

The Structure of Rhythm

Anneke Neijt

1. Introduction

The issue addressed in this paper is the representation of rhythm, the language illustrating this issue will be Dutch. As is well known, Dutch allows for both leftward and rightward rhythmic shifts, cf. *lichtpaars-felg  el* ('light purple combined with bright yellow') and *f  tot  estel* ('camera'), which may be realized also as *lichtpaars-felg  el* and *f  totoest  l*. Given the wide array of rhythmic possibilities in Dutch (Visch 1989, 1999), a systematic investigation of structures in this language may reveal the options of rhythmic alternations available in general.

A major step forward in our understanding of rhythm has been the introduction of morphosyntactically motivated bracketed grids for the representation of stress, cf. Hayes (1995), who presents a synthesized approach based on former insights of Liberman (1975), Liberman and Prince (1977), Prince (1983), Hammond (1984), Halle and Vergnaud (1987), Kager (1989), Visch (1989), Cinque (1993) and others. In essence, Hayes uses bracketed grids in two ways: vertically they represent stress, and horizontally rhythm. Both are needed to account for tonal contours: stress predicts the position of pitch accents and the scope of focus, whereas rhythm predicts aspects of tonal contours that correlate with different tapping patterns. The surprise-redundancy contour for *f  totoestel*, for instance, may be realized in either of two ways: the low tone following H* aligns with *toe-* when the tapping pattern is trochaic (*f  tot  estel*) and it aligns with *-stel* if the tapping pattern is dactylic (*f  totoest  l*).

After a short summary of the system proposed by Hayes, the system will be applied to a set of complex words and phrases. It turns out to be possible to derive rhythmic structures from stress structures with the rules of Beat Addition, Move x and Rhythmic Phrasing. Therefore, it is not necessary to develop a special component for the generation of rhythmic structures and to define rules for the mapping of rhythm and stress, as has been proposed in work on poetic meter (Kiparsky 1977, Prince 1989, Neijt 1993). The influence of pitch accents on rhythm, however, remains as much a mystery as it has been in frameworks preceding this one. The present set of rules predicts mismatches, which do indeed occur, but it cannot

handle cases of rhythmic alternation triggered by pitch accents, such as — — for *tienfrancstuk* ('coin of ten francs'), a word with — — as its basic pattern.

2. Stress and rhythm in one structure

In Hayes (1995), the position of stress is indicated by columns of grid marks, such that the final syllable of (1a) and the first syllable of (1b) bear main stress. Secondary stresses are on the second and third syllables of these structures.

- (1) *Stress representations*
- | | | | | | | | | | | | |
|----|--------------------|-----|-----|-----|----|----|----------------|-----|-----|-----|---|
| a. | (| | | | x) | b. | (x | | | |) |
| | (| | x) | (| | | (x | |) | (x | |
| | (x) | (x) | (x) | (x) | | | (x) | (x) | (x) | (x) | |
| | lichtpaars-felgeel | | | | | | fo to toe stel | | | | |

The brackets of these structures are predictable on the basis of the number of syllables and the morphosyntactic structure, such that the four syllables of these words form the bottom-line stress domains in (1), which are grouped on the basis of morphosyntactic information into two domains at the higher levels, with extra grids marking final stress in all domains of (1a) and initial stress in all domains of (1b). Notice that here, the syllable is considered the smallest constituent in metrical structure, whereas Hayes (1995:2) assumes that the smallest constituent is the foot. One of the reasons to base the structure on syllables is that it renders the rule of Grid Expansion (Hayes 1995:393) unnecessary, and thus allows for a more constrained theory.

The appropriateness of stress representations such as (1) is shown by tonal contours: an accent lending tone on *geel* in *lichtpaars-felgeel* for instance indicates that the whole compound is in focus (wide scope), whereas an accent lending tone on *paars* indicates that *lichtpaars* is the word in focus (narrow scope). This way, grid marks and brackets establish the relation between the scope of focus and the position of pitch accents.

These bracketed grids simultaneously represent rhythmic patterns: the bottom line forms a pattern of four beats — — — —, the higher line forms a pattern of two beats — — or — — and the top line has only one beat, which perhaps may not be called a rhythmic pattern on its own. Variants of these beat patterns are generated by Move x, such that the basic beat patterns — — and — — are optionally transformed into the rhythmic 'hammock' — — (van Zonneveld 1980). Because of the Continuous Column Constraint (there is no gap in the column of grids) and the Faithfulness Constraint (there is exactly one grid mark per stress domain),

Move x is restricted to movement of a grid mark within its domain to a position where a continuous column of grids is available in the lower domains. Hence, Move x generates for the structures in (1) no other rhythmic patterns than the ones discussed thus far.

In left-branching or right-branching structures, the rule of Beat Addition (the rule called Domain Generation in Hayes 1995:378) provides continuous columns for grid marks, cf. (2), where the bold x's are instances of beats obligatorily present because of the Continuous Column Constraint. Henceforth, rhythmic patterns with such obligatory Beat Additions, but without optional applications of Beat Addition and Move x will be called 'basic'.

(2) *Basic patterns*

- | | | | | | |
|----|--|----|-------------------------|----|---------------------------|
| a. | (x) | b. | (x) | c. | (x) |
| | (x) (x) | | (x) | | (x) (x) |
| | (x) (x) (x) | | (x) | | (x) (x) |
| | (x) (x) (x) (x) | | (x) (x) (x) (x) | | (x) (x) (x) (x) |
| | on ge veer tien | | in een rood hemd | | nep hoogglansverf |
| | 'approximately ten' | | 'in a red shirt' | | 'fake bright- |
| | | | | | glimming paint' |

By application of the optional rule of Beat Addition (in former frameworks called Strengthening, cf. Visch 1989), five derived variants are available for (2b):

(3) *Variants of (2b), derived by optional Beat Addition*

- | | | | | | | | | | |
|----|-------------|----|-------------|----|------------|----|------------|----|------------|
| a. | x | b. | x | c. | x | d. | x | e. | x |
| | x x | | x | | x x | | x | | x |
| | xx x | | xx x | | x x | | x x | | x x |
| | xxxx | | xxxx | | xxxx | | xxxx | | xxxx |

As the height of the columns is irrelevant, (3c) and (3d) are rhythmically equivalent. The other representations predict different sets of beat patterns to be simultaneously present: — — — —, — — ∪ — and — ∪ — in (3a), — — — — and — — ∪ — in (3b), — — — — and — ∪ — in (3c), etc.

Given the general assumption that Move x resolves clashes, this rule will not apply in (2b), nor in its variants (3), but it may apply in (2a) and (2c), cf. (4), where angled brackets indicate the underlying position of the moved x. Notice that in (4b) an optional beat is added in order to provide a landing place for Move x.

(4) *Variants of (2a) and (2c), derived by optional Move x*

- | | | | |
|----|--|----|--|
| a. | (x) | b. | (x) |
| | (x <<) (x) | | (x) (>> x) |
| | (x) (x) (x) | | (x) (x) (x) |
| | (x) (x) (x) (x) | | (x) (x) (x) (x) |
| | on ge veer tien | | nephoogglansverf |

The topmost x will not move, given the widely accepted assumption that movement is allowed only in situations of clash. This way, the fact that rhythmic patterns align with the main stressed syllable of a string is accounted for (but cf. below for exceptions to this 'fact'). Only one x will move at a time, such that — — — is rightly excluded for *nephoogglansverf*, cf. (5):

(5) *Illicit simultaneous movement of two x's*

- (x)
(x) (>> x)
(x) (>> x)
(x) (x) (x) (x)
nephoogglansverf

The rule system thus generates a wide array of rhythmic possibilities for which it will be difficult to find positive evidence. However, as long as no negative evidence turns up, there seems no need to define additional constraints.

3. Predictions for four-syllable strings

Five morphosyntactically motivated structures are available for strings of four syllables: structures of two pairs (P), fully right-branching or left-branching structures (R and L), and right-branching or left-branching structures with a center-embedded pair (cR, cL). Because of the possibility of final or initial stress in the sub-parts, eight stress variants are available for each of these five structures, cf. the appendix. Henceforth, we will indicate the structure of the examples presented by the above mentioned abbreviations. For instance: P3 and cR3 are the third structures of the classes of 'pairwise grouping' and 'center-embedded right-branching'.

In order not to complicate this exposition unnecessarily, only ideally 'eurhythmic' patterns are discussed, i.e., patterns of — — —, — — — and — — —. Notable parts of the outcome of the rule system are the excluded patterns (6) and the set of examples for which variable eurhythmic patterns are generated (7).

(6) *Eurhythmic patterns excluded*

- a. —u—: nep-Noord-Friesland (R3), pop-up-scherm 2 (L3)
- b. —u—u: maagzweer-o.k. (P2), nood-brand-o.k. (R2), nep-tros-tv (R4), nephoogglansverf (cR1), nood-elftal 2 (cR3), nep-tv-10 (cR4)
- c. u—u—: huisvrouw in spe (P7), huisdeur 5 top (L2), hoogglansverf met (L4), zuid-zuidwest 6 (cL1), hulp-cv-gas (cL3), sierschildpad 5 (cL4).

(7) *Eurhythmic variants*

- a. *Basic* —u—u, *derived* —u—u:
godsdienstomroep (P1), nep-pin-up-blad (cR2), nood-o.k.dienst (cL7)
- b. *Basic* u—u, *derived* —u—u:
lichtpaars-felgeel (P8), in Zeeland-oost (cR7), Zuid-Zeeland met (cL2)
- c. *Derived* —u—u, *derived* —u—u:
langpootmugsteek (L8), schoolzaalvoetbal (R1), badhanddoeklus (cL8)
- d. *Derived* u—u, *derived* —u—u:
hoofd tros-tv (R8), stap stap keer draai (L1), vaag muisgrijs-blauw (cR8)

The fact that rhythmic variants are available might be the source of uncertainty about judgements in the literature. My own judgements are in line with (6)–(7), but I think more reliable tests are necessary than intuitive judgements. In order to obtain at least intersubjective judgements, I presented partial sets of predictions to twelve ‘experts’ in the field: two writers of metrical poems and ten phonologists. They were asked to indicate the most likely eurhythmic pattern and, if appropriate, one other eurhythmic pattern for 33 examples. Most of the examples were relatively easy to judge. Some examples had the same structure, in order to verify the stability of judgements. All in all, only 21 of the 40 logically possible structures occurred in the test. The results were quite stable, with only 15 unique judgements. The rule system predicts non-occurrence of all these choices and of the eurhythmic patterns that were never chosen. Hence, given the reasonable assumption that these 15 unique judgements are errors, we may conclude that for the part tested, the system does not overgenerate.

In 8 of the 33 examples, a eurhythmic pattern predicted not to occur was nevertheless chosen more than once. These examples belong to five different categories (cf. P3, P4, P8, R5 and R6 in the appendix), and the judgements were given by 6 of the 12 experts, but no pattern of judgements could be distinguished for individuals. The non-predicted judgements formed the minority in this set of 8 examples (23 out of a total of 113). In one compound type (P3) it seems that the non-predicted pattern has been chosen systematically. A possible explanation might

be the phrasal nature of the first part, a point taken up in the final section, where all cases will be discussed in slightly more detail.

It has been reported in the literature (Visch 1999:3.5, to appear) that the trochaic pattern — — — for (7c) is ill formed and that the so-called rhythmic hammock — — — (van Zonneveld 1980) is the generally preferred pattern in Dutch compounds and phrases. A small test amongst 28 students of my Dutch department confirmed this for *badhanddoeklus*, not for *langpootmugsteek* and *schoolzaalvoetbal*. In the test amongst experts, only two words of the set (7c) were included, both with structure R1. There was a slight preference for the trochaic pattern, cf. the appendix for details. The test also showed that there is no general tendency to prefer the hammock in words that allow both patterns. Instead, there is a tendency in such words to prefer basic patterns over derived ones.

In sum, we may conclude that the rule system is adequate, except perhaps that it overgenerates in the structures exemplified by *badhanddoeklus* (cL8). It might be that this instance reveals one of the disadvantages of restricting the database to strings of four syllables, not represented in context. Perhaps the trochaic pattern of *badhanddoek* is available in larger contexts, such as *badhanddoeklusstof* ('fabric for straps of bath towels').

4. Rhythm in larger strings and Rhythmic Phrasing

One of the predictions of the present system generating rhythm is that left- and right-branching structures allow for more variation than pairwise embedding, since the number of lines is larger in left- and right-branching structures. Consider the following, admittedly highly artificial, compounds:

- | | |
|------------------------------------|-------------------------|
| (8) a. | b. |
| | (x) |
| | (x) |
| (x) | (x) |
| (x) (x) (x) (x) | (x) |
| x x x x x x xx | (x) |
| dwangsomdraagkrachtvangnetwettekst | x x x x x x |
| | langpootmugsteekzalfpot |

For (8a), two eurhythmic patterns are generated by the system: — — — — and — — — — . For (8b), four patterns are available: — — — —, — — — —, — — — — and — — — —. Although one may wonder whether a fully dactylic realisation of (8b) is well-formed if the string is pronounced in isolation, this pattern seems to occur when an initially stressed word follows, e.g. *langpootmug-*

steekzalfpot opschrijven. In larger words with left- or rightbranching structures such as (8b), the number of variants increases faster than the number of variants in pairwise groupings such as (8a), and this prediction seems to be borne out by the data.

The present rule system needs one other rule for the generation of rhythmic structure, as variants are available for structures such as (8a) on the basis of what is here called Rhythmic Phrasing: the fact that such longer words can be rhythmically split into two domains: $\text{---} \cup \text{---} / \text{---} \cup \text{---}$. For (8b) this rule of Rhythmic Phrasing would generate structures such as $/ \text{---} \cup / \text{---} \cup \text{---}$, $/ \text{---} \cup / \text{---} \cup \text{---}$, etc., but addition of phrase boundaries does not lead to new tapping patterns.

Morphosyntactic structures may thus provide the basis of rhythm, but a fully rhythmic representation will arise only when after the application of Beat Addition and Move x, a rule of Rhythmic Phrasing provides the boundaries of recurrent rhythmic patterns.

5. Phrases *versus* words and the influence of pitch accents

In earlier work on the relation between stress and rhythm, it has been noticed that phrases allow for more rhythmic variation than words; rules for the mapping of stress and rhythm such as the Monosyllabic Word Constraint for iambic verse (Kiparsky 1977) and the Disyllabic Word Constraint for dactylic verse (Neijt 1993) are a direct reflection of this finding. Moreover, it has been found for Dutch that nominal compounds pattern like words, and adjectival or verbal compounds pattern like phrases.

The set of four-syllable strings presented in the appendix includes both compounds and phrases, and presumably the unexpected judgements referred to above, a trochaic pattern for P3 (*zwartgeldoppas*) and a rhythmic hammock for P4 (*push-up-beha*), are due to the fact that in these cases a phrase is embedded in the nominal compound. Given the pervasive influence of pitch accents, one might be inclined to try and find the explanation in that direction. For two reasons, however, it is highly unlikely that pitch accents explain the outcome. First, P3 and P4 include the examples *top-10-hitlijst* and *push-up-beha*, for which an interpretation with contrastive meanings for *top* and *push* is hardly imaginable. Second, the most natural tonal contours of these words show no sign of pitch on the first word, cf.:

- (9) a. *zwart*^g*el*¹*doppas* b. *push*-^u*p*¹*-beha*
 — ∪ — ∪ — ∪ ∪ —

Such examples illustrate that pitch accents need not cooccur with beats. Similar findings of mismatches between rhythm and pitch can be found in Dutch dactylic lines of poetry (Neijt 1993), that show orthographic signs of pitch accents (the diacritics used) in off-beat positions, cf. (12). (In these examples, the boundaries of dactylic feet are indicated by slashes; the examples are from De Roy van Zuydewijn's *Homerus Odysee*, 1992: 187, 212.)

- (10) a. /Daar dan /lag hij, zijn /hoofd naar één /zijde ge/keerd, ...
 'There he was, his head turned to one side, ...'
 b. /én van uw /schip én uw /mannen, ...
 'both of your ship and your crew, ...'

Whereas the fact that rhythm is more freely assigned in phrases may account for the unpredicted patterns found for P3 and P4 in the test (and perhaps also for the two unpredicted judgements for the examples of R5 and R6), this explanation is not available for the two unpredicted judgements of *kort-kort-lang-lang* (P8), since here, the unpredicted beat pattern seems to be available only with pitch accents on the first occurrences of *kort* and *lang*. A similar observation holds for words such as *tienfrancstuk* ('coin of ten francs'), for which —U— is available when *tien* is in focus. At present, no explanation is available for this interaction of pitch accents and rhythm that simultaneously accounts for the non-interaction of pitch and rhythm in cases such as (9) and (10).

6. Conclusions

Lieberman and Prince (1977) proposed different structures for stress and rhythm, as only the latter kind of structure could provide an insightful account of stress clashes and rhythmic movements. Twenty years later, it turns out to be possible to represent stress and rhythm in one structure, and to derive rhythmic variants from basic stress structures. However, a rule of Rhythmic Phrasing needs to be added to the set of rules proposed by Hayes (1995). Morphosyntactic structures thus provide the basis of rhythmic structures, but these structures are not isomorphic.

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Appendix: four-syllable structures

Legenda: P, R, L, cR and cL are codes for the kind of structure, with following numbers indicating the division of stress within the structure. Rhythmic patterns are Basic (B), derived by Movement to the right/left (Mr/l) or derived by Beat Addition to the right/left of the syllable with main stress (Ar/l). An output present in the test, but predicted not to exist by the rule system is indicated by *!. In the set of test words, underline indicates main stress and the numbers after the abbreviations correspond to the responses in the test: the number of preferred choices before the slash and the number of second choices after the slash.

Pairwise branching (P)

(x) (x) (x) (x) (x) (x) (x) 1. godsdienstomroep B — — — — Mr — — — —	(x) (x) (x) (x) (x) (x) (x) 3. zwartgeldoppas Mr — — — — *! — — — —	(x) (x) (x) (x) (x) (x) (x) 5. huisdeur vijftien B — — — —	(x) (x) (x) (x) (x) (x) (x) 7. huisvrouw in spe B — — — —
(x) (x) (x) (x) (x) (x) (x) 2. maagzweer-o.k. B — — — —	(x) (x) (x) (x) (x) (x) (x) 4. push-up-beha B — — — — *! — — — —	(x) (x) (x) (x) (x) (x) (x) 6. Nieuwzuid/ Oudpoort MI — — — —	(x) (x) (x) (x) (x) (x) (x) 8. lichtpaars/felgeel B — — — — MI — — — — *! — — — —

Test words

(P1) godsdienstomroep, B 7/2, Mr 2/2, omroep die gebaseerd is op een bepaalde godsdienst 'religion based broadcasting station'

(P1) dwangsomdraagkracht, B 11/0, Mr 1/2 berekende draagkracht i.v.m. de hoogte van een dwangsom 'financial strength recognizance'

(P1) namaakdeelwoord, B 9/1, Mr 1/2, een deelwoord dat nagemaakt is 'fake participle'

(P3) zwartgeldoppas, Mr 11/0, *! 1/2, oppas die zwart betaald wordt 'black market babysitter'

(P3) linksomdanspas, Mr 9/0, *! 2/3, danspas waarbij je linksom moet draaien 'dance-step turning left'

(P3) top-tien-hitlijst, Mr 11/0, *! 1/2, hitlijst met de top-tien 'top-ten chart'

(P4) push-up-beha, B 12/0, *! 0/4, speciaal soort bustehouder 'push up bra'

(P6) Nieuw-Zuid-Oudpoort, MI 11/0, bushalte die tussen de wijken Nieuw-Zuid en Oudpoort in ligt 'name of bus stop in between Nieuw-Zuid and Oudpoort'

(P8) lichtpaars-felgeel, B 9/1, MI 3/3, ter omschrijving van een stof met die twee kleuren 'combination of two colors: light purple and bright yellow'

(P8) kort-kort-lang-lang, B 7/2, MI 3/3, *! 1/1, gezegd van een morsesein bijvoorbeeld 'Morse code: short-short-long-long'

Right-branching (R)

(x) (x) (x) (x) (x) (x) (x) (x) (x) (x) 1. schoolzaalvoetbal 1x Mr — — — — 2x Mr — — — —	(x) (x) (x) (x) (x) (x) (x) (x) (x) 3. nep-N-Friesland B — — — —	(x) (x) (x) (x) (x) (x) (x) (x) (x) 5. chef wegaanleg Mr — — — — *! — — — —	(x) (x) (x) (x) (x) (x) (x) 7. Kaap-W-Finland Al — — — —
(x) (x) (x) (x) (x) (x) (x) (x) (x) (x) 2. nood-brand-o.k. Mr — — — —	(x) (x) (x) (x) (x) (x) (x) (x) (x) 4. nep-tros- tv B — — — —	(x) (x) (x) (x) (x) (x) (x) (x) 6. hoofd brand-o.k. B — — — — *! — — — —	(x) (x) (x) (x) (x) (x) (x) 8. hoofd-tros- tv 1x Al — — — — 2x Al — — — —

Test words

- (R1) schoolzaalvoetbal, 1x Mr 6/1, 2x Mr 5/0, zaalvoetbal in schoolverband 'indoor soccer at school'
 (R1) herfstschoolelftal, 1x Mr 9/2, 2x Mr 3/3, schoolelftal dat in alleen in de herfst speelt 'school team formed for the autumn competition'
 (R2) nood-brand-o.k., Mr 11/0, in nood te gebruiken operatiekamer voor brandwonden 'operating-room for burns, to be used in case of need'
 (R3) nep-Noord-Friesland, B 12/0, streek in het noorden van Groningen die zich als Friese streek voordoet 'fake North-Friesland'
 (R5) chef-wegaanleg, Mr 11/0, *! 0/2, chef van de afdeling die wegen aanlegt 'chief of road constructions'
 (R6) hoofd-brand-o.k., B 11/0, *! 0/2, iemand die hoofd is van de operatiekamer voor brandwonden 'chief of operating-room for burns'
 (R6) pro-nep-ad-hoc, B 10/0, *! 0/2, gezegd van bijvoorbeeld een maatregel i.p.v. een andere onterechte ad-hocmaatregel 'instead of a fake ad hoc (measure)'

Left-branching (L)

((((x) (x) (x) (x) 1. stapstapkeerdraai 1x MI — — — 2x MI — — —	((((x) (x) (x) (x) 3. pop-up-schermer-2 B — — —	((((x) (x) (x) (x) 5. eropuitgaan MI — — —	((((x) (x) (x) (x) 7. grofvuildienstman Ar — — —
((((x) (x) (x) (x) 2. huisdeur-5-top MI — — —	((((x) (x) (x) (x) 4. hoogglansverf-met B — — —	((((x) (x) (x) (x) 6. huisdeur-5-mens B — — —	((((x) (x) (x) (x) 8. langpootsteekmug Ar — — — Ar — — —

Test words

- (L1) stap-stap-keer-draai, 1x MI 8/1, 2x MI 4/4, gezegd van een te leren danspas 'step-step-turn-spin'
 (L5) eropuitgaan, MI 11/0, een uitstapje maken 'to take a trip'
 (L5) gin-tic-met-drank, MI 11/0, drank van gin met een tic, met nóg iets (ijsblokjes of zo) 'drink of gin-tic and something else'
 (L6) huisdeur-5-mens, B 12/0, het mens dat achter huisdeur 5 woont 'person of street door 5'

Center-embedded, right-branching (cR)

(x)	(x)	(x)	(x)
(x) (x)	(x) (x)	(x)	(x)
(x) (x)	(x) (x) (x)	(x)	(x) (x)
(x) (x) (x) (x)	(x) (x) (x) (x)	(x) (x) (x) (x)	(x) (x) (x) (x)
1. nephoogglsanverf	3. nood-elf tal -2	5. die afvalbak	7. in Zeeland-Oost
Ar+Mr —U—	B —U—	Ar U—U—	B U—U—
			Al —U—

(x)	(x)	(x)	(x)
(x) (x)	(x) (x)	(x)	(x)
(x) (x)	(x) (x) (x)	(x)	(x) (x)
(x) (x) (x) (x)	(x) (x) (x) (x)	(x) (x) (x) (x)	(x) (x) (x) (x)
2. nep-pin-upblad	4. nep -tv -10	6. lucht-kwik-I-stof	8. vaag-muisgrijs-blauw
B —U—U	B —U—	Al —U—U	MI U—U—
Ar+Mr —U—			Al —U—

Test words

(cR1) nep-hoogglsanverf, Ar+Mr 10/0, hoogglsanverf die niet echt is 'not genuine super brilliant paint'

(cR2) nep-pin-up-blad, B 10/1, Ar+Mr 2/4, pin-up-blad dat nagemaakt is 'not genuine pin-up magazine'

(cR2) nep-tv-man, B 10/1, Ar+Mr 2/0, iemand die zich ten onrechte voordoeft als werkzaam bij de tv 'someone who fakes to work for a TV station'

(cR4) nep-tv10, B 12/0, namaakvariant van tv10 'fake variant of TV10'

(cR4) nood-o.k.-west, B 12/0, operatiekamer in de westvleugel die in geval van nood gebruikt wordt 'operating-room in the west wing that is used in case of need'

Center-embedded, left-branching (cL)

(x)	(x)	(x)	(x)
(x) (x)	(x) (x)	(x)	(x)
(x) (x)	(x) (x) (x)	(x)	(x) (x)
(x) (x) (x) (x)	(x) (x) (x) (x)	(x) (x) (x) (x)	(x) (x) (x) (x)
1. zuid-zuidwest-6	3. hulp-cv-gas	5. FortdeFrance-glas	7. nood-o.k.-dienst
Al+MI —U—	B —U—	Al —U—U	B —U—U
			Ar —U—

(x)	(x)	(x)	(x)
(x) (x)	(x) (x)	(x)	(x)
(x) (x)	(x) (x) (x)	(x)	(x) (x)
(x) (x) (x) (x)	(x) (x) (x) (x)	(x) (x) (x) (x)	(x) (x) (x) (x)
2. Zd-Zeeland met	4. sierschildpad — 5	6. in-opdrachtwerk	8. badhanddoeklus
B U—U—	B —U—	Ar U—U—	Mr —U—U
Al+MI —U—			Ar —U—

Test words

(cL1) zuid-zuidwest-6, Al+MI 11/0, sterkte van wind 'south southwest 6 (strength of wind)'

(cL2) Zuid-Zeeland-met, B 6/1, Al+MI 6/3, reisje naar Zuid-Zeeland inclusief bepaalde extra's 'trip to Zuid-Zeeland with extra's included'

(cL2) oud-laagbouw-zuid, B 1/5, Al+MI 11/0, voormalige laagbouwflats die in het zuiden lagen 'former southern low-rise buildings'

(cL3) hulp-cv-gas, B 9/0, bijverwarmings-cv die op gas werkt 'gas operated auxiliary central heater'

(cL4) sierschildpad-5, B 12/0, in een dierenwinkel: genummerde schildpadden 'fancy turtle 5'

(cL7) nood-o.k.-dienst, B 11/0, Ar 1/3, dienst hebben voor de noodgevallen-operatiekamer
'duty for the emergency operating-room'

(cL7) nep-gin-tic-glas, B 4/2, Ar 7/1, glas voor niet-echte gin-tics 'glass for not genuine gin-tics'