An Optimality Theoretical analysis of the Dutch diminutive*

Jeroen van de Weijer
Leiden University / ULCL

1. Introduction

The analysis of the diminutive in Dutch has been a topic of debate among phonologists and morphologists for almost one and a half centuries.[1] There are five allomorphs in the standard language, there is a lot of variation between dialects, and there is variation between speakers for diminutives of morphologically complex and rarely used words. As a result, previous analyses have argued over the data, the shape of the underlying form of the morpheme and the sets of rules which would derive the surface alternants. These rules have usually been highly complex, and idiosyncratic for the diminutive — that is, the phonological rules concerned were marked for applying only in the context of the diminutive morpheme. On a theoretical level, morpheme-specific rules are a problem in a framework such as Optimality Theory, in which constraints are assumed to be universal, i.e. not specific to particular languages and, *a fortiori*, not specific to particular morphemes in particular languages. Thus, the Dutch diminutive, with at least three such morphophonological rules, is an obvious challenge to the OT framework and invites re-analysis. In this investigation, I present the outlines of an OT-style analysis of the allomorphy in the standard language, comparing this to earlier rule-based work. I will show that the language-specificness can be circumvented to a large degree in a constraint-based framework, which, additionally, captures a number of phonological regularities that are not expressed by the rule-based approach.

2. Data and rule-based analysis

In this section I present the basic alternants of the diminutive in standard Dutch, and review one previous analysis, presented in Gussenhoven & Jacobs (1998). Other

Linguistics in the Netherlands 2002, 199–209.
ISSN 0929–7332 / E-ISSN 1569–9919

work includes Kooij (1982), Trommelen (1983), and van der Hulst (1984), among many others. The basic facts of the diminutive are presented in (1) (data partly taken from van der Hulst 1984: 117ff., where more examples can be found).

(1)	a.	**-ətjə**		
		after short vowel + liquid or nasal:	karretje	'car-DIM'
			balletje	'ball-DIM'
	b.	**-jə**		
		after obstruent:	busje	'bus-DIM'
			kerkje	'church-DIM'
	c.	**-pjə**		
		after long vowel + m:	duimpje	'thumb-DIM'
			raampje	'window-DIM'
		after short vowel + liquid + m:	halmpje	'stalk-DIM'
			bermpje	'verge-DIM'
	d.	**-kjə**		
		after short vowel + ŋ:	koninkje	'king-DIM'
			landinkje	'landing-DIM'
	e.	**-tjə**		
		after long vowel + son:	laantje	'avenue-DIM'
			boeitje	'buoy-DIM'
		after long vowels and diphthongs:	zeetje	'sea-DIM'
			uitje	'onion-DIM'
		after short vowel + r + n:	kerntje	'core-DIM'
		after schwa:[2]	$^{?}$wondetje	'wound-DIM'
			$^{?}$boetetje	'fine-DIM'
			$^{?}$hetzetje	'innuendo-DIM'

The form /tjə/ has been taken as the underlying form in most previous analyses, because this is the one which appears after vowels, while the other alternants (especially [pjə], [kjə], [jə]) can be derived from it rather straightforwardly. The epenthesised form of the diminutive, [ətjə], has evoked more discussion; from the examples above it is clear that, a priori, the length of the preceding vowel and the nature of the preceding consonant play a role.

Gussenhoven & Jacobs (1998) (henceforth GJ) present an account of the diminutive allomorphy based on SPE-type rules. First, assuming underlying /tjə/, a rule is necessary to convert /t/ into [p] or [k] after labials and velars, respectively. Examples of this alternation were given in (1c, d) above. The rule GJ formulate for this (1998: 108) is given in (2):

(2) PLACE ASSIMILATION $$\text{t} \rightarrow [\alpha\text{place}] \: / \begin{bmatrix} +\text{nas} \\ \alpha\text{place} \end{bmatrix} + \_\_ \: \text{jə}]_{\text{DIM}}$$

Note that this rule must refer specifically to the diminutive, since Place assimilation of nasals to other consonants in Dutch is regressive in *all* cases other than the diminutive, as illustrated by the data in (3):

(3)	in+brengen	'to bring in'	/n+b/	→	[mb]
	in+kopen	'to purchase'	/n+k/	→	[ŋk]
	in+gaan	'to enter'	/n+ɣ/	→	[ŋɣ]
	man#kracht	'manpower'	/n+k/	→	[ŋk]

In the forms in (3) the stop determines the place of articulation of the preceding nasal, while the place of the stop in the diminutive allomorph is determined by the last consonant of the root through progressive assimilation.

Another rule which is idiosyncratic for the diminutive is t-DELETION, responsible for deletion of /t/ after obstruents. Data were presented in (1b). The rule responsible for this is given below (GJ 1998: 108):

(4) t-DELETION $\quad t \rightarrow \varnothing\ /\ [-\text{son}] + \_\_\ \text{jə}]_{\text{DIM}}$

Although Dutch has more cases of t-deletion, this phenomenon must be formulated to apply specifically in diminutives, since in compounds, regular inflection and non-derived words, no deletion takes place after single obstruents:

(5)	huis-tuin…	'house-garden…'
	pas-te	'fit-PAST'
	woestijn	'desert'

The most spectacular alternation concerns the insertion of schwa after roots that end in a short vowel followed by a single sonorant. Examples were given in (1a) above. The class of consonants after the short vowel can be identified with the sonorants; practically only nasals and liquids occur in this position, as there are only very few words in Dutch that have short vowel + glide, such as *koi* ~ *koitje* 'Japanese carp'. If the final glide is syllabified in the nucleus (making [ɔɪ] a real diphthong, on a par with *ui* [œy]) the diminutive will be [tjə] here, too.

The rule GJ (1998: 107) formulate is given in (6), where the short vowels are identified with the class of lax vowels:

(6) ə-INSERTION $\quad \varnothing \rightarrow \text{ə}\ /\ [-\text{tense}] \begin{bmatrix} +\text{cons} \\ +\text{son} \end{bmatrix} + \_\_\ \text{tjə}]_{\text{DIM}}$

Again, the rule is specific to the diminutive, since schwa insertion does not take place in similar environments in underived words (e.g. the Indonesian name *Kantjil* is never pronounced (*[kanətjil]) cf. [kanətjə] from /kan+tjə/) or in other types of derivation.

To conclude, a rule-based account of the Dutch diminutive needs three rules specific to this morpheme ((2), (4) and (6)) to account for the alternations induced by the diminutive morpheme in Dutch. Optimality Theory (Prince & Smolensky 1993) does not use rules, of course, but only constraints, which are assumed to be universal, not language-specific. Hence, an OT account making use of constraints pertaining only to the diminutive morpheme in Dutch is not adequate. In the next section we will see to what extent an alternative OT account of the data is possible.

3. Towards an OT account

First, let us try to deal with Place assimilation [tjə ~ pjə ~ kjə] in diminutives. In OT, it is necessary to assume a constraint against heterorganic nasal-stop sequences. One possible formulation is given in (7):

(7) NASALPLACEAGREEMENT (NPA)
A sequence of nasal plus consonant must be homorganic.

There is a large variety of specific proposals that will produce this effect, and we will not explore the specifics here. It is obvious that the constraint in (7) has a wider scope than the rule in (2) that was supposed to account for the same kind of Place alternations. For instance, the constraint in (7) also accounts for the facts in (3), and would therefore alone seem to be preferable to the rule-based account. Note that identity of Place can be achieved in (at least) two ways: by changing the nasal (which would result in the incorrect output form [boːntjə] or by changing the stop consonant in the diminutive, which gives the correct [boːmpjə]. It is an important insight that in such cases in Dutch the base is never altered: alterations target the diminutive morpheme, not the root. This is expressed by the following well-established, and tentatively universal, constraint ranking (McCarthy & Prince 1995, see also Kager 1999: 75–76):

(8) FAITH(ROOT) » FAITH(AFFIX)
Faithfulness requirements are enforced more strictly within the root than in non-root morphemes, such as affixes.

This accounts for the difference in direction of assimilation between the data in (1) and the facts in (3): the crucial insight is that in both cases the affix is targeted and the root is left intact.[3]

Note that the fact that FAITH(ROOT) dominates FAITH(AFFIX) does not mean, of course, that the former is undominated: FAITH(ROOT) can be violated to satisfy higher level constraints. For instance, final root consonants can be devoiced, and thus altered, to satisfy whatever constraint configuration is necessary to express final devoicing in Dutch.

Tableau (9) illustrates the selection of the output [boːmpjə], where both FAITH-constraints are cover terms for a family of correspondence constraints, in particular IDENT (McCarthy & Prince 1995):

(9)

/boːm/+/tjə/	NPA	FAITH(RT)	FAITH(AFF)
a. [boːmtjə]	*!		
b. [boːntjə]		*!	
c. ☞[boːmpjə]			*

It must be pointed out that NPA is violated in other parts of the morphology of Dutch. Consider the use of the distributive suffix (or rather circumfix) *ge-* + *-te* in (10), for instance:

(10)	ge+boom+te	tree-DIST	'foliage'
	ge+raam+te	window-DIST	'skeleton'
	ge+worm+te	worm-DIST	'vermin'

Although this suffix is hardly productive, the question might be raised how assimilation is blocked in these cases (preventing **geboompe*, on a par with *boompje*). One proposal, which space does not permit to develop fully, would be to recognize that the [t] in this morpheme does not alternate, so may be fully specified in the underlying representation (the same holds for other consonants, such as initial [t] in the third person singular form, or the past tense morpheme).[4] In the diminutive, however, as we have seen, the [t] does alternate. It might therefore be underlyingly underspecified for Place. We would then have to stipulate in the grammar that nasal assimilation only applies in a "feature-filling" manner, i.e. that existing Place specifications are respected, and that only underspecified representations can be affected. In this way, the initial consonant of the diminutive is always available for assimilation, and the initial consonant of the distributive suffix never is. This requires a further account of the treatment of underspecified representations in Optimality Theory, which we will not develop here. Note that it is necessary to fill in the coronal specification on the underspecified segments in order for a constraint like *GEM(INATES) (see below) to apply properly.

For another instance that shows root faithfulness over affix faithfulness, compare the behaviour of the past tense morpheme in Dutch, which alternates between /tə/ and /də/. Although in Dutch voice assimilation is usually leftward from stops (*kaasdoek* [kaːzduk] 'cheese cloth', *kopbal* [kɔbal] 'header (in football)'), in past tense formation assimilation is rightward:

(11)	a.	/vlaɣ-/	vlag[d]e	'flag-PAST'
		/ɣəloːv-/	geloof[d]e	'believe-PAST'
	b.	/lax-/	lach[t]e	'laugh-PAST'
		/bɔf-/	bof[t]e	'be lucky-PAST'

This represents another case where root faithfulness takes precedence over affix faithfulness to satisfy constraints on sequence wellformedness (which in this case demands that two adjacent obstruents agree in voicing): the underlying form of the suffix is /-də/, which is assimilated progressively after voiceless obstruents.

Another very general constraint that is needed bars geminate consonants (following GJ: 106), which will account for single [t] in forms like [kantjə] (< /kant/+/tjə/). Many languages disallow geminates, which can be taken care of by way of a constraint such as that in (12), which must be ranked higher than a constraint against consonant deletion, Max-IO.

(12) *Geminates (*Gem)
$*C_\alpha C_\alpha$

The selection of [kantjə] is illustrated in the tableau in (13):

(13)

/kant/+/tjə/	*Gem	Max-IO
a. [kanttjə]	*!	
b. ☞[kantjə]		*

In accordance with the root faithfulness hypothesis stated above, we assume that it is the /t/ of the suffix that is deleted in such cases.

More consonants can be deleted. In the diminutive of *kast* 'cupboard', for instance, both the /t/ of the suffix as well as that of the root are deleted, giving the output [kaʃə], identical to the diminutive of *kas* 'greenhouse'. A constraint against longer sequences of consonants is obviously involved here. The precise formulation is not entirely straightforward, however. For the time being, we will adopt the constraint *Sequence in (14)

(14) *Sequence (*Seq)
*[CCC]

The constraint in (14) is formulated too generally. In Dutch it is [t] which is deleted when sandwiched between two consonants, under specific conditions concerning morphological status, stress, nature of the consonants on either side, speech style, etc. Examples are given in (15), where the bracketed [t]'s (sometimes devoiced from underlying /d/) are targets for deletion:

(15) pos[t]kantoor 'post office'
nach[t]kastje 'bedside table'
hoof[t]pijn 'headache'

There is some phonetic and variationist literature on the topic, which we will not reiterate here (see e.g. van Hout 1989: 100ff.). We will assume that a constraint like *Seq actually represents a family of constraints, where the arguments in the expression can vary from language to language. In Dutch, the relevant constraint would be *Seq(t) *[Ct$_\sigma$C],), penalizing syllable-final /t/ between two consonants.[5]

The selection of the proper output in the case of /kast/+/tjə/ is presented in (16), to be refined below:

(16)

/kast/+/tjə/	*Gem	*Seq(t)	Max-IO
a. [kasttjə]	*!	*!	
b. [kastjə]		*!	*
c. ☞[kasjə]			**

Note that the winning candidate in (16) is still phonetically imprecise: a more accurate representation would be [kaʃə] or [kaçə]. Since some languages do allow [sj] sequences to persist, we must for Dutch assume a high-ranking constraint against sequences of coronal plus [j], which dominates a constraint against coalescence, responsible for palatalization of coronals next to [j]. Such a constraint could probably be defined more widely, because of the fact that Dutch lacks *any* sequences of consonant plus [j] in the onset as well as the coda (bar a very limited number of common names and loanwords such as *Tjeerd, Pjotr* [names], *tjiftjaf* [a bird], *fjord* 'fjord' for which an underlying palatal sound may be postulated, and not necessarily a sequence) (see also van der Torre: forthcoming for a discussion of the behaviour of glides and other sonorants in the syllable structure of Dutch). I will propose the constraint *PalCl in (17) as a first approximation to express this, where [j] is assumed to be the feature complex denoting palatals (so that clusters with palatals are also penalised):[6]

(17) *PalatalClusters (*PalCl)
*[Cj]/[jC]

This constraint interacts with constraints preserving the underlying features of [j] causing merger (not deletion) with an adjacent consonant if a suitable (i.e. coronal) consonant is available. The phonetically more accurate winner is presented in the tableau in (18):

(18)

/kast/+/tjə/	*Gem	*Seq(t)	*PalCl	Max-IO
a. [kasttjə]	*!	*!	*!	
b. [kastjə]		*!	*!	*
c. [kasjə]			*!	**
d. [kasʃə]			*!	**
e. ☞[kaʃə]				**

At first sight the *PalCl constraint would also appear to be violated in epenthetic diminutives such as *kraantje* 'faucet-dim' or *katje* 'cat-dim'. However, phonetically these forms have palatal stops [c], not clusters [tj]. Thus, palatal coalescence may be understood as a way of satisfying the constraint in (17).

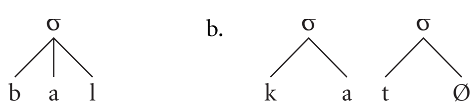
The final and perhaps biggest mystery regarding the Dutch diminutive is that of schwa insertion in 'light' forms like *relletje* 'riot-dim'. Insertion is a violation of Dependence, a correspondence constraint. The constraint that compels insertion anyway could be related to Sfx-to-PrWd (McCarthy & Prince 1993: 51ff), which demands that affixes are affixed to stems which have sufficient weight. If stems are subminimal, augmentation takes place.

(19) Sfx-to-PrWd
The Base of suffixation is a Prosodic Word

In Axininca Campa, for instance, the base must be augmented to at least bimoraic size to allow suffixation (/na+piro/ 'carry-verity' → [naTApiro], McCarthy & Prince 1993). In Dutch, a similar constraint can be held accountable for schwa insertion before the diminutive.

To express this insight, we adopt some proposals that have been made in the literature. First, following Botma & van der Torre (2000), we assume that codas with a sonorant are structurally different from codas with an obstruent. While in the former case the sonorant is part of the nucleus, in the latter case the final obstruent heads a separate empty-headed syllable.[7] Consider the representations of *bal* 'ball' and *kat* 'cat' in (20) (after Botma & van der Torre 2000: 24–25):

(20) a. b.



These representations reflect the fact that *bal* is somehow lighter than *kat*. Since the latter, but not the former, has two syllables, it could be represented as a Foot or Prosodic Word. In this way, *kat* does satisfy the constraint Sfx-to-PrWd as it is, while *bal* must be augmented. Put differently, the diminutive suffix requires a well-formed binary structure immediately to its left, which *bal* does not provide. The easiest way of creating the required structure is to introduce an epenthetic final vowel, producing the outcome *balletje*. The same constraint can then be used to explain the diminutive in a number of long words (e.g. in -*ing*), which are well known to vacillate. Just like in previous accounts (Kooij 1982, Gussenhoven & Jacobs 1998), we can relate this to the foot structure, given representations like (20) above.

(21)	?vergaderinkje ~ vergaderingetje	'meeting-DIM'
	?wandelinkje ~ wandelingetje	'walk(n)-DIM'
	tweelinkje ~ tweelingetje	'twin-DIM'
	valiumpje ~ ?valiummetje	'valium-pill-DIM'

We easily account for this vacillation as a result of a difference in foot structure: *vergáderìnkje* (with secondary accent and therefore a binary foot on the final two syllables) accepts the diminutive suffix as is, while *vergáderingetje* with primary accent only projects only one stress foot and therefore needs augmentation.

Just like with the nasal assimilation facts above, we would expect the constraint in (19) to be relevant in other areas of Dutch morphology. Such cases can be found, although, again, it would take us too far afield to explore all the implications. Consider the data in (22):

(22) a.	banneling	'exile'	groenling	'greenfinch'
	jongeling	'youth'	leerling	'student'
	lammeling	'dead loss'		
b.	kennelijk	'apparently'	begeerlijk	'delectable'
c.	warm+te	'hot-NOM'		
	*slimte	'smart-NOM'	slimheid	'smartness'
	*domte	'stupid-NOM'	domheid	'stupidity'

In the forms in (22a), the person suffix -*ling* alternates between a schwa-full and a schwa-less form under the same conditions as the diminutive did; the same is true for the adjectivizer -*lijk* in the (b) forms. In the (22c) examples, it is shown that the nominalizer -*te* does not attach to roots that are too light (in the sense described above) in such cases -*heid* must be selected.

An interesting problem arises with a number of short words that end in obstruents (exclusively velars and labials) and that vacillate between a schwa-less and a schwa-full diminutive. The unexpected schwa-full forms are given below; in each case a regular, schwa-less form is also possible:

(23)	rug	'back'	ruggetje	trap	'stairs'	?trappetje
	brug	'bridge'	bruggetje	pop	'doll'	poppetje
	weg	'road'	weggetje	kip	'chicken'	kippetje
	eg	'harrow'	eggetje	big	'piglet'	biggetje
	heg	'hedge'	heggetje	vlag	'flag'	vlaggetje
	rog	'ray (fish)'	roggetje	krab	'crab'	krabbetje

This vacillation is lexically determined, and provisions to account for it must be made in the lexicon. Note that most of these words have final velars which might point up their propensity to be syllabified in the nucleus (see again van der Torre, forthcoming).

4. Conclusion

In this paper we have shown that much of the construction-specificity which has troubled the Dutch diminutive for such a long time disappears in an Optimality Theory analysis. Language-specific constraints are not allowed in OT, and therefore construction-specific constraints are not allowed either. Instead, it turns out that the Dutch diminutive can be analysed by way of a set of natural constraints that have wider scope than the diminutive alone. Further work will be necessary to shed light on a number of issues involved in the exact formulation of these constraints and might be extended to include the analysis of the diminutive in dialects.

Notes

* Thanks to an anonymous *LIN* reviewer, and audiences at the TINdag, in particular Geert Booij and Marc van Oostendorp, the Leiden Phonology Reading Group, in particular Bert Botma, Feng-fan Hsieh, Jan Kooij, Erik Jan van der Torre and Grażyna Rowicka, and the Groningen CLCG Linguistics Colloquium, in particular Dirk-Bart den Ouden and Bouke Slofstra, for questions and discussion. Thanks also to Toni Borowsky, Bożena Cetnarowska, Carlos Gussenhoven and Curt Rice for comments on an earlier version. The usual disclaimers apply.

1. Te Winkel (1862) is the first article drawing attention to the "factors sonorancy, vowel length and stress" playing a role in diminutive formation (Trommelen 1983: 3).

2. As the examples show, most of these diminutives are rather uncertain, which may be related to the sequence of two schwas in the output forms, especially when both are preceded by a coronal obstruent. Perhaps speakers are insecure about the morphological affiliation of the schwa (which in the context before [-tjə] is always inserted, regularly (as in the examples in (1a)) or as a lexical exception (as in the examples in (23)).

3. An anonymous reviewer points out, correctly, that this still leaves the direction of Place assimilation in compounds, such as *mankracht* in (3) unexplained. This might be explained by leaving all coronals underlyingly unspecified for Place (see also below). See also Borowsky (2000) who explains the difference in terms of word faithfulness vs. root faithfulness.

4. Van Oostendorp (2000: 300) hits on a similar solution for the diminutive in Rotterdam Dutch.

5. Note that *Seq(t) does not penalize *ruimpje*, which is exactly what we want. Second, it must be assumed that /tj/ in *kas+tje* cannot form a proper onset; cf. also below.

6. The *PalCl constraint can be understood as a prohibition against complex segments (here: palatals) in complex syllabic constituents. See Butskhrikidze & van de Weijer (2001: (12)) for a constraint against affricates (another type of complex segments) in complex onsets in Georgian.

7. An alternative account is possible based on the assumption that final sonorants (but not obstruents) are moraic after a short vowel (but not after a long vowel), so that schwa would be inserted after moraic consonants. Space limitations prevent me from developing this analysis here.

References

Borowsky, T. J. (2000) 'Word-faithfulness and the direction of assimilations'. *The Linguistic Review* 17, 1–28.

Botma, E. D. & E. J. van der Torre (2000) 'The prosodic interpretation of sonorants in Dutch'. In H. de Hoop & A. van der Wouden (eds.) *Linguistics in the Netherlands 2000*, 17–29. John Benjamins, Amsterdam and Philadelphia.

Butskhrikidze, M. & J. M. van de Weijer (2001) 'On de-affrication in Modern Georgian'. In H. Broekhuis & A. van der Wouden (eds.) *Linguistics in the Netherlands 2001*, 45–56. John Benjamins, Amsterdam and Philadelphia.

Gussenhoven, C. & H. Jacobs (1998) *Understanding Phonology.* Arnold, London.

Hayes, B. P. (1995) *A Metrical Theory of Stress: Principles and Case Studies.* University of Chicago Press, Chicago, Illinois.

Hout, R. W. N. M. van (1989) De Structuur van Taalvariatie. Een Sociolinguïstisch Onderzoek naar het Stadsdialect van Nijmegen. Doctoral dissertation, University of Nijmegen.

Hulst, H. G. van der (1984) *Syllable Structure and Stress in Dutch.* Foris, Dordrecht.

Kager, R. (1999) *Optimality Theory.* Cambridge University Press, Cambridge.

Kooij, J. G. (1982) 'Epenthetische schwa: processen, regels en domeinen'. *Spektator* 11, 315–25.

McCarthy, J. J. & A. Prince (1993) Prosodic Morphology I. Constraint interaction and satisfaction. Ms, University of Massachusetts and Rutgers University.

——— & ——— (1995) 'Faithfulness and reduplicative identity'. In J. Beckman, L. Walsh Dickey & S. Urbanczyk (eds.) *Papers in Optimality Theory*, 249–384. University of Massachusetts Occasional Papers 18. Graduate Linguistic Student Association, Amherst, Mass.

Oostendorp, M. van (2000) *Phonological Projection. A Theory of Feature Content and Prosodic Structure.* Mouton de Gruyter, Berlin.

Prince, A. S. & P. Smolensky (1993) Optimality Theory — Constraint Interaction in Generative Grammar. Technical Report #2 of the Rutgers Center for Cognitive Science. Rutgers University, Piscataway, New Jersey.

Pulleyblank, D. G. (1997) 'Optimality and features'. In D. Archangeli & D. T. Langendoen (eds.), *Optimality Theory: An Overview*, 59–101. Blackwell, Oxford.

Torre, E. J. van der (forthcoming) The Sonorants of Dutch. Doctoral dissertation, ULCL/Leiden University.

Trommelen, M. (1983) *The Syllable in Dutch: With Special Reference to Diminutive Formation.* Foris, Dordrecht.

Winkel, L. A. te (1862) 'Over de verkleinwoorden'. *De Taalgids* 4, 81–116.