

Pre-lateral mid-vowel colouring and the Dutch tense–lax contrast

In this paper we examine to what extent a syllable-final /l/ neutralises the contrast between tense and lax mid-vowels in Standard Dutch. This question touches upon two problems in Dutch phonology: the status of the Dutch tense/lax contrast itself, as well as a process of “mid-vowel laxing”.

The monophthongs of Dutch can be grouped into two sets that display contrasting phonological behaviour and phonetic exponents. While in the traditional terminology these two sets are referred to as long vs. short (based among other things on the fact that the ‘long’ vowels pattern with diphthongs phonotactically, see e.g. Zonneveld 1978), more recent approaches have convincingly argued that the difference is primarily qualitative rather than quantitative, and these use the labels ‘tense’ and ‘lax’ (Smith et al. 1989, Van Oostendorp 2000). Phonetic length is seen as secondary (not underlying) under these views, although tenseness and length are clearly correlated: all non-high tense vowels are long, whereas all lax vowels are short. Length, then, is perhaps an enhancing or inherent feature of tenseness.

The main problem concerning the assumption of a tense–lax distinction is the lack of conclusive arguments for its phonetic grounding. A number of accounts have argued that relative peripherality vs. centrality is the most important phonetic factor (Lindau 1979, Harris and Lindsey 1995), whereas others refer to tongue root activity. In the latter approaches, tense vowels are said to be articulated with an advanced tongue root (i.e., are [+ATR]) (Stewart 1967, Halle & Stevens 1967, Halle & Clements 1983, Smith et al. 1989); conversely, lax vowels have been argued to involve a retracted tongue root, i.e. are [+RTR] (or [lax], as in e.g. Van Oostendorp 2000). The use of tongue root features to characterise the tense–lax contrast is not uncontroversial, however (see MacKay 1977 for English and Ladefoged and Maddieson 1996 for German). We will argue that instead of tongue root features, the Dutch tense–lax contrast is indeed best described using relative centrality (or more specifically, closeness to schwa).

Our empirical focus is on the second question posed above: is the tense–lax contrast in vowels indeed neutralised before a syllable-final /l/? In most phonological accounts of the process, this is either implicit in the transcriptions (Gussenhoven 1993, Van der Torre 2003), or explicit in the use of the term ‘laxing’ (as in Van Oostendorp 2000). Examples of the traditional transcription, from Van der Torre (2003), are in (1).

(1)	a. tense			b. lax				
	<i>speel</i>	/spel/	[sprɪ:l]	‘play’(1sg)	<i>pil</i>	/pɪl/	[pɪl]	‘pill’
	<i>Pool</i>	/pɔl/	[pɔ:l]	‘Pole’	<i>bol</i>	/bɔl/	[bɔl]	‘sphere’
	<i>geul</i>	/xøl/	[xy:l]	‘ditch’	<i>gul</i>	/xyl/	[xyl]	‘generous’

The forms in (1a) have underlyingly tense vowels, which surface in the infinitival verb forms and noun plurals with which they alternate:

(2)	<i>spelen</i>	[spelə]	‘play’(inf)
	<i>Polen</i>	[pələ]	‘Poles’
	<i>geulen</i>	[xələ]	‘ditches’

What the forms in (1) suggest is that the qualitative difference between the vowels in (1a) and their lax counterparts in (1b) is neutralized, and that a length difference alone remains to distinguish the two sets before /l/. This state of affairs is hard to reconcile with a tense–lax approach to the Dutch vowel system: why would a length contrast remain in the absence of a contrast in vowel quality, if length is merely secondary? An analysis of the Dutch monophthong system as involving an underlying length contrast would be more straightforward. However, what we wish to challenge is not the tense–lax approach to the Dutch vowel system, but rather the accuracy of the transcriptions in (1a).

To test the accuracy of the interpretation of mid-vowel colouring as ‘laxing’, we conducted a production experiment in which 15 female speakers of Standard Dutch repeated a frame sentence in which only the target word differed; the target words contained either a tense or a lax vowel, in either pre-/l/ or pre-obstruent context (e.g. *speel – spil – kees – mis*). We measured durations and spectral properties (the first three formants) of these vowels in their different contexts. We also conducted a perception (recognition) experiment based on the production data to test the extent of the neutralisation.

The results of our experiments lead us to two main claims. First of all, a description of pre-/l/ colouring as ‘laxing’ is inaccurate. Vowels before /l/ are retracted rather than centralised. Secondly, a length contrast between the two sets of vowels is never realised in the absence of a qualitative contrast. Some speakers show a large degree of neutralisation both qualitatively and quantitatively, whereas others neutralise the length difference but not the spectral differences between the two sets of vowels. A third group of speakers maintained the tense–lax contrast before /l/ with the accompanying length contrast. We take this as evidence for an underlying contrast in the Dutch vowel system based on tense–lax, while length is an enhancing feature of tense vowels. We will explore the implications of these findings in an Articulatory Phonology framework (Browman and Goldstein 1986, 1992, Gafos 1999, 2002), in which pre-/l/ colouring and the notion of tenseness and its relation to length can be carefully teased apart: the first can be seen to result from gestural overlap, whereas the latter arises from differences in gestural magnitude.