

# The structure of Dutch /au/\*

Francine Swets and Marc van Oostendorp  
Meertens Instituut/KNAW, Amsterdam

## 1. Introduction

In the phonological literature, the Dutch diphthongs /*ɛi*/, /*œy*/ and /*au*/ are generally treated as a natural class of so-called ‘true’ diphthongs, occupying two positions in the syllable nucleus. In contrast to these are the ‘false’ diphthongs such as /*ai*/ and /*iw*/, which either occupy one position in the nucleus and one in the coda or one in the nucleus and one in the onset of a following syllable.<sup>1</sup> In this article, we show that there actually are a few differences among the ‘true’ diphthongs and in particular that the phonotactic distribution of /*au*/ is different from that of the other two diphthongs. In many dialects of Dutch — such as the standard language — this sound has a distribution that is much more limited than that of the other two diphthongs, in that it can only be followed by coronal consonants at the end of the word: [paus] is well-formed, but \*[saup] is not.

Our proposal is that /*au*/ has more in common with the ‘false diphthongs’ such as /*ai*/ and /*iu*/ than with the other true diphthongs. This is important, because it means that the set of diphthongs is not symmetric. Even though there are three major places of articulation for the vowels (front unrounded, front rounded, back rounded), one of the three spots in the paradigm (back rounded) is not filled by a true diphthong.

In line with Van der Torre’s (2003) work on the phonotactics of Dutch sonorants, we argue that /*au*/ has a more consonantal ending than the true diphthongs, and for this reason it formally resembles the false diphthongs. Although the analysis given below is stated in terms of Government Phonology, it should be relevant for (and storable in) other frameworks of phonological theory as well.

## 2. The issue: /au/ as a false diphthong

If we disregard schwa, the Dutch vowel system can be plotted in a fairly symmetrical chart, with three dimensions of place of articulation(see, for instance, Trommelen

and Zonneveld 1980, Booij 1995). At each of these three places of articulation we also find a diphthong. These are the so-called ‘true’ diphthongs of Dutch:

(1)		front unrounded	front rounded	back
a. lax (‘short’)	ɪ		ʏ	ɔ
	ɛ			a
b. tense (‘long’)	i		y	u
	e		ø	o
				a
c. diphthongs	ɛi		œy	au

Next to the true diphthongs, a set of so-called ‘false’ diphthongs is also recognized:<sup>2</sup>

(2) ‘False’ diphthongs	ev	a	i
	iv		oi
	(yv)		ui

True and false diphthongs can be distinguished according to the following properties:

- (3) Properties of true and false diphthongs
- i. The first part of true diphthongs is lax whereas the first part in false diphthongs is tense.
  - ii. The two constituting parts in true diphthongs are homorganic (\*ɛu, etc.), the two constituting parts in false diphthongs are not (\*ov, etc.).
  - iii. True diphthongs can be followed tautosyllabically by all consonants, but false diphthongs can only be followed by a coronal obstruent (and those usually function as inflectional suffixes).

Property (iii) is illustrated in (4); (4a) shows that ‘true diphthongs’ can be followed by all kinds of consonants, but ‘false diphthongs’ can only be followed by coronals.

(4) a.	<i>bij</i> [bɛi] ‘bee’	<i>rui</i> [rœy] ‘moult’	<i>pauw</i> [pau] ‘peacock’
	<i>rijk</i> [rɛik] ‘rich’	<i>ruik</i> [rœyk] ‘smell’	<i>pauk</i> [pauk] ‘kettledrum’
	<i>lijf</i> [leif] ‘body’	<i>kuij</i> [kœyf] ‘forelock’	–
	<i>krijt</i> [kreit] ‘chalk’	<i>fruit</i> [frœyt] ‘fruit’	<i>koud</i> [kaut] ‘cold’
b.	<i>knoei</i> [knui] ‘mess up’		<i>kieuw</i> [kiv] ‘gill’
	*[roik]		*[kivk]
	*[luif]		*[levf]
	<i>moois</i> [mois] ‘beautiful (partitive)’		<i>schreeuwt</i> [sxrewt] ‘shouts’

Yet the upper righthand box in (4) is somewhat misleading on closer inspection. If we fill in the other possible word-final consonants, we get the following table.<sup>3</sup>

(5)	ɛi	œy	au
_#	<i>bij</i> [bɛi] 'bee'	<i>ruï</i> [rœy] 'moult'	<i>pauw</i> [pau] 'peacock'
_x	<i>hijg</i> [hɛix] 'pant'	<i>ruig</i> [rœyx] 'rough'	—
_k	<i>rijk</i> [reik] 'rich'	<i>ruik</i> [rœyk] 'smell'	<i>pauk</i> [pauk] 'drum'
_ŋ	—	—	—
_f	<i>lijf</i> [lɛif] 'body'	<i>kuij</i> [kœyf] 'forelock'	—
_p	<i>rijp</i> [reip] 'ripe'	<i>kuij</i> [kœyp] 'tub'	—
_m	<i>lijm</i> [leim] 'glue'	<i>luim</i> [lœym] 'humour'	—
_s	<i>reis</i> [reïs] 'trip'	<i>ruis</i> [rœys] 'noise'	<i>kous</i> [kaus] 'stocking'
_t	<i>krijt</i> [kreit] 'chalk'	<i>fruit</i> [frœyt] 'fruit'	<i>koud</i> [kaut] 'cold'
_n	<i>klein</i> [klɛin] 'small'	<i>tuin</i> [tœyn] 'garden'	<i>faun</i> [faun] 'faun'
_r	—	—	—
_l	<i>pijl</i> [pɛil] 'small'	<i>vuil</i> [vœyl] 'dirty'	<i>Paul</i> [pau] 'Paul'

We have shaded three boxes which seem to be only marginally filled, viz. by a small number of loanwords or names. For instance, *pauk* is one of the very few words in which the diphthong *au* is followed by a non-coronal stop (the other words we have been able to find are *glauk* '(kind of) blue' and *bauxiet* 'bauxite'). We disregard these words at first, but will return to them in Section 4. Further, the strange fact that /r/ and /ŋ/ cannot be preceded by tautosyllabic diphthongs is beyond the scope of the present paper.<sup>4</sup> Note that English *ou* has a similar distribution (Anderson 1986, Harris 1994: 278, Hammond 1999: 109):

- (6) *mouth, shout, house, crown, foul*, \*[plau], \*[raub], \*[taug]  
cf. *ripe, like, lake, smoke*

/au/ thus behaves more like a false diphthong, as far as the third property in (3) is concerned. As far as we are aware, the following fact has gone hitherto unnoticed in the literature (but see Brink 1970, who comes quite close):

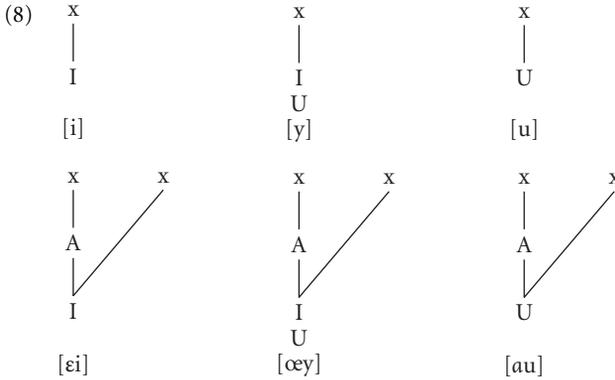
- (7) /au/ can only be followed by a coronal obstruent within the same syllable.

(7) is the fact we try to explain in this paper (synchronically; in Section 5 we list some objections against a possible diachronic explanation).<sup>5</sup>

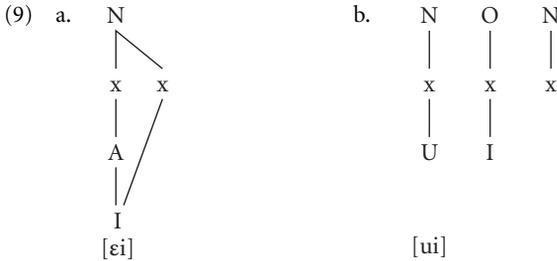
### 3. Analysis in terms of Government Phonology

We will try to solve the puzzle we have established in the previous section using the notational apparatus of Government Phonology (Kaye, Lowenstamm and Vergnaud 1985, 1990; Harris 1994); but we will also use some notions of other frameworks, in particular Optimality Theory.

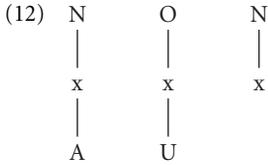
There are three relevant places of articulation, which are represented by the elements |I| (giving front unrounded vowels) and |U| (giving back rounded vowels). Front rounded vowels are denoted as |I,U| in this system, reflecting their typologically marked status. The element |A| is used here to represent lowness (and in some cases unrounded backness). As an illustration, three high tense vowels ([i, y, u]) and the ‘true’ diphthongs can be represented as follows (cf. Smith et al. 1989 for a slightly different view):



The difference between true and false diphthongs can be described in various ways. We assume that true diphthongs fill a binary branching nucleus, whereas false diphthongs consist of a nucleus (filled by the tense vowel) followed by an onset (and a possibly empty nucleus). We give the structures of *bij* and *knoei* as an example (omitting the initial consonants):<sup>6</sup>







Notice that we now analyse the first part of the diphthong as not being rounded (this is necessary because of the OCP and the prohibition on sharing). This conforms to the transcription [au], which we have hitherto used, but it should be noted that the transcription [ɔu] is also quite common in the literature, so that this is not a real argument. Notice that we now have a representation in which the first part and the second part of the diphthong are not homorganic; also, the first part of the diphthong is in an open syllable and should therefore be tense (given the fact that the low tense vowel is usually transcribed as [a] in the Dutch tradition, [au] might therefore be the transcription that most closely fits our analysis). In other words, in our analysis, /au/ is a ‘false’ diphthong according to all three properties mentioned in (3).

More importantly, we have now created a gap in the otherwise perfectly symmetrical system in (8), which we need to explain. Why is [au] exceptional? We use the theory of place-driven phonotactics developed in Van der Torre (2003). According to this theory, the elements |A|, |I|, |U| can play a role in phonotactics in roughly the following way:

- (13) **Place-Driven Phonotactics (PDP)**
- a. The |A| element (velar) is attracted to rhymal positions
  - b. The |U| element (labial) is attracted to onset positions
  - c. The |I| element (coronal) is least marked

Van der Torre adduces arguments for this theory from the phonotactics of Dutch consonants. (13a) can, for instance, be used to explain the fact that the velar nasal can only occur in coda positions in Dutch (*lang* [lan] ‘long’, \*[ɲal])

- (14) *man* [man] ‘man’, *nam* [nam] ‘took’, *lang* [lan] ‘long’

(13c) explains among other things the relative freedom of coronal consonants we have seen exemplified above; as a statistical piece of evidence in favour of (13b) it could be pointed out that there are many more words in Van Dale (1992) starting with *w* than starting with *j*; also, (13b) provides part of the explanation why the glide (or liquid) *w* [v] can be the head of a complex onset, while the other glide (liquid) cannot (it should be noted that in the speech of many speakers of Dutch the *w* hardens to a fricative [v] in this position; but this is not the case in all dialects):

- (15) a. *wreed* [vrɛ:t] ‘cruel’, *wraak* [vrɑ:k] ‘revenge’  
 b. \*[lɛ:t], \*[jɾɑ:k]

PDP actually would mark the structure in (12) as highly desirable. In particular, the [U] element seems attracted to the onset position. This can only happen in this particular configuration. Other diphthongs are not subject to a similar force of attraction in Standard Dutch.<sup>7</sup>

#### 4. On *glauk* and *pauk* and other problems

We now briefly return to the shaded boxes in the table in (5): the words *faun*, *Paul*, *pauk*, *glauk* and *bauxiet* we have thus far excluded from the analysis.

As to *faun* and *Paul*, we note that these words all end in a coronal, albeit a coronal sonorant. Coronal sonorants (or at least /n/) can marginally be extrasyllabic in other environments in Dutch as well. E.g. the *n* in *hoorn* [horn] ‘horn’ is supposedly extrasyllabic, since we usually only find one consonant after tense vowels. Note that many speakers tend to epenthesize a schwa between the two consonants. In that perspective, *parel* [parəl] ‘pearl’ may be seen as an instance of extrasyllabic /l/, and *Paul* would also not be a surprising kind of exception.

*Pauk*, *glauk* and *bauxiet* are slightly more problematic; *glauk* seems unknown to many speakers, but *pauk* and *bauxiet* certainly count as normal words of Dutch — even though *pauk* is a word with an ‘onomatopoeic’ origin, according to De Vries & De Tollenaere (2000). It should be noted that it probably is no coincidence that the extra segment is a voiceless velar stop in all these cases. Within the word, syllables cannot be closed by more than *one* consonant after a short vowel (rather than more than *two* word-finally). Exceptions to this generalisation often involve a final /k/ (this is true for English as well):

- (16) *arctisch* [arktis] ‘arctic’, *punctueel* [pʏŋktyel] ‘punctual’

This fact may even be related to the theory of Place-Driven Phonotactics: it probably is no accident that it is a velar, which can act as a rhymal ‘extra’.

#### 5. Conclusion

In this paper we suggest that /au/, one of the three Dutch so-called true diphthongs, actually is not a true but a false diphthong. This is due to the consonantal status of the ending of /au/ as well as to the fact that its constituent parts are less homorganic than the parts of the true diphthongs. We have formalized the key ideas in terms of Government Phonology, but they could be translated to other frameworks as well (at least to those frameworks in which PDP can be expressed, and in which vowels and consonants have the same place of articulation).

We do not consider these facts to be the result of mere accident of history. It could for instance be argued that historically, many Dutch /au/ sequences derive from original /al/ or /ɔl/ before coronals (*oud* = ‘old’, *koud* = ‘cold’), whereas the origin of /ei/ and /œy/ is usually diphthongization of tense high vowels (*tijd* ‘time’ from /tid/ etc.). This would explain most of the differences between /au/ and the other two as a difference in development. However, this diachronic account would beg the question as to why vocalisation of /l/ was restricted to a context before a coronal and after a low back vowel in the first place (*melk* ‘milk’ did not turn into *mewk*). Furthermore, loanwords with *au* have also been adapted from other languages, giving new phonotactic patterns (*laurier* [lau.rier] ‘laurel’) We could therefore wonder why no words ending in *auC* entered the language, filling the phonotactic gap in this way. Naturally, one could argue that the reason for non-adaptation of loanwords with *auC* is again a matter of historical accident, since the source languages did not have *auC* sequences (with the exception of German, which does; but in this language all diphthongs are nonhomorganic and therefore not ‘true’ diphthongs). (6) shows that e.g. English, at present the strongest source of loanwords in Dutch, does not have these sequences. But again, this begs the question *why* these are absent from English. We claim that the reason behind this is not a historical accident but the consonantal status of /l/; a force that is presumably universal, and not restricted to some phase in the development in Dutch.

## Notes

\* We want to thank the audience at TIN 2003, and in particular Geert Booij and Ben Hermans for useful comments. Thanks also to Bert Botma and Frans Hinskens. All disclaimers apply.

1. Observe that we represent the vowels which are phonetically tense and long, phonologically as tense and not as long (see Van Oostendorp 2000 and references cited there).

2. We disregard /yw/ which is somewhat special, because here the two parts of the diphthong are homorganic. Also, this diphthong is the only one that can be argued to be stress-avoiding. See Trommelen (1983) who analyses this sequence as underlyingly consisting of schwa plus /w/, with features spreading from the consonant to the vowel at the surface.

3. Dutch has final devoicing, so it stands to reason that no diphthong will ever be followed by a voiced obstruent.

4. On /t/ see Trommelen and Zonneveld (1989); on /ŋ/ see Trommelen (1983) and Van Oostendorp (2001).

5. We disregard here the fact that central vowels tend to slightly diphthongize phonetically ([e<sup>i</sup>, ø<sup>j</sup>, o<sup>w</sup>]) (Van der Velde 1996), a fact that is usually argued to be of no consequence for the phonology; the fact that the various ‘true’ diphthongs can get different realisations in different dialects of Dutch (‘t Hart 1969); and the fact that in the speech of youngsters in the provinces of North- and South-Holland, coda /l/ is often vocalised, yielding new diphthong-like sequences such as [mɛrk] (Van Reenen 1986; Van Reenen and Jongkind 2000).

Also, several facts have gone unnoticed in this paper. For instance, we have no explanation to offer on why /au/ can be followed by heterosyllabic /r/ (*laurier* 'laurel'), but /ɛi/ and /œy/ cannot; see Trommelen and Zonneveld 1989. We have also disregarded the marginal but interesting diphthong /ɔi/ (*hoi* 'hi', *goj* 'goj').

6. Both 'true diphthongs' and 'false diphthongs' attract stress. The stress attracting property of (9a) is readily accounted for, since this is the structure of a heavy syllable. The stress attracting property of (9b) is accounted for (if it occurs word-finally, as is always the case with these structures) because it is a bisyllabic, trochaic, unit. Since stress in Dutch is on the last trochee of the word in the unmarked case, this means that stress will be on the first nucleus of this structure.

7. See Swets (forthcoming) for an analysis of diphthongs in Tilburg Dutch; in this dialect *all* diphthongs which are 'true' in Dutch, behave phonologically as 'false', in the sense that they can only be followed by a coronal obstruent or a pause. Yet even in this dialect, /au/ behaves as special, and its ending as 'more consonantal'.

## References

- Anderson, J. (1986) 'Suprasegmental dependencies'. In J. Durand, ed., *Dependency and Non-Linear Phonology*. Croom Helm, London, 55–133.
- Brink, D.T. (1970) 'Problems in Phonological Theory; a Generative Phonology of Dutch'. Ph.D. dissertation, University of Wisconsin.
- Geerts, G. and Heestermans, H. (1992) *Van Dale groot woordenboek der Nederlandse taal*. Van Dale Lexicografie, Utrecht/Antwerpen.
- Hammond, Michael. (1999) *The Phonology of English. A Prosodic Optimality-Theoretic Approach*. Oxford University Press, Oxford.
- Harris, J. (1994) *English Sound Structure*. Blackwell, Oxford.
- Hart, J. 't. (1969) 'Fonetische steunpunten'. *Nieuwe Taalgids* 62, 168–174.
- Kaye, J., Lowenstamm, J. and Vergnaud, J-R. (1985) 'The internal structure of phonological elements: A theory of charm and government'. *Phonology Yearbook* 2, 305–328.
- Kaye, J. (1990) 'Constituent structure in phonology'. *Phonology* 7, 193–232.
- Oostendorp, M. van (2000) *Phonological projection*. Mouton, Berlin.
- Oostendorp, M. van (2001) 'Nasal consonants in varieties of Dutch and some related systems'. *Neerlandistiek.nl* 01.08.
- Reenen, P. van. (1986) 'The vocalization of /l/ in Standard Dutch. A pilot study of an ongoing change'. In F. Beukema and A. Hulk, eds., *Linguistics in the Netherlands 1986*, Foris, Dordrecht, 189–198.
- Reenen, P. van and Jongkind, A. (2000) 'De vocalisering van de /l/ in het Standaard Nederlands'. *Taal en Tongval* 52, 189–199.
- Smith, N., Bolognesi, R., Leeuw, F. van der, Rutten, J. and Wit, H. De (1989) 'Apropos of the Dutch vowel system 21 years on'. In H. Bennis and A. Van Kemenade, eds., *Linguistics in the Netherlands 1989*. Foris, Dordrecht, 133–142.
- Swets, F. (forthcoming) *The phonological word in Tilburg Dutch*. PhD Dissertation, University of Amsterdam.
- Torre, E.J. van der. (2003) 'Dutch Sonorants. The role of place of articulation in phonotactics'. PhD Dissertation, Leiden University.
- Trommelen, M. (1983) *The syllable in Dutch*. Foris, Dordrecht.

- Trommelen, M. (1989) 'Stress, diphthongs, *r* in Dutch'. In H. Bennis and A. Van Kemenade, eds., *Linguistics in the Netherlands 1989*. Foris, Dordrecht, 143–152.
- Trommelen, M. and Zonneveld, W. (1980) 'Egg, onion, ouch! On the representation of Dutch diphthongs'. In W. Zonneveld et al., eds., *Studies in Dutch Phonology*. Martinus Nijhoff, Den Haag. Available electronically at <http://www.dbnl.org/tekst/zonn004eggo01/>
- Velde, H. van de (1996) *Variatie en verandering in het gesproken Standaard-Nederlands (1935–1995)*. PhD. Dissertation, KUN.
- Vries, J. de and Tollenaere F. de (2000) *Etymologisch woordenboek*. Het Spectrum, Utrecht.
- Wiese, R. (1996) *The phonology of German*. Oxford University Press, Oxford.