Language variation and phonological theory: inflected adjectives in Dutch and related languages

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1. Introduction

It is obvious that there is a intimate relation between dialectology and phonological theory. Since each dialect is a language, dialects are as important as standard languages as sources of data for phonologists, and thus dialects form a very extensive testing ground for phonological theory. On the other hand, phonological theory might be of use in achieving our aim of providing accurate and interesting descriptions of dialects.

Moreover, the study of dialects is intimately connected to the study of language variation and language change. The issue of how to characterize the phonological differences between related languages or dialects, or between successive historical stages of a language in terms of formal differences between the grammars of the variants involved has always been part of the research tradition of generative phonology.[1] In the *SPE*-style of generative phonology, dialects may differ at least with respect to:

- the inventory of underlying segments
- the underlying forms for related words

[1]Cf. also Hinskens et al. (1997) for a recent survey of the issues involved in the relation between phonological theory and the study of language variation.

- the set of phonotactic constraints
- the set of phonological rules
- the order of shared phonological rules

In the seventies, it was Kiparsky who argued that the differences between two related dialects can sometimes be analysed as differences in rule ordering: the dialects have the same underlying forms, but the phonetic realizations of the relevant words differ because certain phonological rules apply in different orders, thus leading to different phonetic outputs (cf. also Taeldeman 1980). Kiparsky (1968) [1982: 19ff], for instance, characterized the differences between two Swiss German dialects in terms of different orderings for the phonological rules of umlaut and lowering.

This example is not only interesting because it shows how we might formally characterize dialectal differences, but it is also of direct relevance for phonological theory: if this is the correct characterization of these dialectal differences, it implies that extrinsic ordering of rules should be allowed for in grammars of natural languages. Thus, trying to account for language variation may have implications for our theory of the formal properties of grammars.

In recent years, the theory of phonology has changed considerably in that the role of output constraints has become much more prominent in phonological analyses. At present, Optimality Theory (McCarthy & Prince 1993, 1994; Prince & Smolensky 1993) is the dominant output-based theory of phonology.

In this paper, I will argue that an output-based approach has a number of advantages above a theory which derives phonetic outputs by applying rules to underlying forms. First, I will first demonstrate how this approach can account for prosodically conditioned suffix selection in the realm of Dutch pluralization of nouns (Section 2). In Section 3, I will give an outline of the systematics in the phonological form of inflected adjectives in Dutch. Then, I will show how the

differences in schwa-apocope in inflected adjectives between present-day Standard Dutch and a number of related Germanic languages can be insightfully accounted for in a model that allows for output-based affix selection (Section 4). This will lead to the conclusions that a phonology that makes use of output constraints offers interesting perspectives for the analysis of language variation, and that a rather concrete non-phonological analysis of certain allomorphy patterns is called for (Section 5).

2. Pluralization of nouns in Dutch

In Optimality Theory (OT), the computation of the correct phonetic form of words and phrases is not executed by applying rules to underlying forms, i.e. in terms of a derivation of the phonetic form in a number of steps. Instead, the phonology of a language is conceived of as a language-specific ranking of a set of universal but violable phonological constraints. GEN, the generator, creates a set of possible output candidates for each underlying form, and that candidate is chosen that is most harmonic, i.e. incurs the least severe violations of the set of constraints. A violation is more severe if it violates a higher ranked constraint:

/underlying form/	Condition A	Condition B
Candidate 1	*!	
☞Candidate 2		*

The asterisk indicates violation, the exclamation mark means that a violation is fatal, and that the candidate involved is the loser. The pointing finger indicates the winning candidate.

Let me illustrate this with a very simple example, the phenomenon of syllable-final devoicing of obstruents in Dutch. This phenomenon can be accounted for by the following universal (cf. Stampe 1969), but violable output constraint;

(1) **Final Devoicing**: obstruents in coda position are voiceless

This condition competes with the Faithfulness condition that the underlying form of each morpheme is completely realized on the surface. In Dutch, FinalDevoicing is ranked higher than Faithfulness, and thus obstruents in coda position will surface as voiceless, as shown here for the item *land* [lΨnt] `id.'. In English, on the other hand, the working of the universal constraint FinalDevoicing is made invisible because it is ranked lower than Faithfulness. Thus, in English the final /d/ of *land* will surface as a [d].

Dutch

/lΨnd/	Final Devoicing	Faithfulness
lΨnd	*!	
☞lΨnt		*

English

/lɛ:nd/	Faithfulness	Final Devoicing
☞lɛ:nd	*!	
lɛ:nt		*

This example also serves to illustrate that in Optimality Theory differences between languages can be characterized partially in terms of different rankings of the same constraints.

This example does not, however, show the superiority of output-based phonology as opposed to the classical derivational model of phonology. Numerous arguments in favor of OT have been adduced. Here, I will concentrate on one particular advantage, which is crucial for the particular analysis of language variation that I will present in this paper: OT enables us to give an insightful account of prosodically governed allomorphy and affix selection.

Dutch has two plural suffixes for nouns, *-s* and *-en* (the *e* stands for the schwa). The basic selection pattern can be formulated as follows:

(2) *-s* after an unstressed syllable, *-en* after a stressed syllable.

This is illustrated by the following examples

(3) kánon `canon' - kánon-s
kanón `gun' - kanónn-en
nátie `nation' - nátie-s
geníe `genius' - geníe-en

This selection principle also correctly predicts that monosyllabic nouns have *-en* as their plural suffix:

(4) non `nun' - nonnen
knie `knee' - knieën
bal `ball' - ballen

Note that it is obvious that we cannot derive the plural suffixes from a common underlying form by means of general phonological rules. Nevertheless, as is the case in a number of languages

(cf. Carstairs 1988), the distribution of competing affixes and allomorphs may be governed by purely phonological principles.

The formulation of the selection principle given above is formulated in terms of properties of the input forms for the pluralization process, the nominal stems, which are formally identical to the singular forms. However, such a formulation does not explain why this particular selection principle holds. In terms of complexity of the grammar, it would make no difference if Dutch were just the other way round, that is, if *-s* occurred after stressed syllables, and *-en* after unstressed ones. The motivation behind this particular suffix selection is that plural nouns will always end in a disyllabic trochee. The disyllabic trochee is the preferred pattern of organization of syllables into higher prosodic units in Germanic languages. We will therefore assume the following violable constraints:

(5) **Trochee**: in a foot, the first syllable is the head

FootMax: feet are maximally disyllabic

ParseSyllable: syllables are parsed into feet

FootMin: feet are minimally disyllabic

Let us assume that the ranking of these constraints is as follows:

(6) Trochee >> FootMax >> ParseSyllable >> FootMin

The conditions ParseSyllable and FootMax imply that a sequence of two syllables both of which are headed by the vowel schwa is not optimal. In Germanic languages, syllables headed by schwa, the default vowel, cannot bear stress, i.e., they cannot head a foot. Therefore, a sequence of two schwa-syllables implies that either the second of these is not made part of a foot,

or that we have to create a ternary foot. In the first case, ParseSyllable is violated, in the second case FootMax. Since FootMax has the higher ranking in (6), the second of two schwa-syllables will not be parsed into a foot, and hence will be dominated directly by the prosodic word node. However, this particular ranking is not crucial for the claims made in this paper.

These constraints also explain why Dutch lexical morphemes never contain a sequence of two schwa-syllables. Such sequences only arise in complex words, due to morphological operations.

If we added *-s* to a word ending in a stressed syllable, we would not create optimal, i.e., disyllabic feet, i.e., FootMin would be violated. On the other hand, if we added *-en* after an unstressed syllable, the newly created syllable cannot be parsed into a binary foot. Note, however, that if we add /s/ to an unstressed syllable, we create superheavy (VVC or VCC) syllables which form the weak constituent of a trochee, which is also a not-preferred configuration. I will call this constraint Weight:

(7) **Weight**: superheavy syllables do not occur in weak position

The following tableaux show how the selection of the correct plural suffix takes place. Note that we now extend the notion `candidate' because the set of candidates is not defined exclusively phonologically, but also morphologically: each combination of stem + allomorph is the basis for a set of candidates.

Kánon+PL	FootMax	ParseSyll	FootMin	Weight
☞ $(ka:nons)_F$			*	
$(ka:non)_F$-en		*!		
Kanón+PL	FootMax	ParseSyll	FootMin	Weight
$Ka(nons)_F$		*	*!	

☞ Ka(nonnen)$_F$		*		

The constraint FootMin is obviously violated by monosyllabic nouns in their singular forms, and also in plural forms of loanwords which keep the original suffix:

(8) *English loan*: tram - trams `trams'

French loan: paraplú - paraplu's `umbrellas'

Interestingly, Dutch children tend to regularize these patterns, and create plural nouns such as *trammen* `trams'. Also, we find the following differences between southern Dutch and northern Dutch:

(9)	*southern Dutch plural form*	*northern Dutch plural form*
test 'test'	testen	tests
expert 'expert'	experten	experts

The output-based approach is not only superior in that it formally expresses the 'why' behind the selection principle, it also makes the prediction that nouns ending in schwa have both the endings *-s* and *-en* because of the effect of prevocalic schwa-deletion (a schwa deletes before an adjacent vowel within the same prosodic word), which ensures that the addition of *-en* after a noun ending in schwa does not create a new syllable. This prediction is correct (the stem-final *e* stands for schwa):

(10) kade `quay' kades, kaden

bode `messenger' bodes, boden

lade `drawer' lades, laden

methode `method' methodes, methoden

In some cases, one of them may be preferred, but this is a matter of convention. The kind of variation we meet with here is system-internal variation, i.e., real optionality.

Complex words ending in a schwa-final suffix also have the two options, as is to be expected on the basis of the phonological properties, unless the suffix requires a particular suffix:

(11) *both suffixes*:

-ade marinades `marinades', balustraden `balconies'

-se extases / extasen `extasies', hypotheses / hypothesen `hyptheses'

-de liefdes `loves', kundes / kunden `arts'

-te gedeeltes / gedeelten `parts', koeltes / koelten `coolnessses'

-isme modernismes / modernismen 'modernisms', mechanismes/mechanismen `mechanisms'

-ine sonatines / sonatinen `sonatines'

-ide fluorides / fluoriden `fluorides'

only s (words with non-native suffixes borrowed from French preserve the French plural form):

-aire documentaire-s `documentaries'

-age massage-s `massages'

-asme orgasme-s `orgasms'

-esse secretaresse-s `secretaries, fem.'

-iere cabaretiere-s `cabaretiers, fem.'

-euse masseuse-s `massager, fem.'

-ice directrice-s `directors, fem.'

-ette brunette-s `brunettes', wasserette-s `laundries'

-ure doublure-s `doublets'

native suffixes

-e acrobate-s `acrobats, fem.'

-(t)je toetje-s `desserts', kindje-s `small children'

only -(e)n

-e blonde 'blond'- blonden `blonds' (nominalizing deadjectival suffix)

In conclusion: morphology may override phonology. The selection of a particular plural suffix may be governed by morphological principles, as shown by the fact that the last suffix of a derived word may determine the choice of plural suffix. That is, the choice of a particular suffix cannot always be reduced to phonological output conditions.

The output-based analysis of affix selection makes it also possible to give a proper account of the interaction between stem allomorphy and selection of plural suffix. A number of nouns in *-or, -on, -ol* have two plural forms:

(12) mótor /mo:t]r/ `engine' mótors /mo:t]rs/, motóren /mo:to:rχn/

proféssor /profɛs]r/ `professor.' proféssors /pro:fɛs]rs/, professóren /pro:fɛso:rχn/

néutron /nœytr]n/ 'neutron' néutrons /nœytr]ns/, neutrónen /nœytro:nχn/

The conspiracy of stem allomorphy, stress location (weight-sensitive assignment of primary stress) and choice of plural suffix follows directly from the output constraint. Note that the last

syllables of the long stem allomorphs form superheavy syllables, and therefore attract the main stress.

A similar generalization concerning the form of plural nouns in terms of the required output can be made with respect to German (leaving aside the special category of plural nouns ending in *-s*), as pointed out by Wiese (1996: 106): "plural nouns in Modern Standard German must end in a bisyllabic foot, with the second syllable being a schwa syllable" as shown by the following examples:

(13)

Singular	*Plural*
Filter `filter'	Filter-ø
Mauer `wall'	Mauer-n
Uhr `watch'	Uhr-en

The correct prediction of this output condition is that zero-marking of the plural is limited to nouns that end in a schwa-syllable, and that the ending *-en* only occurs after syllables headed by a full vowel.

Now that we have seen some arguments for making use of output constraints, we will now turn to the analysis of the variation in the phonological form of inflected adjectives in Dutch.

3. Inflected adjectives in Dutch

In present-day standard Dutch adjectives in attributive position are inflected: the stem is followed by schwa, except when the adjective forms part of an indefinite NP headed by a neuter noun. In the latter case, there is no overt inflection. Traditionally, these forms are called uninflected

adjectives. In the examples below, *boek* `book' is a neuter noun, and *tafel* `table' is a non-neuter noun.

(14) een goed-ø boek `a good book'
het goed-e boek `the good book'
(de) goed-e boeken `(the) good books'

een goed-e tafel `a good table'
de goed-e tafel `the good table'
(de) goed-e tafels `(the) good tables'

When the stem of the adjective ends in *–en,* however, the schwa does not appear:

(15) het open boek `the open book'
de hout-en tafel `the wooden table'
de ge-slagen room `the whipped cream'
de ver-geten jas `the forgotten coat'

The absence of the schwa in this position does not follow from a purely phonological rule of schwa apocope, because there is only absence of schwa if the schwa is the inflectional morpheme of the adjective. In other cases, the schwa remains, e.g. in the nominalized forms of adjectives:

(16) het geslagen-e `the beaten' (neuter)
de geslagen-e `the beaten (person)' (non-neuter)

Moreover, it is only after *-en* that the inflectional schwa does not surface; it does surface after other consonants, and after the combination full vowel + /n/:

(17) de mager-e vrouw `the lean woman'
de lelijk-e man `the ugly man'
de edel-e mens 'the noble man'

That it is the output configuration *-ene* only that is to be avoided, can be concluded from the fact that past participles used as attrributive adjectives do have a final inflectional schwa if they have an exceptional form ending in full vowel + /n/, which is the form for the verbs *doen* `do', *gaan* `go', *staan* `stand', *zien* `see' and their derivatives:

(18) ge-dan-e zaken `lit. done business, finished matters'
door-stan-e moeite `lit. suffered effort, efforts'
be-gan-e wegen `trodden paths'
een ge-zien-e collega `lit. a seen colleague, a respected colleague'

Furthermore, the same pattern can be observed for infinitives with *te* used in attributive position. After infinitives in *-en*, the inflectional schwa does not occur, whereas the five exceptional infinitives for the verbs *doen, gaan, slaan* and *zien*, mentioned above, and the verb *slaan* `strike' do have the schwa:

(19) nog te nemen-ø maatregelen `lit. still to take measures'
versus
nog te doen-e zaken `matters still to be done'

nog te gan-e wegen `ways that must be gone'

nog te door-stan-e beproevingen `trials still to be suffered'

niet af te slan-e voorstellen `proposals not to be rejected'

niet te zien-e organismen 'organisms that cannot be seen'

Summarizing: the inflectional schwa of words used as attributive adjectives has a zero-allomorph if the stem ends in *-en*.

The avoidance of the sequence *-ene* can be related to the prosodic structure of Dutch and related Germanic languages: as pointed out above, syllables are organized in disyllabic trochaic feet. A syllable headed by the vowel schwa cannot function as the head of a foot, and therefore, a sequence of two of such schwa-syllables should be avoided if possible, as was also pointed out in Dyk (1996), as required by the constraints Parse and FootMax: the second of the schwa-headed syllables will be left over, and cannot be parsed into a foot.

A form like *opene* `open' violates this constraint, whereas *open* is in accordance with the constraint. Therefore, the form *open* should be selected by the grammar as the proper form of the inflected adjective.

In a rule-based analysis of this kind of schwa apocope, we would have to assume the following rule:

(20) $\chi \rightarrow \emptyset / \chi\ n\ \text{--}]_A$

Such a description fails to express, however, why it is only in this context, after a preceding schwa, that the final schwa deletes. A rule with the context '[+voc] n --', i.e., a rule that deletes schwa after /n/ whatever the preceding vowel, would formally be simpler. Yet, it is obvious that it would not be simpler from the point of view of the overall systematics of the grammar.

The constraint ParseSyllable can be violated since we do find words with a sequence of two schwa-syllables, in the following situation:

(21) (a) with another consonant than /n/, e.g. edele mens `noble man'

(b) in the inflected present particple: lopend-e mensen `walking people'

(c) if the schwa is a nominalizing suffix: het open-e `the open, neuter', de ge-bor-en-e `the born person'.

Violable constraints are an essential ingredient of OT. In this case, the constraint Parse is dominated by the principle that morphemes must receive a phonetic realization, i.e. Faithfulness is more important than Parse:

(22) het open-e

	Faithfulness	ParseSyllable
☞(ope)$_F$ne		*
(open<e>)$_F$	*!	

(the part of a string between < > will not be realised).

The question thus arises how we account for the difference between the behavior of the inflectional schwa of adjectives, which alternates with zero, and the other inflectional schwas which always appear on the surface. Such differences in behavior could be accounted for in terms of different constraint rankings. However, I do not want to assume suffix-specific rankings of constraints, because this would imply that the language learner would have to acquire a substantial number of different grammars for his native language. Therefore, the only reasonable

account for the non-overtness of the inflectional schwa of attributive adjectives is that it has a zero-allomorph ø which is selected by the same grammar:

	Faithfulness	ParseSyllable
$(\text{open-e})_F$ e		*!
☞$(\text{open- ø})_F$		

The second form with the allomorph ø does not violate ParseSyllable, and is therefore to be preferred. The inflectional schwa of adjectives must therefore be assumed to have a zero-allomorph which is subcategorized for appearing after /n/. Note that we do not have to subcategorize this zero-allomorph for appearing only after /n/ preceded by a schwa, because this follows from the constraint FootBinarity already discussed in the preceding section. That is, it follows automatically that the zero-allomorph does not appear after /n/ preceded by a full vowel, as is the case for an adjective like *groen* `green':

	FootMin
☞ $(\text{groene})_F$	
$(\text{groen- ø})_F$	*!

In other words, if Dutch has the option to create a disyllabic word, it will do so, and not choose the zero-allomorph which results in a less optimal phonetic form.

There are also a few adjectives, ending in e*r*, that also have the zero-form of the inflectional ending: denominal geographical adjectives such as *Limburger* and *Groninger*, and the adjectives *linker* `left' and *rechter* `right'. In other words, the zero-allomorph of the adjectival inflection must also be specified as to appear after such adjectives. This zero-allomorph will then be

selected by the constraint system proposed above, because forms like **linkere* will be less optimal. However, this zero-allomorph is not allowed for all adjectives in *-er*: comparatives do have the schwa. This implies that the specification of the context of the zero-allomorph has to refer to specific classes of adjectives.

The working of the constraint ParseSyllable is also visible in another case of prosodically conditioned allomorphy: denominal and deverbal nouns exhibit suffix allomorphy. The allomorphs -e*r*, -*de*r, and -*aar*:

(23) *denominal nouns*

geographic noun	*inhabitant name*
Amsterdám	Amsterdammer / *Amsterdam-der / *Amsterdamm-aar
Bijlmerméer	*Bijlmermeer-er / Bijlmermeer-der / *Bijlmermeeraar
Almére	*Almeer-er / Almeer-der / *Almer-aar
Diemen	*Diemen-er / Diemen-aar / *Diemen-der

deverbal nouns:	*allomorphs -er, -der, -aar*
luister `listen'	*luisterer / *luisterder / luisteraar
etter `nag'	*etterer / *etterder / etteraar
leer `learn'	*lerer / leerder / leraar

The choice of -*de*r instead of -e*r* has to do with the avoidance of the sequence /rχr/, which is a manifestation of the general constraint *$C_i\chi C_i$, and discussed in detail in Booij (1998). The choice between -*aar* versus -*er* or -*der* is a matter of optimal foot structure. A superheavy syllable (VVC or VCC) in the weak position of a foot is very marked, though not impossible, as in the exceptional word *zond-aar* `sinner'. Therefore, -*aar* will be avoided after a syllable that bears

stress, such as *Bijlmermeer* with the denominal noun *Bijlmermeerder*. The correct candidate is selected as follows:

	FootMax	ParseSyllable	FootMin	Weight
$(\text{dieme})_F$ner		*!		
$(\text{dieme})_F(\text{naar})_F$			*	

The allomorph *-aar* is also a special allomorph, subcategorized for appearing after a coronal consonant. Again, the fact that this coronal consonant is always preceded by a schwa, does not have to be stated, but follows from the constraints, in this case Weight discussed above (a weak syllable must be light). Since the suffix allomorph *-aar* creates a heavy syllable (long vowel followed by a consonant), it will not occur after a stem-final syllable with a full vowel. For instance, *Amsterdammaar* is out because it would have a superheavy syllable in weak position:

s w s w s w s w

(am ster) (dam ma:r) (am ster) (dam mer)

Thus, we see again how prosodically conditioned allomorph or affix selection can be accounted for in an insightful way in terms of violable and ranked output constraints.

4. Language variation

As pointed out in the introduction, an adequate theory of phonology should enable us to give an insightful account of differences between related languages or dialects. In this section I will

discuss how inter- and intra-dialectal variation in the phonological form of the inflected adjective can be analysed.

In Frisian, the second official language of the Netherlands, the omission of a final schwa in the inflected adjective is optional (Dyk 1996), whereas in Dutch the form without schwa is obligatory. In Middle Dutch, the inflectional schwa of the attributive adjective always surfaced. Similarly, in Standard Modern German inflected adjectives always end in a schwa-syllable. How can these differences between related languages be interpreted?

The difference between Frisian and Dutch can be seen as a manifestation of the perennial tension between two forces that determine the phonetic realization of a morphologically complex word: on the one hand, each morpheme requires a faithful realization of its underlying form in order to express the relevant information, on the other hand the constraints on phonologically optimal outputs may require that morphemes are not completely realized. In the case of Dutch, it is the phonological output constraint Parse that is complied with, but only in the case of contextual inflection, where a zero-allomorph does no harm. In Middle Dutch, there always was an overt inflection for attributive adjectives. Gradually, the schwa became optional in this context (Raidt 1968: 29-30). Frisian is thus in between Middle Dutch (and German) and Modern Dutch in that it optionally omits the final schwa of inflected adjectives.

In the theoretical framework of OT, some differences between two related languages can be described as ranking differences between constraints. Variation within a language can be interpreted as a situation in which two constraints are not ranked with respect to each other. Hence, there are two possible winning candidates (Löhken 1997). Phonological change can then be depicted as follows:

(24) Stage 1 Cond A >> Cond B

Stage 2, variation Cond A, Cond B

Stage 3 Cond B >> Cond A

An example of such an analysis can be found in Golston & Wiese (1996: 155). They argue that the difference between Modern Standard German and the Hessian dialect of German with respect to pluralization of nouns can be described as a difference in ranking of some constraints. For instance, the form for `dogs' is *Hunde* is Standard German, but *hon* in Hessian. Hessian thus exhibits subtractive morphology: the plural is formed by dropping the final /d/. The crucial difference is that in Standard German the constraint Fill, which forbids epenthesis is ranked below the constraint Parse Segment that forbids deletion of the /d/; hence a schwa is inserted in order to comply with the output condition that a plural noun must end in a sonorant segment. In Hessian, the ranking of these two constraints is the inverse one; hence Hessian prefers deletion of the /d/ to insertion of the default vowel schwa, in order to comply with the output condition.

For the phenomenon under discussion here, the form of inflected adjectives, the constraint ranking would be as follows:

(25) Middle Dutch,German Faithfulness >> ParseSyllable
Frisian Faithfulness, ParseSyllable
Modern Dutch ParseSyllable >> Faithfulness

This model does not suffice, however, for the case under discussion, because it is only in the case of the inflectional schwa of inflected adjectives that ParseSyllable appears to dominate Faithfulness; in all other cases the schwa remains, as discussed above, i.e., Faitfulness dominates ParseSyllable. Therefore, the differences between these three related languages must be described in terms of allomorphy: Modern Dutch has an obligatory zero-allomorph for the inflectional schwa of adjectives, and Frisian has an optional zero-allomorph for this suffix. In

other words, this kind of language variation is not a matter of differences in constraint rankings, but in the availability of specific underlying forms. The Dutch zero-allomorph must be listed as such, and cannot be derived by phonology. Given its possibility of occurrence after /n/, this zero-allomorph will be preferred to the schwa-allomorph, because it violates neither Faithfulness nor ParseSyllable.

In the case of material adjectives, Frisian has another means to avoid a sequence of two schwa-syllables (Dyk 1996: 57): instead of the material adjective suffix -e*n*, another suffix is available, namely -*s*. This is the suffix used after nouns ending in e*l*, e*n* and *je*:

(26) linnen `linen' linnen-s
duffel `duffel' duffel-s
flenje `flanel' flenje-s

The question then arises under which conditions zero-allomorphy is allowed for. The important point to be noted here, and also observed by Dyk (1996) is that the kind of inflection involved is what has been called weak (Kiparsky 1982) or contextual (Booij 1994) inflection: is is inflection that is completely dependent on and governed by the syntactic context, and has no independent information content. Therefore, it is omissble.

As observed by Kiparsky (1971) [1982: 67], it is contextual inflection that gets lost first:

"Morphological material which is predictable on the surface tends to be more susceptible to loss than morphological material which is not predictable on the surface".

A number of illustrations of this principle can be found in Booij (1994).

And indeed, as we saw above, schwas that have a non-predictable function, e.g. the function of nominalizer (changing an adjective into a neuter or a non-neuter noun) always surface, and do not have a zero-allomorph.

In Frisian, where the schwa-apocope is optional, the zero-allomorph after /n/ is optional, and not an obligatory allomorph. The optionality of the allomorph suggests that phonology has not yet completely won the victory over morphology. In the classical rule-based framework we would say that Frisian has an optional rule of inflectional schwa-deletion, and this is in conformity with the following generalization (Kiparsky 1982: 68): "Grammatically conditioned variability in the application of optional rules favours optimal outputs". It is interesting to see how in the formulation of this generalization the notion `output' already plays a direct role.

What remains something of a mystery is why it is only after the /n/ that there is a zero-allomorph. Why do not we choose for *later* instead of *latere* in a phrase such as:

(27) de latere ontwikkelingen `the later developments'

Similarly, the allomorph *-aar* of the suffix *-er* can only be used afer coronal consonants, so that we have *bezem-er* `sweeper' besides *reken-aar* `computer': what is wrong with the incorrect *bezemaar*?

We do see tendencies, however, to also avoid sequences of schwa-syllables in Dutch inflected complex adjectives of the following types, with the suffixes *–elijk* /χlχk/ and *–ig* /χπ/:

(28) het onvermijdelijk(e) gevolg `the unavoidable consequence'
ons hartelijk(e) weerzien `our cordial meeting again'
gebruikelijker(e) gevallen `more usual cases'
een voorzichtiger(e) formulering `a more prudent formulation'

This optionality implies that the possibility of a schwa-less allomorph for certain adjectives in attributive position must be specified in the lexicon by listing this allomorph.

Related languages can thus be put on a scale of output simplification with respect to the constraint ParseSyllable; Parse Syllable is violated less frequently in modern Dutch due to the introduction of a zero-allomorph:

(29) Middle Dutch Frisian Dutch

--> output simplification

A parallel development can be seen in the form of inflected infinitives. In Middle Dutch, infinitives could be inflected: the preposition *te* assigned dative case, expressed by the ending *-e*:

(30) te copene `to buy'

te kerene `to turn'

te vellene `to fell'

In Modern Dutch, this inflectional ending is no longer found, nor in Frisian.[2]

Afrikaans introduced the most radical change in the inflection of adjectives (Raidt 1978, 1983) in that the final schwa of adjectives completely lost its morphological status. The schwa became part of the underlying form of the adjective instead, so an Afrikaans adjective may have an attributive form that ends in schwa, but the occurrence of this attributive allomorph does not depend on morphosyntactic properties such as number, gender and definiteness: in this

[2]In Frisian, the distinction between the inflected and the non-inflected infinitive forms has been preserved in another way: after *to*, and in a number of other nominal contexts, the infinitive ends in *-en* (the residue of *-ene*), whereas in non-nominal contexts the ending is *-e* (the residue of *-en*) (cf. Dyk 1997).

attributive position, the adjective either always ends in schwa, or never. Thus, for a number of adjectives one has to learn that the attributive form is the predicative form plus schwa. This applies first of all to all derived adjectives, i.e. adjectives that end in an adjectivizing suffix (Raidt 1983: 142), for instance:

(31) -aal provinsi-ale `provincial'
-agtig boek-agtige `bookish'
-erig bang-erige `somewhat afraid'
-end verskill-ende `several'

When the schwa becomes part of the underlying form of the adjective, it is protected against deletion by the condition of Faithfulness for lexical morphemes.

For underived adjectives, certain tendencies might be formulated, based on the phonological composition of the adjectives. For instance, adjectives ending in a voicelss stop tend not to have the final schwa. In some cases, both forms are possible, as for *dubbel(e)* `double' and *enkel(e)* `single'. In other words, in Afrikaans, the occurrence of final schwa is no longer a matter of phonology or a matter of morphology, but of massive, syntactically conditioned lexical allomorphy: adjectives that appear with a final schwa in attributive position must be listed with this syntactically determined allomorph in the lexicon. The schwa-less form is the default form, to be used in predicative position, and as the form for word formation (composition and derivation). In the case of complex adjectives, the existence of the schwa-final allomorph is predictable, and this regularity can be expressed by a lexical allomorphy rule. The schwa in these cases no longer has the status of an inflectional morpheme, it is a stem-extension.

As may be expected on the basis of this massive allomorphy, there are also cases in which the predicative form differs from the attributive form in unpredictable ways. for instance, the adjective for `new' is *nieuw* /niw/ in attributive position, but *nuut* /nyt/ in predicative position.

Moreover, in many cases the two allomorphs exhibit meaning differences (Raidt 1968: 108; 1983: 143ff). For instance, we have the opposition between

(32) 'n waar storie `a true story'

'n ware Afrikaner `a real Afrikaner'

This kind of semantic differentiation supports the claim that the occurrence of final schwa in Afikaans adjectives has to be interpreted as non-phonological allomorphy, to be listed in the lexicon.

5. Conclusions

What can we learn from these facts concerning the variation in the form of attributive adjectives in a number of related Germanic languages? There are two main conclusions to be drawn.

First, a phonological theory that makes use of output constraints enables us to give a better account of variation and change than a rule-based description, because the latter does not unveil the driving forces behind variation and change, the perennial struggle between optimal phonetic form and the overt realization of linguistic information, whereas the constraint-based approach does.

Secondly, we have seen that given an output-constraint-based analysis, the differences between related languages cannot always be expressed as a difference in the ranking of

constraints. Instead, the differences had to be stated at the lexical level, namely as a difference between the absence (Middle Dutch) or presence (Dutch and Frisian) of two allomorphs for a certain suffix, which made it possible to create more optimal phonetic forms, at least for attributive adjectives ending in /n/.

We also saw that zero-allomorphy in these two languages is constrained by the principle that it is only contextual, i.e. syntactically predictable inflection that allows for zero-allomorphy.

The contextual nature of the inflectional schwa in attributive adjectives made it possible that in Afrikaans this schwa completely lost its morphological status, and only remained as the last segment of an allomorph of the adjective that can only appear in attributive position.

In sum, phonological variation within languages, and differences between related languages or between different historical stages of a language may be a matter of a kind of allomorphy that cannot be completely reduced to phonology, rather than a matter of differences in the ordering of rules or the ranking of constraints. In that sense, the study of language variation and change supports a rather concrete approach to phonological alternations in the forms of words.

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