Prosodic Conditions on Allomorph Selection in Dutch Derivational Morphology

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This paper examines the distribution of schwa-initial versus schwa-less allomorphs in specific areas of Dutch derivational morphology, with particular reference to Shannon’s (1991) argument that schwa epenthesis is motivated by the need to improve poor syllable contacts. The present paper makes two basic claims. First, although optimization of syllable contacts may play a role in certain segmental constraints on the distribution of schwa, its main motivation is prosodic. That is to say, schwa-less suffix allomorphs follow a branching foot. If the foot is non-branching, schwa is inserted as a linking element to make it branch. Furthermore, it is also argued that monosyllabic feet can be branching, so that “heavy” syllables of this type pattern in the same way as two syllables. The second claim made here is that these prosodic conditions on schwa allomorphy are best formulated not in terms of a rule but rather as a schema in the sense of Bybee and Slobin 1982.

1. Introduction.

One area of derivational morphology that has frequently been discussed in the literature on Dutch phonology and its interaction with morphology is the behavior of derivatives ending in the suffixes -(e)lijk, -(e)ling, -(e)loos, and -(e)nis, each of which has a schwa-initial and a schwa-less allomorph. Three basic questions posed include the following: i. whether schwa epenthesis in these forms is a phonological or morphological rule (Kooij 1976:65–69); ii. whether schwa is part of the stem or the suffix

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(Booij 1995:86); and iii. whether the insertion of schwa is motivated by conditions on syllable contacts (Shannon 1991:193–201). To summarize the findings up to this point, schwa insertion before these sonorant-initial suffixes is believed to be a morphological rule that generally applies after stem-final obstruents, the motivation for this being that an obstruent preceding a sonorant at the point of contact between two syllables is not favored in universal preference laws for syllable structure, and therefore this “poor” contact is broken up by the insertion of schwa.

In contrast to the rule-based approach of, for example, Kooij (1976), it is argued here that the distribution of schwa in these forms is not the result of a morphological process but is governed by a general well-formedness statement or “schema,” in the sense of Bybee and Slobin 1982, whose function is to assist in the organization of stored lexical items. The phonological conditions set out in the schema are not only segmental (that is, referring to the features of the stem-final sound), but also prosodic. Specifically, it is argued that the “stem-final obstruent versus sonorant” distinction is an inadequate statement of the conditions for the distribution of schwa, and that the main distinction is whether or not the suffix follows a branching foot, allowing for the fact that a branching foot can either be bisyllabic or monosyllabic. In the latter case, a heavy syllable consisting of a long vowel or diphthong plus a sonorant consonant, or of a long vowel plus a glide, is shown to be prosodically equivalent to two syllables, consisting of a strong and a weak branch dominated by the foot. Where the foot is non-branching, schwa is needed to make it branch, thereby fulfilling the conditions outlined in the schema. This means that schwa should not be seen as part of the suffix itself but as a linking element between stem and suffix, which forms a prosodic unit with the last syllable of the stem (see also Booij 1995).

Although it is argued here that the distribution of the schwa-initial and schwa-less allomorphs is, for the most part, phonologically determined, morphological and semantic factors such as productivity and semantic transparency also play a role, particularly in accounting for subsets of exceptions. Thus, it is necessary at this point to give an overview of the suffixes in question with regard to their productivity and semantic features; see the examples in 1.
(1) a. –(e)lijk /–(ø)løk/ is the most frequently occurring of the four suffixes, but it is unproductive (Geerts et al. 1984:353). It often corresponds to English –ible/–able when added to a verb, or –ly when added to a noun or adjective, although in many cases the meaning of the derived word is not predictable.1

Examples:

begrijp – begrijpelijk ‘understand – understandable’
vriend – vriendelijk ‘friend – friendly’
ziek – ziekelijk ‘sick – sickly’
ken – kennelijk3 ‘know – obvious’
daad – dadelijk ‘deed – immediate’

b. –(e)nis /–(ø)nis/ is relatively restricted in its occurrence and is completely unproductive (Geerts et al. 1984:98). It is used to form nouns from verbs and adjectives, and sometimes corresponds to English –ness, but the meaning is not always predictable.

Examples:

duister – duisternis ‘dark – darkness’
geheim – geheimenis ‘secret – mystery’
begraaf – begrafenis ‘bury – burial, funeral’
muis – muizenissen (pl. only) ‘mouse – worries’

b. –(e)ling /–(ø)lín/ usually denotes a person, but again the meaning is not always systematic. It is unproductive with noun bases, but has a limited amount of productivity with adjectival and verbal bases (Geerts et al. 1984:89).

Examples:

dorp – dorpeling ‘village – villager’
jong – jongeling ‘young – youth, young person’
leer – leerling ‘learn – pupil’
bescherm – beschermeling ‘protect – protégé’

d. –(e)loos /–(ø)lo:s/ differs from the other three suffixes in that it is very productive (Geerts et al. 1984:362). Furthermore, it has a

1 Unless otherwise specified, all Dutch examples are taken from the Van Dale Groot Woordenboek (1999).
2 When the base form is a verb, the present stem is given.
3 In open syllables, short vowels are indicated by doubling the following consonant. Conversely, long vowels are written as one vowel in open syllables and as two vowels in closed syllables.
systematic meaning (namely, ‘without’, often corresponding to English –less), so that words ending in –(e)loos are usually semantically transparent (see section 6.2 below for a fuller discussion of this). It is usually added to nouns, except for a few isolated examples where it is used (unproductively) with verbs.

Examples:

- liefde – liefdeloos ‘love – loveless’
- slaap – slapeloos ‘sleep – sleepless’
- gewicht – gewichtloos ‘weight – weightless’

3. Choice of Allomorph and Syllable Contacts.

It has often been pointed out that although some exceptions do exist, the schwa-initial allomorphs are usually favored after obstruents, while the schwa-less ones tend to appear elsewhere (Kooij 1977:56, Booij 1995:86). Consider the examples in 2 with the most frequently occurring suffix, –(e)lijk.

\[
\begin{align*}
(a) & \quad \text{haat – hatelijk} & \text{‘hate – hateful’} \\
& \quad \text{vriend – vriendelijk} & \text{‘friend – friendly’} \\
& \quad \text{begrijp – begrijpelijk} & \text{‘understand – understandable’} \\
& \quad \text{zaak – zakelijk} & \text{‘business – business-like’} \\
& \quad \text{stof – stoffelijk} & \text{‘cloth/material – material/concrete’} \\
& \quad \text{mens – menselijk} & \text{‘human being – human’} \\
& \quad \text{lach – belachelijk} & \text{‘laugh – ridiculous’} \\
(b) & \quad \text{heer – heerlijk} & \text{‘gentleman – splendid’} \\
& \quad \text{pijn – pijnlijk} & \text{‘pain – painful’} \\
& \quad \text{natuur – natuurlijk} & \text{‘nature – natural’} \\
& \quad \text{gevaar – gevaarlijk} & \text{‘danger – dangerous’}
\end{align*}
\]

The stem-final plosives and fricatives in 2a are regularly followed by –lijk, while the stem-final sonorants in 2b are followed by –lijk. Kooij (1977:66) accounts for this by positing a morphological redundancy rule stating that schwa is inserted after a stressed syllable ending in an obstruent. Kooij makes explicit in his analysis that the distribution of the allomorphs is motivated by syllable structure (that is, the environment in question is at the end of a stressed syllable), yet one may ask why it is only obstruents and not sonorants that are followed by schwa when they occur in the same syllable-final position.

In order to throw more light on the matter, Shannon (1991) argues that the choice of allomorphs for sonorant-initial suffixes in Dutch is
motivated by Vennemann’s Contact Law, which governs sequences of syllables (see Vennemann 1988:41).

(3) Vennemann’s Contact Law
A syllable contact $A^cB$ is the more preferred the less the Consonantal Strength of the offset $A$ and the greater the Consonantal Strength of the onset $B$. More precisely, the greater is the characteristic difference $CS(B) - CS(A)$ between the Consonantal Strength of $B$ and that of $A$.

Here, strength is measured on the basis of articulatory force, which means that plosives and fricatives (that is, obstruents) are considered to be stronger than nasals and liquids (that is, sonorants), which, in turn, are stronger than vowels. Compare the hierarchy in 4.

(4) Vennemann’s (1988:9) Consonantal Strength Hierarchy

Increasing Consonantal Strength

voiceless plosives
voiced plosives
voiceless fricatives
voiced fricatives
nasals
lateral liquids (l-sounds)
central liquids (r-sounds)
high vowels
mid vowels
low vowels

Shannon argues that since the suffixes in question begin with a sonorant, we should not expect to find a strong stem-final obstruent coming into contact with a weak sonorant-initial suffix, as this would violate the Contact Law. Hence the tendency is to avoid this “poor” contact by inserting a schwa between stem and suffix. Indeed, Shannon argues that this is precisely why these sonorant-initial suffixes are the
only ones in Dutch to have an allomorph beginning with schwa. Examples with -(e)ling, taken from Shannon 1991:194–197, are given in 5.

(5) a. volg – volgeling ‘follow – follower’
    smeek – smekeling ‘entreat – supplicant’
    doop – dopeling ‘baptize – one who is baptized’

   b. leer – leerling ‘learn – pupil’
    een – eenling ‘one – individual’
    naar – naarling ‘odious – odious fellow’

Although these examples clearly show a tendency to break up obstruent plus sonorant syllable contacts, the fact that Shannon restricts his analysis to the suffixes -(e)ling and -(e)nis, and ignores the much more frequent -(e)lijk, for example, means that we do not have enough examples of different stem types occurring with -(e)ling and -(e)nis to test the hypothesis fully, as these two suffixes are largely unproductive and fairly restricted in their occurrence (see section 2 above). For instance, the Contact Law makes no reference to stress, which implies that final obstruents in unstressed syllables would also form poor contacts with sonorant-initial suffixes and therefore schwa would be inserted. For lexical reasons, however, there are no cases of obstruent-final unstressed syllables preceding -(e)ling and -(e)nis. Yet if we consider the suffix -(e)lijk, we see that it does occur in such environments. Compare the examples in 6a with those in 6b, where stress is marked with an accute accent.

(6) a. móeder – móederlijk ‘mother – maternal’
    álèl – álèllijk ‘nobility – noble’
    wézen – wézenlijk ‘being, essence – essential’

   b. wéreld – wéreldlijk ‘world – worldly’
    vúrig – vúriglijk ‘fiery – fierily’
    voorspóedig – voorspóediglijk ‘prosperous – prosperously’

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4 Shannon dismisses the diminutive suffix, which also has a schwa-initial allomorph -(e)tje, as “a topic for another paper in itself” (1989:193ff.), but it is argued here that the distribution of -(e)tje and that of -(e)lijk, -(e)ling, etc. are very similar.
It is clear from these examples that the choice of the schwa-less allomorph is not motivated by the presence of a preceding sonorant or obstruent but by the fact that the syllable is unstressed. Thus considerations of stress must outweigh the need for avoiding poor syllable contacts.

More problematic for the contact analysis are those examples in which stem-final sonorants in stressed syllables regularly appear with the schwa-initial allomorph. Shannon (1991:197) notes the following examples:

(7) (ver-)bán – (ver-)bánneling ‘banish – exile’
    begin – beginneling ‘begin – beginner’
    overwín – overwónneling ‘conquer, vanquish – vanquished person’

If the combination “syllable-final sonorant + suffix-initial sonorant” makes a good syllable contact, as Shannon argues in cases such as leerling, eenling, and naarling, then there is no motivation for the occurrence of schwa in 7 above. Shannon attempts to account for the data by appealing to morphological factors: He argues that since some deverbal forms are derived from past participle stems, it is possible that these schwa-final participles have influenced the form of the corresponding nouns (for example, overwonné, pronounced without the final –/n/, influences overwónneling). This explanation does not account for the other examples, however. In fact, most deverbal nouns in –(e)ling are derived from the present stem of the verb, and those derived from the past participle form a relatively small group.

Moreover, if we consider adjectives with –(e)lijk, it soon becomes apparent that the appearance of schwa after a stressed syllable containing a short vowel plus sonorant is very regular. Compare the examples in 8.

(8) ken – kénnelijk5 ‘know – obvious’
    bemín – bemínnelijk ‘be fond of – amiable’
    overwín – onoverwínnelijk ‘conquer – invincible’
    zin – zínnelijk ‘sense – sensual’
    man – mánnelijk6 ‘man – manly, masculine’

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5 Contrast kennis (not *kennenis) ‘acquaintance’, which reflects the more general principle of not inserting schwa between identical consonants in Dutch.

6 Although the Groot Woordenboek also notes schwa-less alternatives to these examples, it becomes apparent on further investigation that these alternatives are
Note that morphological considerations are irrelevant here, since the choice of allomorph is the same with nominal as with verbal bases.

Indeed, the notion that the distribution of these allomorphs is motivated by phonological factors in this case is supported by the fact that it is precisely in this environment (that is, stressed short vowel plus sonorant) that the schwa-initial allomorph -(e)tje of the diminutive suffix occurs, for example, bon – bonnetje ‘ticket’, tor – torretje ‘beetle’, bal – balletje ‘ball’ versus haar – haartje ‘hair’, dōctor – dōctortje ‘doctor’ (Booij 1995:69–70).

From these examples of sonorant-final stems with -(e)lijk and -(e)tje a regular pattern emerges whereby stress and vowel length are shown to play a major role in determining the choice of schwa-initial versus schwa-less allomorphs in addition to the last segment of the stem, and it becomes clear that an adequate explanation of these regularities cannot be provided without further investigation of such prosodic phenomena.

4. Metrical Feet.

Following the generally accepted representation of stress advocated by Liberman and Prince (1977) as a binary relation between a strong and a weak element, a typical bisyllabic Dutch word such as moeder /ˈmuːdər/ ‘mother’ would be represented as in 9.

(9) F
    /ˈmuːdər/
    o_s
    o_w

The two syllables form a metrical foot, the first element of which is strong (that is, stressed) and the second weak (that is, unstressed), making it a left-headed foot, which is characteristic of Dutch and other Germanic languages. Monosyllabic words in Dutch are also dominated

not used enough to be of any significance. An examination of the thirty-eight-million word corpus of the Institute of Dutch Lexicology (1996) reveals the following token frequency scores: kennelijk (1744) / kenlijk (2); beminlijk (29) / beminlijk (0); onoverwinnelijk (14) / onoverwinlijk (0); zinnelijk (11) / zinlijk (0); mannelijk (640) / manlijk (14).
by a foot (see Booij 1999:61), so that a word like *man ‘man’* would be represented as in 10.

(10)  
\[
\begin{array}{c}
\text{F} \\
\text{σ} \\
\end{array} \\
/\text{man/}
\]

Here the foot is not branching, so there are no strong-weak relations within it.

The fact that the schwa-less allomorphs *–lijk, –ling, –nis, and –loos* always appear after unstressed syllables suggests that they need to follow a branching foot (11a), and if the foot is monosyllabic and non-branching (11b) it requires a schwa to make it branch (11c).

(11)  
\begin{align*}
\text{a.} & \quad \text{F} \\
& \quad \text{σ}_s \\
& \quad \text{σ}_w \\
& \quad /\text{muː}\text{dr}/ \\
\text{b.} & \quad \text{F} \\
& \quad \text{σ} \\
& \quad /\text{hæt/} \\
\end{align*}
\begin{align*}
\text{a.} & \quad \text{F} \\
& \quad \text{σ}_s \\
& \quad \text{σ}_w \\
& \quad /\text{veː}\text{rəlt/ + /loʊk/} \\
\text{b.} & \quad \text{F} \\
& \quad \text{σ} \\
& \quad /\text{man/} \\
& \quad */\text{-loʊk/}
\end{align*}
Under this analysis, schwa is treated not as part of the suffixes themselves but as a linking element that is required by the suffixes to fill in the weak constituent of a foot where nothing else is present. Note that bisyllabic and polysyllabic stems with a vowel other than schwa in the final syllable tend to shift their stress to stem-final position before –lijk, creating a strong syllable that is then followed by schwa: for example, bísschop ‘bishop’, bísschöppelijk ‘episcopal’. By contrast, words such as moeder and wereld have a schwa in their final syllable (/muːdər/, /veːɾəlt/), and schwa can never be stressed (see Zonneveld 1993:74).

The condition that schwa-less allomorphs can only cooccur with branching feet could be represented as a general redundancy statement applying to all sonorant-initial suffixes, as in 12.

(12) The Branching Foot Condition

With sonorant-initial suffixes, schwa-less allomorphs follow branching feet.

This begs the following question, however: If schwa is needed to fill in the weak constituent of a foot, why does it not appear after monosyllables such as heer and pijn (see 2b), leer, een, naar (see 5b) and the stressed (that is, strong) syllables natúur and geváar (2b)? The answer is that these syllables all have something in common: Their rhyme contains a long vowel (or diphthong) and a sonorant consonant, and it is argued here that these syllables are prosodically equivalent to a strong plus weak syllable combination. That is to say, the long vowels and diphthongs are dominated by the strong node of the foot, as they are always stressed, while the sonorants are dominated by the weak node.

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7 The /n/ in mannelijk must be ambisyllabic, so that the stressed syllable does not end in a short vowel, which would be problematic in Dutch (see Booij 1995:32).
The long vowels and diphthongs occupy two timing slots (that is, moras, abbreviated as “m”) while the sonorants occupy just one. See 13 below.8

(13) F σ w
     σ   m m m mm
    m m u: dër /
  /m e: r/   + /–lōk/

A similar analysis is proposed by Kooij (1982) for the distribution of schwa in Dutch diminutives.9 However, one important difference between diminutives and words with sonorant-initial suffixes is that the schwa-initial diminutive allomorph is more restricted than its schwa-less counterpart –tje, which leads Kooij to posit a rule for the former, while the latter is treated as more general. In the case of the sonorant-initial suffixes, however, it is the schwa-less allomorph that is more restricted (except in the case of –loos, where morphological and semantic factors interact with the phonology),10 while the schwa-initial variant appears to be the default allomorph. Indeed, in colloquial spoken Dutch, it is not uncommon to insert schwa before –lijk, the most frequently used of the four suffixes, in contexts where it would not usually be spelled (see Geerts et al. 1984:356).

A further difference between the diminutive and the sonorant-initial suffixes is that diminutive formation is an extremely productive rule in

8 A general argument for the moraic status of sonorant consonants is their behavior in languages with pitch accent contrasts, such as Lithuanian, for example, in which the “circumflex” accent can only occur in syllables with a long vowel or vowel plus sonorant (Zec 1995). Further arguments for the moraic status of sonorants in some Germanic languages and dialects can be found in Dresher and Lahiri 1991 and Chapman 1993.
10 See section 6.2 for a fuller discussion of the different behavior of –loos.
Dutch and the distribution of allomorphs is clearly phonologically conditioned, give or take a few lexical exceptions, while words containing the sonorant-initial suffixes are much more subject to lexical conditioning, as one would expect from such prototypical derivational morphology (see Dressler 1989). In these cases, the derivational forms are stored in the lexicon as whole words, some of which are clearly associated both semantically and formally with their base (14a), while others are less semantically transparent (14b), or differ in form (14c). Indeed, some have no base at all (14d).

(14) a. vriend – vriendelijk
    gevaar – gevaarlijk
    fatsoen – fatsoenlijk
    ‘friend – friendly’
    ‘danger – dangerous’
    ‘respectability – respectable’

    b. uitspreek – onuitsprekelijk
    draag – draaglijk
    beweeg – beweeglijk
    heer – heerlijk
    ‘pronounce – unspeakable’
    ‘carry – bearable’
    ‘move – lively’
    ‘gentleman – splendid’

    c. geheim – heimelijk
    lach – belachelijk
    blijk – klaarblijkelijk
    schijn – waarschijnlijk
    ‘secret – secret (adj.)’
    ‘laugh – ridiculous’
    ‘seem – evident’
    ‘seem – probable’

    d. vrolijk
    lelijk
    gemelijk
    ‘merry’
    ‘ugly’
    ‘peevish’

This suggests that, although there are phonological similarities between the distribution of schwa-initial and schwa-less allomorphs in diminutives and words ending in –(e)lijk, –(e)ling, etc., morphologically they have a different status. Thus while it may be appropriate to derive diminutive schwa allomorphs from underlying schwa-less forms by means of a morpholexical rule (see Booij 1995:69) and regard the schwa in –(e)tje as being the product of a schwa-insertion rule, the presence of schwa in words with sonorant-initial suffixes could be better accounted

11 Contrast these examples with the following derivations in –baar, which have a more literal meaning: onuitspreekbaar ‘unpronounceable’, draagbaar ‘portable’, beweegbaar ‘moveable’ (Geerts et al. 1984:354).
for in terms of a general well-formedness condition on lexemes of this type. This could take the form of a schema in the sense of Bybee and Slobin 1982, which, rather than relating a base form to a derived one, as a rule does, makes a general statement regarding the phonological shape of the derivatives as a morphological class. In the case of words with sonorant-initial suffixes, which all follow a similar pattern with regard to their allomorphic variation (especially those ending in –(e)lijk, –(e)ling, and –(e)nis), we can apply the following statement to all words: “The schwa-less allomorph follows a branching foot. Sonorants following long vowels and diphthongs make the foot branch.”

We have already argued that sonorants cause the foot to branch because they have moraic status, while obstruents do not, hence the occurrence of the schwa-initial allomorph regardless of whether the stem contains a long or a short vowel. See examples in 15.

(15) a. wétenschap – wetenscháppelijk ‘science – scientific’
    hof – hoffelijk ‘court – courteous’
    gemák – gemákkelijk ‘ease – easy’

    b. feit – feitelijk ‘fact – actual, real’
    hoop – hopelijk ‘hope – hopefully (it is to be hoped that)’
    zaak – zakelijk ‘business – business-like’

The main difference between obstruents and sonorants is that the latter are more sonorous than the former, as 16 illustrates.

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12 The different lexical status of diminutives versus derivatives with –(e)lijk, –(e)ling, etc. is reflected in the behavior of certain purely phonological (that is, postlexical) rules. For instance, Kooij (1982:322) notes that schwa before –lijk etc. can be elided in the spoken language (for example, makkelijk ‘easy’ can be pronounced /mækʎək/ and vegadering ‘meeting’ as /ˈfɔɣəːdɾɪŋ/, whereas with –etje this is not possible (e.g., snorretje ‘little moustache’ is not pronounced */sɔntʃə/), as this would be “undoing” the schwa-insertion rule.

13 The schema may also be extended to new lexemes, so that if words in –(e)lijk, –(e)ling, etc. are created by analogy, we would expect the choice of allomorph to follow the schema. For instance, dagelijks ‘daily’ (whose suffix, incidentally, has a different origin from that of –(e)lijk) served as the base for the creation of wekelijks ‘weekly’, where the weak node in the “s”–“w” sequence is filled by schwa, and jaarlijks ‘yearly’ where the weak node is already filled by /l/, hence the absence of schwa (see Schönfeld 1947:184 for the etymology and development of these words).
(16) Sonority Hierarchy (based on Selkirk 1984)
Increasing Sonority
  - low vowels
  - mid vowels
  - high vowels
  - central liquids (r-sounds)
  - lateral liquids (l-sounds)
  - nasals
  - voiced fricatives
  - voiceless fricatives
  - voiced plosives
  - voiceless plosives

Thus it is not necessary to stipulate that the weak element of the foot must contain a sonorant, as this follows automatically from the more general observation that only sonorous elements can be dominated by “w.” Therefore, both in branching feet with an unstressed syllable and in branching feet with one “heavy” syllable, “w” dominates a sonorous segment (usually a schwa in the former, for example, moed/ər, and a sonorant consonant in the latter, for example, heer).

5. Segmental Conditions.
Although the Branching Foot Condition outlined above can account for the majority of derivations with sonorant-initial suffixes, there is a clearly defined group of words that do not follow it, namely those with stems ending in a non-coronal consonant. Consider the examples in 17, which demonstrate that stem-final /m/ is always followed by the schwa-initial allomorph, even when it follows a long vowel or diphthong.

(17) a. arm – armelijk ‘poor – poor, shabby’
vorm – vormelijk ‘form – formal’
áfstam – afstámmeling ‘descend – descendant’
b. naam – namelijk ‘name – namely, that is’
áanneem – aannémelijk ‘accept – acceptable’
verdóem – verdóemeling ‘damn – reprobate’
verdóem – verdóemenis ‘damn – damnation’
The foot-based analysis cannot account for this, as /m/ is dominated by “w” in examples such as those in 17, and therefore a schwa-less allomorph would be expected. The fact that schwa-less allomorphs are only found after /r/, /l/, and /n/ is noted in Shannon 1991:193, yet his analysis based on relative consonant strength cannot account for this restriction. Since he argues that sonorants, being weak, make relatively good contacts when followed by other sonorants in the next syllable, there is no motivation for schwa to break up the contact after /m/. If the contact analysis were extended to include place of articulation, however, we could explain why schwa appears after non-coronals: Where there is an articulatory distance between the stem-final and suffix-initial segment (the latter of which is always a coronal, namely /l/ or /n/), the contact is poorer than in the case of segments agreeing in place of articulation, and contact therefore tends to be avoided by the insertion of schwa. Note that this restriction only applies to stem-final consonants in stressed syllables, however, as unstressed syllables are always followed by the schwa-less allomorph regardless of the final segment. This means that we need a two-part schema in which the first part (A) represents an exceptionless condition motivated by general syllable sequencing principles in Dutch (that is, the avoidance of adjacent unstressed syllables, particularly with schwa; see Booij 1999). The second part (B) has a segmental restriction on the “w” node and, as is shown in section 6, is more subject to lexical exceptions. This is shown in 18.14

14 Note that the schema must be subordinate to general phonological conditions on Dutch syllable structure. For instance, woord ‘word’ can be seen as having a coronal sonorant in the weak branch of the foot, but the fact that it is a “superheavy” syllable, that is, a syllable containing a long vowel plus two consonants, means that it is automatically broken up by inserting schwa and resyllabifying the final consonant, for example, woor-de-lijk ‘verbal’, in line with a general condition on Dutch syllable structure stating that superheavy syllables are limited to the right edge of prosodic words (van der Hulst and Ritter 1999:17). Thus *woordlijk would be automatically disfavored, since the superheavy syllable occurs to the left of the prosodic word.
(18) Schema for words with sonorant-initial suffixes (Part 1: ø-allomorph)

A [ø], ø + ø-allomorph

B [α place] + ø-allomorph [α place]

A [moederlijk]_{ADJ}
 [ademloos]_{ADJ}
 [zonderling]_{N}
[ergernis]_{N}

B [heerlijk]_{ADJ}
 [pijnloos]_{ADJ}
 [eenling]_{N}
 [stoornis]_{N}

This expresses the condition that the schwa-less allomorph must follow a branching foot that is bisyllabic (A) and monosyllabic (B) when the point of syllable contact agrees in place. Elsewhere, the schwa-initial allomorph is the norm, and its default status can be expressed by constructing a hierarchical tree of schemas with the schwa-initial allomorph set at the top and the schwa-less allomorph subsets at a lower node. This operates in combination with the principle that lower node specifications may override higher node specifications (default override). See 19 on the following page.
(19) Schema for words with sonorant-initial suffixes (= combined schema)

\[
\begin{array}{c}
\text{[stem + ø + suffix]} \\
\mid \\
\text{[+son]} \\
\end{array}
\]

A further problem for Shannon’s (1991) contact analysis concerns stems ending in glides. Since glides are weaker than sonorants, they should make very good syllable contacts and there should be no motivation for the insertion of schwa.\textsuperscript{15} Shannon (1991:200) notes,

\textsuperscript{15} Vennemann does not include glides in his Consonantal Strength Hierarchy, but usually they would appear between sonorants and vowels. For example, van
however, that some words whose stem ends in a glide insert schwa while others do not: For example, betrouweling ‘confidant’ and verkouwenis ‘cold (n.)’ contain schwa, whereas zaailing ‘seedling’ (from the verb zaaien ‘to sow’) does not. If, however, we test these data against the schema in 19 above, it becomes clear why this discrepancy exists: The glide <w> is labial and does not fulfill the [α place] condition on the weak branch of the monosyllabic foot, while the glide <i> (phonologically /j/) is coronal and therefore does (see Keating 1991).

Indeed, if we compare the examples in –(e)ling and –(e)nis with words in –(e)lijk (20), we see that schwa regularly appears after <w> in the latter, and also after <j> when it is the second element of the diphthong <ij> (phonologically /ei/) rather than a glide, which suggests the representation in 21.

(20) vrouw – vrouwelijk ‘woman – womanly, female’
vertrouw – vertrouwelijk ‘trust – confidential’
vrij – vrijelijk ‘free – freely’

(21) \[
\begin{array}{c}
\sigma_s \\
\sigma_w
\end{array}
\]
\[
/\text{frei}/ + /\text{–lōk}/
\]

Unfortunately, the occurrence of long vowels plus /j/ is relatively rare, and only a couple of words with this combination plus a sonorant-initial suffix can be attested, including zaailing ‘seedling’, draailing (from draaien ‘to turn’), a type of chanterelle (see the Van Dale Groot Woordenboek, both of which follow the schema.

Note that there is some irregularity with the combination <oei>/u:j/, which in some words is followed by schwa and in others is not, as examples in 22 illustrate.

(22) a. bemoei – bemoeienis ‘meddle – meddling’
aangroei – aangroeieling ‘grow on – excrescence’

der Hulst’s (1984:78) sonority hierarchy for Dutch is as follows (in increasing order of sonority and decreasing order of strength): obstruents, nasals, liquids, glides, vowels.
b. moei – mociljik ‘give trouble – difficult’
   verfoei – verfoeiljik ‘detest – detetable’

This confusion is reflected in the well-formedness judgments of
native speakers who, when asked to express a preference for one of the
two allomorphs in nonsense words such as those in 23 below, were in
agreement that words containing schwa after <aai> and <ooi> sounded
ill-formed. Yet speakers disagreed over <oei>, some finding both
allomorphs equally acceptable while others preferred the schwa-less
variant throughout. This may be due to the fact that high vowels in Dutch
have a shorter duration than mid and low vowels (Gussenhoven to
appear), so that the combinations /a:j/ and /o:j/ with a low and a mid
vowel, respectively, are perceived as longer than /u:j/, which means that
schwa is more likely to appear after the shorter sound.16

(23) a. saai ‘boring’ → saailing (*saaieling rejected)
   mooi ‘beautiful’ → mooiling (*mooieling rejected)
   fraai ‘pretty’ → fraaielijk (*fraaaielijk rejected)
   papegaai ‘parrot’ → papegaaielijk (*papegaaielijk rejected)

b. boei ‘buoy’ → boeieling / boeiling
   groei ‘grow’ → groeieling / groeilings
   boei ‘buoy’ → boeilijk (*boeilijk rejected)

c. ruw ‘rough’ → ruweling (*ruwling rejected)
   eeuw ‘century’ → eeuwelij (preferred to *eeuwlijk)17
   leeuw ‘lion’ → leeuwelij (preferred to *leeuwelij)17

In the case of vowel-final stems, the schwa-less allomorph is the
norm. This is not accounted for by the schema in 19 above, but reflects a
general principle in Dutch word formation of avoiding vowel hiatus
(Shannon 1991:201) and therefore must take precedence over the schema
that is specific to words with sonorant-initial suffixes. It is interesting to
note that allomorph selection is preferred over glide insertion here, the
latter of which is a common anti-hiatus device in Dutch (Booij 1995:66).
This preference is predicted in Optimality Theory, as glide insertion

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16 In other words, if /u/ is interpreted as short, the following /j/ will be part of the
nucleus and not form an additional third mora. This is particularly the case when
a glide immediately follows /u/, as opposed to, say, a sonorant consonant.
17 One speaker preferred the schwa-less forms here.
violates Faithfulness, while allomorph selection does not (see Booij 1999).

(24) twee – tweeling ‘two – twin’
    drie – drieling ‘three – triplet’
    lelijk ‘ugly’
    vrolijk ‘merry’

6.1. –(e)lijk.
The extent to which words containing sonorant-initial suffixes follow the schema varies according to which suffix is being used. Generally speaking, the schema accounts very well for words ending in –(e)ling and –(e)nis. Words ending in the much more frequent –(e)lijk, however, show a certain degree of irregularity within a particular group of lexemes, namely those whose stems end in an underlying voiced fricative /v/, /z/, or /x/ (surfacing as voiceless [f], [s], and [x] [written <g>] in these derivations). With some words, doublets can occur (25a), while with others speakers prefer either the schwa-initial allomorph or the schwa-less one (25b and 25c respectively).\(^{18}\)

(25) a. lief – liefelijk/lieflijk ‘dear, beloved – lovely’
geloof – ongeliefelijk/ongelieflijk ‘believe – unbelievable’
beschrijf – onbeschrijfelijk/onbeschrijfelijk ‘describe – indescribable’
klaag – klagelijk/klaaglijk ‘lament – mournful’

b. erf – erfelijk ‘inherit – inheritance’
huis – huiselijk ‘house – domestic’
walg – walgelijk ‘be disgusted – disgusting’

c. vergeef – onvergeefelijk ‘forgive – unforgivable’
genees – ongeneeslijk ‘cure – incurable’
beweeg – beweeglijk ‘move – mobile, lively’

Although some phonological generalizations can be made (for example, the schwa-initial allomorph tends to be preferred after <f> and <s>, while the schwa-less allomorph is usual after <g>, unless <g> is

\(^{18}\) This is shown in the token-frequency results from the Institute for Dutch Lexicology’s thirty-eight-million-word corpus.
preceded by a consonant), there is still a considerable degree of lexicalization involved (for example, *ongeneeslijk* without schwa versus *vreselijk* ‘frightful’; compare *vrees* ‘fear’ with schwa, despite the similarity of the stems).

It is interesting that this “gray area” is restricted to a clearly defined group of words, namely those containing a stem-final underlying voiced fricative. By contrast, fricatives that are underlyingly voiceless are regularly followed by the schwa-initial allomorph, as the schema predicts; examples include *hof* ‘court’ – *hoffelijk* ‘courteous’, *mens* ‘human being’ – *menselijk* ‘human’, *lach* ‘laugh’ – *belachelijk* ‘ridiculous’). What is unique to this class of words is that the stem-final fricative, which is voiceless in syllable-final position due to the general phonological rule of final obstruent devoicing in Dutch (Booij 1995:92–93), does not surface as voiced when resyllabified before schwa, as is usually the case. Contrast the examples in 25 above with those in 26.

(26) lief – lieve ‘dear – dear (+ inflectional ending)’
    geloof – geloven ‘believe – to believe’
    beschrijf – beschrijven ‘describe – to describe’
    erf – erven ‘inherit – to inherit’
    huis – huizen ‘house – houses’

The historical explanation for this is the fact that the stem-final fricatives were originally syllable-final, as they were followed by the schwa-less –*lijk*, and therefore voiceless. Later, however, schwa spread to these forms, yet did not affect the features of the stem-final fricative (Schönfeld 1947:52–53). As this was only the case before –*(e)lijk* and did not apply to other derivations and inflectional forms, one cannot speak of a complete reanalysis of the stem, but rather of a lexical idiosyncrasy. Booij (1995:92–93) represents the situation in terms of a morpholexical rule stating that voiceless fricatives do not voice before the suffix –*lijk*.20

19 Similarly, the labial fricative /v/ is voiceless after –*enis* (compare *erven* ‘to inherit’ to *erfenis* ‘inheritance’).
20 In actual fact, Booij’s rule only applies to the labials and coronals, where the voiced/voiceless distinction is represented in the spelling. The situation with the velar fricatives is not so clear-cut, since some speakers neutralize the /x/ – /γ/ distinction intervocalically in favor of the voiceless variant in any case (Booij
Thus, it appears that, at an earlier stage of the language, underlying voiced fricatives were regularly followed by the schwa-less allomorph, which indicates that the occurrence of schwa at that time did not follow the schema in 19 above but was determined by (at least some) other factors. The spread of schwa to certain words within this group appears to have been a more recent phenomenon, so that at least half of the members of this group are now in line with the schema, albeit with the lexical stipulation that the stem-final consonant surfaces as voiceless. Indeed, more recent derivations (attested from the seventeenth century on; see Schönfeld 1947:184) where -(e)lijk is attached to adjectival bases and used adverbially follow the schema completely and drop the lexical stipulation. See examples in 27.

(27) respectief /-v/ – respectievelijk ‘respective – respectively’
successief /-v/ – successievelijk ‘successive – successively’
abusief /-v/ – abusievelijk ‘wrong – wrongly, by mistake’
vaag /y/ – vagelijk ‘vague – vaguely’

The fact that schwa always appears in these words (for example, *respectievelijk never occurs) lends support to the notion that the schwa-initial allomorph is now the default choice.

6.2. –(e)loos.
A very different picture is presented by words ending in –(e)loos, since these are the ones that follow the schema in 19 the least in that they often occur without schwa, regardless of the phonological environment. This is probably due to the fact that –(e)loos has a combination of properties 1995:7–8), for example, klagelijk [x], but also klagen [x] ‘to complain’ and klager [x] ‘complainer’.

Sonority may have played a role here, as voiced fricatives are often considered to be more sonorous than the other obstruents (see the sonority hierarchy in 16 above and also Ewen 1982:28). A similar stipulation is needed for stems ending in /ŋ/ (historically /ŋg/), which appears as /ŋk/ before –lijk, for example, oorsprong /-ŋ/ ‘origin’ – oorspronkelijk ‘original’ (Booij 1995:92). Since the stem allomorph ends in a plosive (for exammple, oorspronk-), the schwa-initial allomorph is used exceptionlessly (unless, of course, the stem ends in an unstressed syllable, as seen in koning ‘king’ – koninklijk ‘royal’).

The same could also be said for bang ‘afraid’ – bangelijk ‘fearful(ly)’ with a regular stem as opposed to the allomorph ending in –k: *bankelijk (see note 22).
distinguishing it from the other three sonorant-initial suffixes. First, it contains a full vowel and is therefore a prosodic word on its own (Booij 1995:86). If we compare the prosodic structure of, for example, zorgelijk ‘critical’ and zorgeloos ‘careless’, we can see that –(e)loos is much less phonologically dependent on the stem than –(e)lijk. See 28 below.

(28)  

\[
\begin{align*}
\sigma_s & \quad \sigma_w & \quad \omega \\
/zor/ & \quad \gamma & \quad /lo:s/ \\
\end{align*}
\]

This is also the case with –(e)ling, which is similarly a prosodic word, yet the difference is that with –(e)loos the prosodic word status is accompanied by a high degree of productivity, for example, autoloos ‘without a car’, accentloos ‘without an accent’, kritiekloos ‘without criticism’ (Geerts et al. 1984:362), while the productivity of –(e)ling is restricted, and –(e)lijk and –(e)nis are unproductive. In addition, when used productively, the suffixation of –(e)loos creates derivatives that are completely semantically transparent, that is, meaning ‘without X’, while the semantic transparency of adjectives with the other three suffixes is variable depending on the individual word (see the various examples with –(e)ling, –(e)lijk, and –(e)nis above).24

Indeed, it is interesting to note that the words in –(e)loos that follow the schema in 19 are those that appear to be lexicalized and often have a more figurative meaning, while those that are semantically transparent and have been created by the productive use of –loos do not follow the schema but simply use the schwa-less allomorph throughout. Consider the examples in 29 from Kooij 1976:69 and Geerts et al. 1984:362.

24 A nice contrast can be observed in the adjectives relating to vlees ‘meat’: vleselijk ‘carnal’ vs. vleesloos ‘without meat’ (for example, a vegetarian meal), the former of which follows the schema and is less semantically transparent than the latter.
(29)  a. naam – nameloos  ‘name – unspeakable’
    smaak – smakeloos  ‘taste – in bad taste’ (as with a joke)
    zin – zinneloos  ‘sense, meaning – insane’
    zout – zouteloos  ‘salt – insipid’
    werk – werkeloos  ‘work – unemployed, idle’
    verf – verveloos  ‘color – shabby’

   b. naam – naamloos  ‘name – without a name’
    smaak – smaakloos  ‘taste – without taste’ (as with food)
    zin – zinloos  ‘sense, meaning – senseless, without meaning’
    zout – zoutloos  ‘salt – without salt’
    werk – werkloos  ‘work – unemployed, without work’
    verf – verfloos  ‘color – without color’

Note that these doublet forms are only possible where the schema would allow schwa, since stems with a branching foot, as defined by the schema, would not be followed by schwa in any case, for example, eer ‘honor’ – eerloos ‘infamous’, gevaar ‘danger’ – gevaarloos ‘without danger’.

7. Conclusion.
The distribution of schwa-initial and schwa-less allomorphs in words ending in sonorant-initial suffixes in Dutch is, for the most part, quite regular and phonologically predictable. Rather than being a simple matter of referring to the phonological features of the stem-final segment, however, it is determined by a more complex interaction of prosodic and segmental factors. Specifically, the choice of allomorph is foot-based: Schwa-less allomorphs can only cooccur with a branching
foot, and if the foot does not branch, schwa must be inserted to achieve this effect: That is, schwa appears as the weak branch.

It is argued here that not only bisyllabic words can be dominated by a branching foot but also monosyllabic words. The approach advocated here allows sonorant elements (that is, sonorant consonants and glides) to occupy the weak branch of the foot when they follow a long vowel or diphthong and count for an additional (that is, third) mora. These “heavy” syllables are treated as prosodically equivalent to two syllables, which accounts for their parallel behavior not only with respect to the sonorant-initial suffixes but also with respect to other suffixes that have a schwa-initial versus a schwa-less allomorph, namely the diminutive -(e)tje.

The fact that stem-final /m/\(^{25}\) is nearly always followed by schwa, regardless of whether the syllable is heavy or not, makes it necessary to add a segmental stipulation to the prosodically determined condition for the choice of allomorph, namely that the element dominated by the weak branch of the foot must agree in place of articulation with the suffix-initial consonant if it is to form a contact with the schwa-less suffix. Since this stipulation does not apply to segments in unstressed syllables, however, it is recognized that the bisyllabic branching foot provides a more robust condition for the use of the schwa-less allomorph than the monosyllabic branching foot, the latter of which is also subject to some lexical exceptions.

The Branching Foot Condition outlined above adequately accounts for the distribution of schwa after glides, an area that has either been neglected in the literature on schwa allomorphy (for example, Kooij 1982) or seen as problematic (for example, Shannon 1991). It predicts that if a glide appears in the weak position of the foot, it will automatically be subject to the segmental stipulation applying to that position: That is, it must agree in place of articulation with the suffix-initial consonant for schwa to be absent, which correctly accounts for the regular occurrence of schwa after the labial /\(w\)/ versus the lack of schwa after the coronal /\(j\)/.

Although, to some extent, a parallel can be drawn between the distribution of schwa in the sonorant-initial suffixes on the one hand and

\(^{25}\) We have to assume that the same would apply to stems ending in /\(\eta\)/, although there are no words in Dutch that have /\(\eta\)/ occurring after a long vowel or diphthong (Booij 1995:35).
in diminutives on the other, it is recognized that, morphologically, the prototypically derivational forms with sonorant-initial suffixes have a different status from the highly productive diminutives. Specifically, the former are stored in the lexicon as whole words, while the latter are, for the most part, derived by rule. Thus, the Branching Foot Condition given above should not be represented in terms of a phonological condition on a productive rule but as a well-formedness condition on existing classes of words. Under this analysis, it is represented as a morphological schema whose function is to assist in the organization of stored lexical items. Indeed, in some cases, the pattern described by the schema may be used as the basis for new creations, for example, *enthousiast* ‘enthusiastic’ – *enthousiasteling* ‘enthusiast’ (Geerts et al. 1984:89).

Since these derivational forms in -(e)ling, -(e)lijk, etc. show a higher degree of lexicalization than diminutives, (as evidenced by the frequent lack of semantic transparency and/or the various formal differences between the base and derivative, for example), it is not surprising that there are quite a few exceptions to the above-mentioned schema. Yet it is interesting to note that the “gray area” in which the exceptions occur is a clearly defined subgroup of words (namely, words with stems ending in an underlyingly voiced fricative + -(e)lijk), so that the irregularity is kept within limits.

Regarding the general status of schemas and rules, it is argued that the schema, which represents a condition on lexically stored words (although it can also be extended to new cases), is distinct from a morpholexical rule. This accounts for the fact that the productive use of semantically transparent –loos meaning ‘without’ proceeds without reference to the schema, while the lexicalized forms in –(e)loos tend to follow it.

REFERENCES


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26 See, for example, Pinker 1999 for a more general discussion.
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