general rule, i.e. in Dutch verbal endgroups where the order of the different components is fundamentally free.

## 6. ACKNOWLEDGMENTS

Marc Swerts is also affiliated with Antwerp University (UIA) and with the Fund for Scientific Research – Flanders (FWO). Thanks are due to Robbert-Jan Beun for allowing us to make use of his corpus, to Jan-Roelof de Pijper and Jacques Terken for their help with the prosodic transcriptions of the speech materials and to Georges de Schutter for inspiring ideas and for comments on an earlier paper.

## 7. REFERENCES

1. Beun, R.J. *Transcripties spontaan gesproken monologen*, 1990. IPO Report 792. 1991.
2. Haeseryn, W. *Syntactische normen in het Nederlands. Een empirisch onderzoek naar volgordevariatie in de werkwoordelijke eindgroep*. Ph.D Thesis Nijmegen. 1990.
3. 't Hart, J., R. Collier and A. Cohen. *A perceptual study of intonation. An experimental-phonetic approach to speech melody*. Cambridge: Cambridge University Press. 1990.
4. Ladd, D.R. *Intonational Phonology*. Cambridge: Cambridge University Press. 1996.
5. Pardo, J. “De interpretatie van zinnen met de rode en de groene volgorde.” *Forum der Letteren* 32, 1–22. 1991.
6. Pijper, J.R. de and A.A. Sanderman. “On the perceptual strength of prosodic boundaries and its relation to suprasegmental cues.” *Journal of the Acoustical Society of America* 96, 2037–2047. 1994.
7. Schutter, G. de. “De volgorde in tweeledige werkwoordelijke eindgroepen met voltooid deelwoord in spreek- en schrijftaal.” *Nederlandse Taalkunde* 1, 207–220. 1996.
8. Shattuck-Hufnagel, S., M. Ostendorf and K. Ross. “Stress shift and early pitch accent placement in lexical items in American English.” *Journal of Phonetics* 22, 357–388. 1994.
9. Swerts, M. D.G. Bouwhuis and R. Collier. “Melodic cues to the perceived ‘finality’ of utterances.” *Journal of the Acoustical Society of America* 96, 2064–2075. 1994.
10. Vallduv, E. “The role of plasticity in the association of focus and prominence.” *Proc. ESCOL* 7, 295–306. 1991.