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[0756] FRISIAN MONOPHTHONGS AND SYLLABLE STRUCTURE*

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Summary

In this paper I argue that the system of Frisian monophthongs should be divided into two sets according to their phonotactic behaviour: a set of monopositional monophthongs and a set of bipositional monophthongs. Furthermore I show that this division in positional terms does not correspond systematically to phonetic length. Both properties, phonological length (position) and phonetic length (duration) play distinct roles at the phonological level. Finally I discuss some consequences of this division in terms of phonological length (position) for Frisian syllable structure.

1. Introduction

Within the framework of non-linear phonology, phonological representations have been argued to consist of at least two tiers, a skeletal tier, representing the positions that are available for phonological segments, and a melodic tier, representing the phonological segments themselves.[1] The phonological units of the melodic tier have to be connected to the positions of the skeletal tier:

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(1)  skeletal tier   X  X  X
                     |  |  |
     melodic tier    C  V  C
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Structurally, monophthongs can differ from each other in terms of linking possibilities of the skeletal tier to the melodic tier: a monophthong can be represented as the linking of one unit of the melodic tier to one position of the skeletal tier; alternatively, a monophthong can involve the linking of one unit of the melodic tier to two positions of the skeletal tier:

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*. I would like to thank for comments on a preliminary version of this paper Siebren Dyk, Pytsje van der Veen, and Willem Visser. They do not necessarily agree with the claims of this final version.

1. See, for example. McCarthy (1981) and Clements and Keyser (1983).

(2)

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X X X        X X X X
| | |        | |/  |
C V C        C V   C
```

This gives us two types of monophthongs, distinguished in terms of positional characteristics: monopositional versus bipositional monophthongs. The representation of diphthongs fits quite easily into this model. They can be considered vowel-vowel sequences at the melodic tier, each linked to one position on the skeletal tier:

(3)

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X X
| |
V V
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According to such a representation, diphthongs are structurally identical to bipositional monophthongs.

If for a given language, the phonetic opposition ‘short-long’ corresponds systematically to the structural opposition ‘monopositional-bipositional’, then there is no need to postulate a phonological feature for length. The phonological properties of phonetically short and long monophthongs would follow from their different positional properties on the skeletal tier. It is a common assumption in theories about the Frisian phonological system that phonetic length plays a distinctive role at the phonological level. In this paper, I will address the question whether phonetic length in Frisian (duration) can be reduced to phonological length (position).

2. Phonetic length of Frisian monophthongs

It is generally assumed that the phoneme inventory of Frisian[2] consists of following monophthongs:

(4) i, i:, y, y:, u, u:, ɪ, e, ʏ, ø, ɛ, ɛ:, o, o:, ɔ, ɔ:, ɑ, a, ə

2. I use ‘Frisian’ here to refer to the Frisian language variety spoken in the Netherlands.

It has been pointed out in earlier work (for example Fokkema (1961) and Visser (1997)) that this set contains a subset of phonetically short monophthongs which have long counterparts:

(5)	*/y/-/y:/*:	/tyt/ *tút* 'kiss'	/ty:t/ *tút* (interjection)
	/i/-/i:/:	*/sik/ syk(je)* 'to look for'	/si:k/ *siik* 'ill'
	/u/-/u:/:	/huz/ *hoes* 'cover'	/hu:z/ *hûs* 'house'
	/ʏ/-/ø/:	/rʏk/ *ruk(ke)* 'to manage'	/røk/ *reuk* 'smell'
	/ɛ /-lɛ:/:	/vɛr/ *wer* 'again'	/vɛ:r/ *wêr* 'where'
	/ɔ/-/ɔ:/:	/bɔn/ *ban* 'ban'	/bɔ:n/ *bân* 'tyre'

These examples are minimal pairs, suggesting that there is a systematic phonological opposition between these monophthongs that should be described in terms of phonetic length. There is also a set of phonetically short monophthongs that have long counterparts, but they differ slightly in other phonetic properties as well:

(6)	/I/-/e/:	/rɪp/ *rip* 'rack'	/rep/ *reep* 'strip'
	/o/-/o:/:	/doɣ/ *dog(ge)* 'to do'	/do:ɣ/ *dog(e)* 'to be good'
	/ɑ/-/a/:	/lɑm/ *lam* 'paralyzed'	/lam/ *laam* 'lamb'

The phonetic differences between these vowel pairs are: the /I/ is more close and central than the /e/, the /o:/ is more close than the /o/; the /o/ is more central than the /ɑ/. This gives us the following short-long classification of the Frisian monophthongs:

(7) a. short monophthongs: i, y, u, ɪ, ʏ, o, ɛ, ɔ, ɑ, ə
b. long monophthongs: e, ø, o:, a, i:, y:, u:, ɛ:, ɔ:

It is clear from this that 'length' has to be present at the underlying phonological system of Frisian. The question is how it should be represented. Do we have to postulate a feature, or can 'length' be reduced to structural properties of phonological segments?

3. Distributional properties of Frisian monophthongs

In this section I will present evidence for the assumption that the phoneme inventory of Frisian should be divided into two subsets, based on their respective distributional properties. For the time being, I will refer to these subsets with the theory-neutral terms A-vowels and B-vowels, and discuss a bit later how these labels could be interpreted.[3] I will argue for the following classification of the monophthongs in (4):

(8) A-vowels: i, i:, y, y:, u, u: e, ø, ɛ:, o:, ɔ:, a, ə
B-vowels: ɪ, ʏ, ɛ, o, ɔ, ɑ

It is immediately clear that this classification does not correspond to that in (5), which is based on phonetic length. All B-vowels are phonetically short, but the subset of A-vowels contains both phonetically short and long vowels, namely /i/, /y/, /u/, and /ə/. If both the classifications in (5) and (8) are correct, then phonetic length and phonological length are independent properties. I will return to this below.

The motivation behind the distinction between A- and B-vowel is phonotactic: my claim is that A- and B-vowels have different distributional properties. First; in word-internal position, A-vowels have to occur in open syllables. They cannot be followed by a tautosyllabic consonant, wheras B-vowels have to:

(9) A-vowels
(gi)(səl) *gisel* 'swing'; (ri:)(ɣə) *rige* 'series'; (by)(ɣəl) *bugel* 'bugle', (hu)(kə) *hoeke* 'corner'; (ku:)(kə) *koeke* 'cake'; (be)(kər) *beker* 'cup' (bø)(kər) *beuker* 'nipper'; (bɛ:)(kən) *beaken* 'beacon'; (bɔ:)(lə) *bôle* 'bread'; (a)(zəm) *azem* 'breath'; (ri)(ɣə)(lə) *rigele* 'series'
B-vowels
(jIs)(tər) *jister* 'place to milk'; (hʏl)(də) *hulde* 'tribute'; (fɛr)(və) *ferve* 'paint'; (gon)(dəl) *gondel* 'gondola'; (kwɔl)(stər) *kwalster* 'melted snow'; (kɑr)(pər) *karper* 'carp'

3. I follow here Moulton (1962) and van Oostendorp (1995).

Second; in word-final syllables, A-vowels need not be followed by a consonant. This is in contrast with B-vowels which have to be followed by at least one consonant.

(10) A-vowels
/do:məni/ *dominy* ‘vicar’; /rəvy/ *revu* ‘show’; /ljy:/ *lju* ‘people’; /rImbu/ *rimboe* ‘jungle’; /se/ *see* ‘sea’; /snø/ *sneu* ‘disappointing’; /vɪdo:/ *widdo* ‘widdow’; /la/ *la* ‘music note’; /də/ *de* ‘the’
B-vowels
/lɪs/ *lis* ‘iris’; */lI/; /spʏl/ *spul* ‘quarrel’; */spʏ/; /skɛt/ *sket* ‘fence’; */skɛ/; /rom/ *rom* ‘large’; */ro/; /kɔt/ *kat* ‘cat’; */kɔ/; /rɑk/ *rak* ‘rack’; */rɑ/

Note that not all A-vowels show up in word-final position.

Third; in word-final syllables, A-vowels can be followed by no more than one non-coronal consonant, whereas B-vowels can be followed by two noncoronal consonants.

(11) A-vowels

/kil/ *kyl* ‘keel’	/kip/ *kyp* ‘hat’	*/kilp/
	/pi:p/ *piip* ‘pipe’	*/pi:lp/
/hyl/ *húl* ‘wrapping’	/tyv/ *túf* ‘tuft’	*/tylv/
	/sky:v/ *skûf* ‘bolt’	*/sky:lv/
/ful/ *fûl* ‘hard’	/ruk/ *roek* ‘rook’	*/fulk/
/gu:l/ *gûl(e)* ‘to cry’	/ru:k/ *roek* ‘smelled’	*/gu:lk/
/kel/ *keel* ‘throat’	/nev/ *neef* ‘nephew’	*/nelv/
/bøl/ *beul* ‘hangman’	/møk/ *meuk(e)* ‘to mellow’	*/mølk/
/bɛ:n/ *bern* ‘child’	/vɛ:k/ *weak* ‘weak’	*/bɛ:ŋk/
/sto:m/ *stoom* ‘steam’	/ho:p/ *hoop* ‘hope’	*/ho:mp/
/kɔ:m/ *kaam* ‘comb’	/rɔ:p/ *rôp* ‘called’	*/rɔ:mp/
/hal/ *haal* ‘pull’	/haɣ/ *haach* ‘hedge’	*/halɣ/
/hɑmər/ *hammer* ‘hammer’		*/hɑmərk/

(12) B-vowels
/bjIrk/ *bjirk* ‘birch’; /tjIrɣ/ *tjirg(je)* ‘to rage’; /glImp/ *glimp* ‘glimpse’;
/fIŋk/ *fink* ‘finch’;
/skʏlp/ *skulp* ‘shell’; /slʏrp/ *slurp* ‘gulp’; /vʏrk/ *wurk* ‘work’; /tʏrv/ *turf* ‘peat’; /mʏrɣ/ *murch* ‘marrow’;

/stjɛlp/ *stjelp* 'cover'; /skɛl k/ *skelk* 'apron'; /skɛlv/ *skelf* 'stack'; /sjɛrp/ *sjerp* treacle'; /pɛrk/ *perk* 'bed'; /kɛrv/ *kerf* 'notch'; /bɛrɣ/ *berch* 'pile',
/volk/ *wolk* 'cloud'; /volv/ *wolf* 'wolf'; /swolɣ/ *swolch* 'gulp'; /klomp/ *klomp* 'wooden shoe'; /boŋk/ *bonk* 'lump';
/gjɔlp/ *gjalp* 'cry'; /kɔlk/ *kalk* 'lime'; /ɔlv/ *alf* 'eleven'; /bɔlɣ/ *balch* 'bellows'; /kɔrp/s *korps* 'corps'[4] /mɔrk/ *mork* 'cotton grass'; /mɔrv/ *morf* 'mellow';
/hɑrp/ *harp* 'harp'; /ɑrk/ *ark* 'ark'; /slwɑrv/ *sloarf* 'trunk'; /swɑr ɣ/ *soarch* 'care'; /dɑmp/ *damp* 'vapour'; /bɑŋk/ *bank* 'bank';

There are a few cases where such non-coronal consonant clusters are preceded by A-vowels, in particular /i/ and /u/: /vilp/ *wylp* 'curlew', /pilk/ *pylk/* 'arrow', /skulk/ *skûlk* 'dishcloth', /vilɣ/ *wylch* 'willow', /pilɣ/+ər[5] *pylger* 'pilgrim', /bulɣ/ *bûlch* 'bubble'.[6] I know of one example of /i/ preceding /-mp/: /himp/+ə *hympe* 'lump'. Two cases have /u/ before /-mp/: In some Frisian dialects we find /hump/ *hûmp* 'lump', and /plump/ *plûmp* 'water lily' instead of /homp/ *homp* and /plomp/ *plomp.* Exceptions of /u/ preceding /-ŋk/ are /uηk/ *ûnk* 'disaster', /fuηk/ *fûnk* 'spark', /fluηk/ *flûnkerje* 'sparkle', and /ruŋk/ *rûnkje* 'snore'. The last three forms have dialectal variants with /o/ instead of /u/.

Fourth; in Frisian, the velar nasal, /η/, can only be preceded by a B-vowel.[7] I only give a couple of examples:

(13) /diη/ *ding* 'thing'; /doη/ *dong* 'dung'; /baη/ *bang* 'afraid'

There are a few exceptions with respect to A-vowels /i/ and /u/: /giŋ/ *gyng* 'went' (a dialectal variant of /goη/ *gong,* and /giə/ *gie),* and also /priŋ/+əl/ *pryngel* 'yokel' (a dialectal variant of /prIη/+əl *pringel);* furthermore /tiŋ/+ə *tynge* 'news' and /tuŋ]/+ə *tûnge* 'tongue'.

Fifth; the distinction between A- and B-vowels is also relevant to the following distributional generalization with respect to fricatives in Frisian.[8]

4. Here /s/ is extrasyllabic.
5. This representation tries to capture that schwa acts as a word boundary in initial syllabification, see de Haan (1988): 54-58.
6. Visser (1997: 152-154) cites some more examples, but he analyzes them in such a way that they are not in conflict with my observations here.
7. Note that /ɔ/ cannot precede a nasal segment in Frisian, see Visser (1997: 47).
8. See Visser (1997: 50-51).

If at the underlying level, a word-final, or intervocalic fricative occurs after an A-vowel, then it is voiced; if a word-final, or intervocalic fricative is voiceless, it occurs after a B-vowel. The following examples illustrate this generalization:

(14) a. A-vowels preceding a voiced fricative (/ɣ/, /v/, /z/)[9]
/kriɣəl/ *krigel* ‘diligent’; /si:ɣə/ *sige* ‘draught’; /tyɣ/ *túch* ‘trash’; /ty:ɣ/ *túch* ‘rig’; /druɣ/ *droech* ‘dry’; /su: ɣ/ *sûch* ‘draught’; /heɣ/ *heech* ‘high’; /tøɣəl/ *teugel* ‘rein’; /do:ɣ/ *dooch* ‘virtue’; /rɛ:ɣ/ *rêch* ‘back’; /nɔ:ɣ/ *nôch* ‘cooked’; /haɣ/ *haach* ‘hedge’;
/mo:tiv/ *motyf* ‘motive’; /fi:v/ *fiif* ‘five’; /hyvər/ *huver* ‘shudder’; /ky:v/ *kúf* ‘forelock’; /stuv/ *stoef* ‘grim’; /skru:v/ *skroef* ‘screw’; /bev/ *beef* ‘tremble’; /gløv/ *gleuf* ‘groove’; /do:v/ *doof* ‘deaf’; /grɛ:v/ *grêf* ’grave’; /hɔ:v/ *hôf* ‘court’; /skav/ *skaaf* ‘plane’; /prəsiz/ *presys* ‘precize’; /pri:z/ *priis* ‘price’; /gryzəl/ *gruzel* ‘fragment’; /sly:z/ *slús* ‘lock’; /smuz/ *smoes* ‘dodge’; /mu:z/ *mûs* ‘mouse’; /pez/ *pees* ‘string’ ; /røz/ *reus* ‘giant’; /po:zə/ *poze* ‘attitude’; /rɔ:zə/ *rôze* ‘pink’; /lɛ:z/ *1êz(e)* ‘to read’; /baz/ *baas* ‘boss’

b. B-vowels preceding a voiceless fricative (/χ/, /f/, /s/)
/rɪχəl/ *richel* ‘lath’; /bʏχəl / *buchel* ‘hunch’; /boχəl/ *bochel* ‘hunch’; /ɔχəl/ *ochel* ‘noodle’; /kɑχəl/ *kachel* ‘stove’;
/grIf/ *grif* ‘readily’; /hʏf/ *huf* ‘stroke’; /dof/ *dof ‘dull’;* /bɛf/ *bef* ‘band’; /lɔf/ *lof* ‘praise’; /skɑf/ *skaf* ‘meal’;
/rIs/ *ris* ‘equipment’; /bʏs/ *bus* ‘box’; /bos/ *bos* ‘forest’; /lɛs/ *les* ‘lesson’; /dɔs/ *das* ‘badger’; /hɑrnɑs/ *harnas* ‘armour’

This argument is a bit murky, since there are a number of exceptions to this fricative distribution statement. There are exceptions with A-vowels as well as B-vowels:

(15) a. A-vowels preceding a voiceless fricative:
/iχəl/ *ychel* ‘hedgehog’; /go:χəm/ *goochem* ‘smart’;
/vifəl/ *wifel(je)* ‘to waver’; /tyf/ *túf* ‘tuft’; /tafəl/ *tafel* ‘table’
/krys/ *krús* ‘cross’; /busə/ *bûse* ‘pocket’

9. Note that schwa, one of the A-vowels, cannot precede a non-coronal obstruent at the underlying level in Frisian.

b. B-vowels preceding a voiced fricative:
/plʏɣ/ *pluch* 'plug'; /gɑɣəl/ *gaggel* 'palate'; /dɪɣəl/ *diggel* 'pottery'; /moɣəl/ *moggel* 'fat woman';
/lɪz/ *liz(ze)* 'to lie'; /gwoz/ *guos* 'goose'; /hɑzə/ *hazze* 'hare'

These examples indicate that the fricative distribution statement is not an absolute restriction, but reflects a particular tendency (or is, perhaps, no longer a part of the Frisian phonological system). Recognizing these exceptions, I take it to be plausible that this tendency in vowel-fricative distribution should be formulated in terms of the distinction between A- and B-vowels.

These five distributional points lead to the conclusion that the distinction between A- and B-vowels is justified. The first three of these points suggest that this distinction should be interpreted in terms of positional properties. The two vowel types appear to occupy a different number of positions in phonological representations: A-vowels are bipositional and B-vowels are monopositional.[10]

This assumption gets some support from the behaviour of falling and centralizing diphthongs in Frisian. Although space prevents me from demonstrating this, such diphthongs are distributionally equivalent to A-vowels in all respects. They are structurally identical to bipositional monophthongs.[11]

The interpretation of A- and B-vowels in terms of positional lcngth cannot refer to phonetic length, since the distinction between A- and B-vowels does not correspond systematically to a difference in phonetic length. In particular, the phonetically short monophthongs /i/, /y/, /u/, and /ə/. are in the same class as bipositional monophthongs and diphthongs. They behave phonotactically like bipositional segments.[12] This is sufficient to show that phonetic length cannot be reduced to phonological length. I assume that monophthongs have to be specified for their positional

10. After Zonneveld (1978), this is a common assumption in the studies on the phonological system of Dutch, see also Booij (1995).
11. Frisian also has rising diphthongs, which are structurally identical to monopositional monophthongs. They could be analyzed as C-V sequences, or as 'fused' vowels, see Visser (1997: 208-214) for discussion.
12. See Booij (1995) for a similar argumentation with respect to the role of the same vowels in the phonological system of Dutch.

characteristics, although it may be the case that these properties can be predicted from an independently needed feature.[13]

In the beginning of this paper, I referred to the traditional claim that in the Frisian phonological system, phonetic length has phonemic value. There is no reason why this claim should be rejected. Since I have argued here that phonetic length cannot be reduced to structural properties, the conclusion must be that phonetic length of monophthongs has to be represented at the phonological level by means of an independent feature.

4. Phonological length and syllable structure

The claim that the system of Frisian monophthongs has to be divided into monopositional and bipositional segments has consequences for ideas about Frisian syllable structure. In order to account for the distributional properties of Frisian monophthongs in word-internal and word-final syllables, some additional assumptions about the make-up of the Frisian rhyme have to be made. Universally the rhyme of a word-internal syllable is supposed to be confined to a maximum of two positions.[14] There is evidence that in Frisian this bipositional nature is not only a word-internal maximum, but also a minimum for the rhyme in general, that is this minimum holds for both word-internal and word-final rhymes:

(16) *The Minimal Rhyme Constraint*
The rhyme of a syllable in Frisian is confined to a minimum of two positions.

Now it follows from the Minimal Rhyme Constraint and the positional characteristics of the Frisian vowel system that Frisian word-final and wordinternal syllables cannot end in a single monopositional vowel (a B-vowel): they have to end minimally in a bipositional monophthong (an A-vowel), a (falling or centralizing) diphthong, or a monopositional vowel combined with a consonant. That this is correct, is illustrated by the facts in (9) and (10). I take the few examples that are in conflict with the Minimal Rhyme

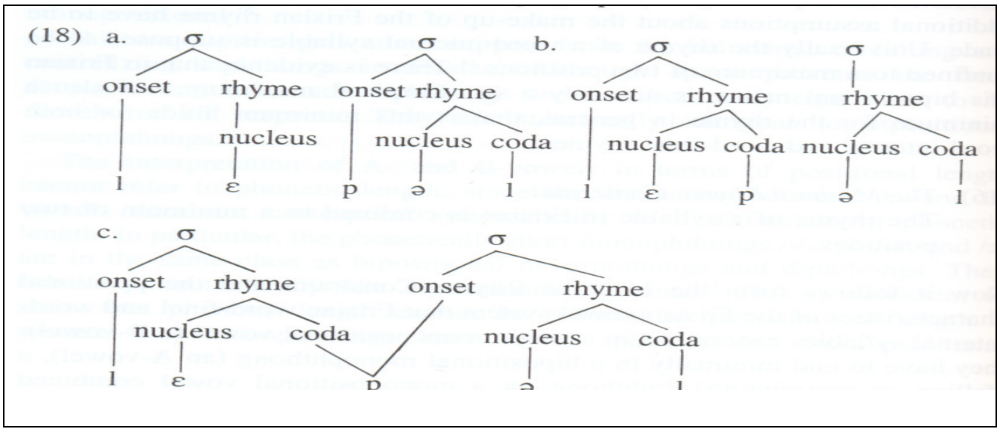
13. See, for example, van Oostendorp (1995: 24-34), who derives distributional properties from the feature <lax>.
14. Cf. Kaye and Lowenstamm (1982).

Constraint as an indication that this constraint is not an absolute restriction, but describes an optimal situation.

This approach also has consequences for the analysis of intervocalic consonants in combination with the plausible background assumption that word-internal syllables in Frisian must have an onset. This is also assumed by Visser (1997: 324), who formulates the following (slightly adapted filter:

(17) *Onset Filter*
$*((\ldots)_\sigma((X)_N)_\sigma \ldots)_\omega$

The Onset Filter, in combination with the Minimal Rhyme Constraint, imposes a particular analysis of intervocalic consonants following a monopositional vowel within the same phonological word. Such consonants have to be analyzed as ambisyllabic. Consider the following alternative syllabifications of the word *leppel* [lɛpəl] 'spoon':



The (a) syllabification, (lɛ)(pəl), is ruled out by the Minimal Rhyme Constraint, and the (b) syllabification, (lɛp)(əl), by the Onset Filter. Only the (c) syllabification with an ambisyllabic segment /p/, (lɛp)(pəl), is in agreement with both constraints.

This conclusion differs from claims about syllabification made in a recent contribution on the theory of the Frisian syllable, Visser (1997). Visser (*op. cit.*: 174-175) lists a number of examples that have a word-final B-vowel, and therefore appear to be counterexamples to the observations expressed in (10) and consequently, to the Minimal Rhyme Constraint as formulated in (16). He considers these examples as sufficient evidence for the claim, opposite to mine, that in Frisian the rhyme is *not* governed by the requirement of a bipositional minimum (*op. cit.:* 177). Consequently, he does not have to analyze intervocalic consonants as ambisyllabic. He adopts the (a) syllabification, although his theory does not exclude ambisyllabicity on principled grounds. The reason why I do not consider Visser's examples with word-final B-vowels as decisive evidence against the Minimal Rhyme Constraint in Frisian, is that his list is very short, and is dominated by function words, interjections, surnames, and loan words. Since such words often show deviant phonological behavior, I do not consider them to be real counterexamples to the Minimal Rhyme Constraint.

5. Final remarks

In this paper I have argued that phonetic length, which plays a distinctive role in the phoneme inventory of Frisian, cannot be reduced to phonotactic properties of segments. Frisian monophthongs are divided in monopositional and bipositional segments, a classification which cuts across the division of monophthongs in terms of phonetic length. In addition to positional characteristics, Frisian phonology still needs independent reference to phonetic length. Furthermore I have argued that the positional properties of segments point to a 'soft' constraint on Frisian syllable structure, which restricts the rhyme to a bipositional minimum. In accordance with this constraint, intervocalic consonants following a monopositional vowel within the same phonological word have to be analyzed as ambisyllabic.

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