Phonological domains in Luxembourgish and their relevance for the phonological system*

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Abstract

Situated in the recent discussion on syllable languages and word languages, the relevance and impact of phonological domains for the phonology of Luxembourgish will be discussed. Analyzing various aspects of the phonological organization of Luxembourgish, the paper addresses the question whether there is one main prosodic domain, i.e. either the phonological word or the syllable, shaping the overall phonological structure of this language. The features presented concern the distribution of shwa, syllable complexity, the behavior of unstressed syllables, the role of the trochaic foot as well as the impact of the language contact with French. It turns out that Luxembourgish cannot be attributed to either the syllable language or word language type. Instead, features originating from both types seem to be mixed in an intricate way. Furthermore, frequent sandhi phenomena like the *n*-rule and voicing assimilation show that indeed both phonological domains are necessary to describe the structures appropriately.

1. Introduction

Inspired by recent work on the phonological system of Luxembourgish by Nübling (2005) and Szczepaniak (2010), in this paper I shall address the relevance of two phonological domains, i.e. the syllable and the phonological word, for the phonological system of Luxembourgish. Following the proposal initiated by Donegan and Stampe (1983) and elaborated by Auer (1993, 1994, 2001) and Szczepaniak (2007), languages can be classified typologically according to the relevance of the prosodic domains of the syllable or the phonological word, respectively. Specifically, a language 'favors' either the syllable or the phonological word in sound change or synchronic phonological rules, processes or alternations, i.e. the phonology of a given language is organized around one main prosodic domain. Several features of this well-known typological distinction have been established, some of which are listed in Table 1 (see Auer 1993).

Table 1: Central characteristics of word languages and syllable languages

Word languages	Syllable languages
complex syllable structure; sonority hierarchy partially not respected	simple syllable structure (preferably CV); sonority hierarchy respected
differences between accented and unaccented syllables	only minor differences between accented and unaccented syllables
central vowel phonemes possible	no central vowels
phonetically strong word accent	phonetically weak word accent
reduction of non-accented syllables	no accent-dependent reduction

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vowel deletion leading to complex clusters	vowel epenthesis to achieve CV structure
resyllabification only within a phonological word	resyllabification across word boundaries
external sandhi ≠ internal sandhi	external sandhi = internal sandhi
frequent assimilations	few assimilations

A prototypical syllable language fulfills as many as possible of the criteria given on the right hand side of the table. Italian, for example, is characterized by a simple syllable structure (alongside phonological processes aiming at the dominance of CV syllables), geminates and a phonetically rather weak word accent. German or Danish, on the other hand, represent word languages, because they have, inter alia, developed a complex syllable structure and a phonetically strong word accent. It has to be emphasized that this typological distinction is organized as a continuum with ideal(ized) endpoints, allowing several intermediate steps. Conceptualized as a direct opposition, a feature which strengthens the phonological domain of the word may weaken the domain of the syllable (and vice-versa). How a variety can be located on this continuum is shown by Caro Reina (*this volume*) for various Catalan varieties.

Here, the phonology of Luxembourgish is tested against some of these criteria in order to assign the language a place on the continuum of the syllable language/word language distinction. The analysis of the structural distance between Luxembourgish and the closely-related Standard German as a prototypical word language will also be of particular interest. Whereas differences between the two languages with regard to segmental phonetics and the impact of language contact have previously been analyzed, prosodic differences have only been addressed rarely.

2. Luxembourgish

Luxembourgish (‘Lëtzebuergesch’) is a small West Germanic language (approx. 300.000 speakers) of Central Franconian origin and today the national language of the Grand-Duchy of Luxembourg.[1] It is used mainly as a spoken language for a wide range of situations, both formal and informal. In this multilingual society Standard German and Standard French also form part of a complex triglossic situation with a high degree of language contact. For Luxembourgish the contact with German and French has resulted in numerous lexical borrowings with various degrees of phonological integration. Language standardization is at a medium level for Luxembourgish: Language codices like dictionaries and grammars exist, but Luxembourgish is still not taught in a serious way in the educational system. As most written domains are occupied by French or German, the status of Luxembourgish as a written language is still weak. In contrast with fully-fledged standard languages like French or German, Luxembourgish phonology has therefore been less influenced by written language to date. This has led to a situation where considerable regional and individual variation is preserved. Nevertheless, the variety spoken in the geographical center of the country (‘Zentralluxemburgisch’) functions more and more as an emerging standard variety. The data to be presented in the following also comes from this variety. In this scenario Luxembourgish is an ideal candidate to test how a phonological system develops when it is not subject to strong standardization.

With regard to the dichotomy of word and syllables, Nübling (2005) and Szczepaniak (2010) discuss in a contrastive way several phonological features of German and

[1] For an overview of the phonetics/phonology of Luxembourgish see Keller (1961), Newton (1990), Gilles (1999, 2009), and Gilles and Trouvain (*under review*).

Luxembourgish. In her analysis of several sound changes, Szczepaniak identifies both syllable language and word language-related traits in Luxembourgish. Among the syllable-related features are shwa epenthesis, Umlaut, resyllabification, the *n*-rule, voice assimilation and the presence of shwa in stressed syllables (in addition to its presence in unstressed syllables). On the other hand, the author also presents several features relating to a word language (e.g. final obstruent devoicing, development of ambisyllabic consonants, complete apocope of final shwa, decrease of shwa epenthesis, dissimilation of [st], [sp] > [ʃt], [ʃp] to indicate the beginning of a phonological word). These findings suggest that Luxembourgish exhibits typological characteristics of both language types and it is consequently classified as 'phonologically mixed'.

The present study will partly re-discuss Szczepaniak's findings, but will also bring further data and phonological argumentation into the debate. In order to answer the far-reaching question of the typological status of Luxembourgish, it would be crucial to take the whole phonological system into account. However, this study will only concentrate on aspects of syllable and word structure, word stress and external sandhi. This ensures that the most pertinent aspects of the phonological system are dealt with. It will turn out that the Luxembourgish data represent an interesting test case in the discussion of how preferences for a phonological domain like the syllable or the phonological word shape the phonology of a language. On the other hand, the discussion will also reveal that an unambiguous attribution of certain phonological processes to either the syllable or the word 'pole' of the continuum is not always straightforward and requires careful consideration of several facets.

The following sections will discuss features of Luxembourgish phonology that clearly relate to the syllable (section 3) or the phonological word (section 4), respectively. Section 5 presents two cases of external sandhi that pose certain problems, as they call for the relevance of the two phonological domains at the same time. In the final section 6 the results will be summarized.

3. (Potential) syllable language traits

The following critical discussion will be devoted to the distribution of shwa and shwa-epenthesis as potential traits to classify Luxembourgish as a syllable language.

3.1 Distribution of shwa

The distribution of shwa in Luxembourgish is not restricted to unaccented syllables, but shwa can also occur in accented syllables (see also Szczepaniak 2010). In other words, it is not the domain of the phonological word that is relevant for the distribution of shwa, but rather the syllable. Following van Oostendrop (1998), this kind of shwa can be labeled 'stable shwa' as it forms part of the underlying representation of the word and cannot be regarded as the result of vowel reduction or epenthetic processes to facilitate syllabification. As with all central vowels, its phonetic realization varies according to contextual influences. In most cases, it can be perceived as a slightly fronted or rounded central vowel, but the articulatory difference to a shwa in unaccented syllables remains hardly noticeable. In Luxembourgish orthography, this stressed shwa is written with <ë> (see examples in 1).

(1) *Shwa in stressed syllables*

Zëmmer	[ˈʦəmɐ]	'room'

sëtz-en	[ˈzətsən]	‘sit-INF’
Lëtzebuerg	[ˈlətsəbuəʃ]	‘Luxembourg’
ënnen	[ˈənən]	‘below’
schëdd-en	[ˈʃədən]	‘pour-INF’
këddel-en	[ˈkədələn]	‘tickle-INF’

If Luxembourgish belonged to the word language type, the phonology would strive to maximize the contrast between the vowel inventory of accented and unaccented syllables by avoiding shwa (as the most important vowel of unstressed syllables) in stressed syllables. Since this is not the case with regard to shwa, one could argue that this feature characterizes Luxembourgish as belonging more to the syllable language type. Despite the fact that shwa can occur in stressed and unstressed syllables one has to keep in mind that the two vowel inventories still remain rather different: The vowel inventory for unstressed syllables is much more restricted compared to the stressed syllables[2] — which is a feature of a word language. Thus, the described distribution of shwa is probably only a weak indicator towards a syllable language.

This claim finds further support if the sound history of the ‘stressed’ shwa is taken into account. Historically, shwa here originates from Westgermanic /i/ or (subsequently unrounded) /y/, which were affected by a general and regular sound change of vowel lowering ([i] > [e] > [ə]). In this general and regular sound change not only polysyllabic words like the ones in (1) but also monosyllabic words like *Fësch* ‘fish’, *wëll* ‘wild’ or *Kënn* ‘chin’ were affected (see Keller 1961: 257; Sturm 1988: 69ff.). It can be concluded that the evolution of this shwa and word stress are not related. That this shwa is found in stressed syllables seems thus a mere by-product of an unrelated segmental sound change.[3]

This partial special status of shwa is further supported by the phonological integration of French loans, which are in general very frequent in Luxembourgish. The words in (2) demonstrate that after phonological integration a former full vowel [e] is reduced to shwa and this syllable also carries the word accent.

(2) *Shwa in stressed syllables*

French			*Luxembourgish*		
télé	[teˈle]	>	*Tëlee*	[ˈtʰəleː]	‘TV’
vélo	[veˈlo]	>	*Vëlo*	[ˈvəloː]	‘bike’
mélasse	[meˈlas]	>	*Mëlass*	[ˈməlas]	‘molasses’
béton	[beˈtõ]	>	*Bëtong*	[ˈbətoŋ]	‘concrete’
pétrole	[peˈtʀol]	>	*Pëtrol*	[ˈpʰətʀol]	‘petrol’

In the course of the phonological integration of these words, the word accent jumps to the first syllable to comply with the general tendency for trochaic word accent (Gilles 2010) and at the same time the former full vowel of the stressed syllable undergoes vowel reduction to shwa.

[2] This only holds true for the Germanic part of the Luxembourgish lexicon. The numerous loan words from French allow a wide range of vowels in unstressed syllables even after phonological integration (e.g. *Premier* [ˈpʀəmjeː] ‘prime minister’, *Bopa* [ˈboːpaː] ‘grand-father’ (< fr. *bon-père*), *Poteau* [ˈpɔtoː] ‘pillar’, *Bijou* [ˈbiʒuː] ‘jewellery’) and remain excluded from this discussion.

[3] To complicate this aspect even further, in segmental-phonological terms this shwa can be regarded as an allophone of the phoneme /e/: while [e] is realized only before (historically) velar consonants, [ə] is realized in all other contexts (see Gilles and Trouvain *under review*).

These words thus again seem to demonstrate that the distribution of shwa is not sensitive to stress, which then can be regarded as a characteristic of a syllable language.

The next feature to be discussed concerns the shwa vowel in unaccented syllables (see also Krier 2008: 104; Conrad 2010). Contrary to e.g. Standard German, shwa here shows a strong resistance against syncope in word-final unaccented syllables (3). Even in faster speaking styles, shwa in word-final syllables (in most cases morphological endings like *-en*) is phonetically realized. Reducing these syllables to syllabic sonorants (often with subsequent assimilation of place of articulation), quite frequent in Standard German, is not possible at all in Luxembourgish.

(3) *Shwa resisting syncope in final unaccented syllables*

Ënn-en	[ˈənən]	*[ˈəṇː]	‘onion-PL’
bak-en	[ˈbaːkən]	*[ˈbaːkn̩]	‘bake-INF’
komm-en	[ˈkomən]	*[ˈkoṃ]	‘come-INF’
gleew-en	[ˈgleːvən]	*[ˈgleːvn̩]	‘believe-INF’
Fuedem	[ˈfuədəm]	*[ˈfuədm̩]	‘wire’
Kärel	[ˈkɛːʀəl]	*[ˈkɛːʀl̩]	‘guy’

According to Nübling (2005) the resistance of syncope can be regarded as a syllable language feature, as every syllable in a word retains its own vocalic nucleus. It remains to be shown however, whether this resistance is not merely a by-product of phonotactic constraints. Moreover, as will be shown in section 5, not all shwas are resistant against syncope.

3.2 Shwa epenthesis

The process of shwa epenthesis can be regarded as a classic feature of syllable languages. Hall (2011: 1576) notes that “in most cases, the function of vowel epenthesis is to repair an input that does not meet a language’s structural requirements”. In Luxembourgish, shwa epenthesis takes place to break up coda clusters consisting of a sonorant and an obstruent or certain sonorant-sonorant combinations. The process originated in certain Old High German dialects, but in Luxembourgish epenthesis has been active for a longer period and has developed a greater number of instances than comparable German dialects (Nübling 2005: 149ff.). In words like e.g. *Kallef* ‘calf’, originating from a monosyllabic form **kalf* (< Germanic root **kalƀaz-*), an intrusive shwa-like vowel could arise due to a mistiming of articulatory gestures of the sonorant *l* and the following obstruent *f* (Auer 1997). By turning a formerly monosyllabic word into a disyllabic one, the syllable structure gets optimized according to the preferences of a syllable language: A former CVCC sequence changes into a more preferred CVCVC sequence (probably with an ambisyllabic consonant).

The list in (4) contains the most common words (in orthographical form) of present-day Luxembourgish that still show epenthesis (see also Krier 2008; Szczepaniak 2010; Conrad 2010).

(4) *Shwa epenthesis in present-day Luxembourgish*

/lf/ > [ləf]	*Kallef* ‘calf’, *hallef* ‘half’, *Hëllef* ‘help’, *eelef* ‘eleven’, *zwielef* ‘twelve’, *Wollef* ‘wolf’, *Folleg* ‘episode’, *Sallef* ‘salve’
/lɕ/ > [ləɕ]	*Mëllech* ‘milk’, *wellech* ‘whichever’, *sëllech* ‘several’
/lk/ > [lək]	*Wollek* ‘cloud’, *Kallek* ‘lime’, *Vollek* ‘people’
/lm/ > [ləm]	*Hallem* ‘culm’

/nf/ > [nəf]	*fënnef* ‘five’
/rl/ > [ʀəl]	*Kärel* ‘guy’, *Pärel* ‘pearl’, *Märel* ‘blackbird’, *Charel* ‘Charles’

Epenthesis takes place in coda clusters consisting of a sonorant and either an obstruent or a second sonorant. As in various Central-German dialects exhibiting epenthesis, the process is blocked if the second member of the coda is a sibilant. Hence, the final clusters *-ls, -lʃ, -ns, -mʃ, -nʃ, -rʃ* have hardly developed epenthesis. Sibilant obstruents are regarded as extrasyllabic consonants (in this position they violate the sonority hierarchy) and thus cannot trigger epenthesis (Auer 1997: 61).

In Luxembourgish the coda cluster *-rn* is also unaffected, but for different reasons. Forms with epenthesis like **gären* (< OHG *gern*) seem conceivable, but here the final *-n* undergoes deletion to avoid the dispreferred coda cluster and the *r*-final forms in (5) emerge.

(5) *Non-application of shwa epenthesis due to final n-deletion*

OHG	>	*Luxembourgish*		
gern		*gär*	**gären* ‘gladly’	(cf. Germ. *gern*)
dorn		*Dar*	**Daren* ‘thorn’	(cf. Germ. *Dorn*)
horn		*Har*	**Haren* ‘horn’	(cf. Germ. *Horn*)
kern		*Kär*	**Kären* ‘core’	(cf. Germ. *Kern*)

In general, shwa epenthesis seems to have affected all words meeting the described coda structure. Nevertheless, a decrease of it in present-day Luxembourgish is noticeable. Firstly, several possible contexts, which are documented in older dictionaries, no longer exhibit epenthesis (6).[4] Interestingly, most instances have an /r/ as the first member of the cluster.[5]

(6) *Loss of former epenthesis*

/nɕ/	[ˈmunəɕ]	>	[munɕ]	*munch*	‘some’
	[ˈmə.nəɕ]	>	[mənɕ]	*Mënch*	‘monk’
/lp/	[ˈtuləp]	>	[tulp]	*Tulp*	‘tulip’
/lm/	[ˈpɑləm]	>	[pɑlm]	*Palm*	‘palm’
	[ˈgɑləm]	>	[ˈgɑlm]	*Galm*	‘stench’
/rm/	[ˈaːʀəm]	>	[aːɐ̯m]	*aarm/Aarm*	‘poor’/‘arm’
	[ˈvuːʀəm]	>	[vuəm]	*Wuerm*	‘worm’
	[ˈtuːʀəm]	>	[tuəm]	*Tuerm*	‘tower’
/rf/	[ˈduːʀəf]	>	[duəf]	*Duerf*	‘village’
	[ˈfaːʀəf]	>	[faːəf]	*Faarf*	‘color’
	[ˈkuːʀəf]	>	[kuəf]	*Kuerf*	‘basket’
	[ˈmiːʀəf]	>	[miːəf]	*mierf*	‘crumbly’
/rɕ/	[ˈkiːʀəɕ]	>	[kiəɕ]	*Kierch*	‘church’
	[ˈduːʀəɕ]	>	[duəɕ]	*duerch*	‘through’
	[ˈmuːʀəɕ]	>	[muəɕ]	*Muerch*	‘marrow’

[4] Older dictionaries until the mid of the 20th century list a far greater number of words with epenthesis (cf. LWB, WLM). The WLM of 1906 contains e.g. the loan *Ongeren* < *Ungarn* ‘Hungary’, where shwa epenthesis took place during phonological integration.

[5] After the loss of the shwa the former syllable-initial [ʀ] moved into the coda, which in turn led to *r*-vocalization (e.g. *Wuerm* [ˈvuːˑʀəm] > [vuːʀm] > [vuːəm] > [vuəm] ‘worm’). Whether *r*-vocalization was a consequence of the loss of shwa epenthesis or an independent process in the restructuring of the syllable coda still remains an open research question.

Secondly, new words entering the language, mostly as loans from Standard German, are no longer subject to epenthesis, giving strong evidence that the process is no longer active (7).

(7) *New loans without epenthesis*

/lm/	*Golf, Film, Alm* ‘alp’, *Helm* ‘helmet’, *Palm* ‘palm’, *calm* ‘quiet’
/lɛ/	*Elch* ‘elk’, *Molch* ‘newt’, *Mulch* ‘mulch’, *Clinch*
/rf/	*Worf* ‘throw’, *Harf* ‘harp’
/rm/	*Daarm* ‘intestine’, *Schierm* ‘umbrella’, *ferm* ‘strong’, *Form, Norm, enorm*
/rn/	*extern, intern, modern, Fernseh* ‘TV’

Although the rise of shwa epenthesis in OHG has to be seen as an optimization of the syllable structure, this process could not find its continuation into present-day phonology. Instead, the word language feature of a more complex syllable coda is gaining ground. Today, shwa forms part of the lexical representation of the few words in (4) above, or, in other words, shwa epenthesis has been lexicalized. From the perspective of the syllable language/word language dichotomy it can be concluded that a syllable language feature has been lost in the course of language history.

The discussion so far has shown that Luxembourgish offers a few features that could be attributed to a syllable language. However, the evidence is either weak (for shwa in stressed or root syllables) or disappearing (shwa epenthesis). It seems justified to classify the features discussed only as potential syllable language features instead. In order to characterize Luxembourgish appropriately, the next section will explore the word language traits.

4. Word language traits

Apart from well-known word language features like final obstruent devoicing (*bleiw-en* [ˈblɑɪ̯vən] ‘stay-INF’ > *(du) bleif-s* [blɑɪ̯fs] ‘(you) stay.PRES-2SG’) or ambisyllabic consonants (*Hunneg* [ˈhuṇəɛ] ‘honey’, *Bidden* [ˈbiḍən] ‘bin’), Luxembourgish presents several further processes, which have not yet fully figured in the discussion. The syllable structure, especially of the onset, shows great accordance with Standard German. Consonant clusters with up to three elements in the word-initial onset (*Sproch* ‘saying’, *Strof* ‘punishment’) or the word-final coda (*buet-s* ‘bath.PRES.2SG’, *Uebst* ‘fruits’, *Stëbs* ‘dust’, *(hien) gaaps-t* ‘(he) yawn.PRES-3SG’) form an integral part of the system (see Bertram 2011). These complex coda clusters can adequately be analyzed as containing extrasyllabic consonants, which are allowed only at the edges of phonological words (see Wiese 2000 for German). It is their function to render the boundaries of the word more prominent. Thus, the word language criterion of a complex syllable structure is met.

Word stress plays a crucial role in Luxembourgish and falls in most cases on the penultimate syllable creating trochaic feet (cf. Gilles 2010). From the following examples it will become clear that the trochaic foot is achieved and/or strengthened by various phonetic, phonological and morphological processes. By rendering the stressed syllable articulatory and perceptively more prominent, surrounding unstressed syllables are accordingly more vulnerable for various kinds of reduction processes. This holds true for the native lexicon, where reduction of vowels in unstressed syllables is frequently observable, especially in the speech of the younger generation (e.g. *kanneresch* [ˈkɑnɐʁ**eʃ**] > [ˈkɑnɐʁ**əʃ**] ‘childish’, *wichteg* [ˈviɕt**eɕ**] > [ˈviɕt**əɕ**] ‘important’, *Samschdeg* [ˈzɑmʃd**eɕ**] > [ˈzɑmʃd**əɕ**] ‘saturday’).

The same holds partially true for the integration of loan words. While the French loans in (2) keep the full vowel in the final open syllable after the word stress has moved to the penultimate syllable, the examples in (8) show that under the same circumstances a now unstressed closed syllable is reduced to an open central vowel [ɐ]. When the plural suffix *-en* is attached to these words the *r*-vocalization is cancelled and [ɐ] turns up as shwa.

(8)	*French*		*Luxembourgish*	*Singular*	*Plural*	
	chauffeur	>	Chauffer(en)	[ˈʃoːfɐ]	[ˈʃoːfəʀən]	‘driver(PL)’
	coiffeur	>	Coiffer(en)	[ˈkwɑfɐ]	[ˈkwɑfəʀən]	‘hairdresser(PL)’
	tracteur	>	Trakter(en)	[ˈtrɑktɐ]	[ˈtrɑktəʀən]	‘tractor(PL)’
	docteur	>	Dokter(en)	[ˈdoktɐ]	[ˈdoktəʀən]	‘doctor(PL)’
but:	auteur	>	Auteur(en)	[ˈoːtœʀ]	[ˈoːtœʀən]	‘author(PL)’

The last example in (8), however, shows that the integration process of French loans has not reached its endpoint yet. Some words may retain the original French syllable structure.

These examples from loan phonology demonstrate how the imposition of the preferred trochaic foot favors vowel reduction in unstressed syllables. These processes taken together, Luxembourgish strives to render the domain of the phonological word more prominent (at the expense of the syllable).

Vowels in pretonic syllables may undergo deletion and the remaining consonantal material be moved to the onset of the stressed syllable where the complexity of the onset cluster is increased. As can be seen from (9), vowel loss affects not only inherently weak shwas but also full vowels. Given that all resulting clusters consist of ‘obstruent’ + ‘sonorant’, they are all characterized by an increase in sonority and comply consequently with the Sonority Sequencing Generalization (cf. Blevins 1995). Except the ‘affricate’ + ‘vibrant’ cluster in [tsʀek] ‘backwards’, all clusters are allowed in Luxembourgish.

(9)	*villäicht*	[filˈæɪ̯ɕt]	>	*vläicht*	[flæɪ̯ɕt]	‘perhaps’
	zeréck[6]	[tsəˈʀek]	>	*zréck*	[tsʀek]	‘backwards’
	virun	[fiˈʀʊn]	>	*vrun*	[fʀʊn]	‘ahead’
	dorun	[doːˈʀʊn]	>	*drun*	[dʀʊn]	‘at it’
	doran	[doːˈʀɑn]	>	*dran*	[dʀɑn]	‘in that’
	duerop	[duəˈʀɔp]	>	*drop*	[dʀɔp]	‘on it’

In most cases, the previous structure with a CV syllable was more optimal in terms of a syllable language, which normally would impede such a reduction. Consequently, this process strengthens the domain of the phonological word. This process supposedly has been active in Luxembourgish phonology for a long time, as it is also found in certain derivations in family names, e.g. the family name *Mréches* derives from the diminutive form of *Mariachen* ‘Mary-DIM’.

Further complex onset clusters arise in the interplay of the proclitic definite article. When immediately adjacent to the noun, the article for feminine singular *déi* /dəɪ̯/, neuter singular *dat* /daːt/ and plural /daːt/ is pronounced [t] or [d̥], respectively (depending on the voicing feature of the following consonant). Orthographically these clitics are spelled as *d’*. The examples in (10) show that the clitic is incorporated in the following syllable onset.

(10)	Fem. Sg.	/dəɪ̯/+/fʀaː/	[tfʀaː]	*d’Fra*	‘the women’
	Fem. Sg.	/dəɪ̯/+/mɑm/	[d̥mɑm]	*d’Mamm*	‘the mother’

[6] In Luxembourgish orthography the <é> is not indicating stress but represents a closed short [e].

Fem. Sg.	/dəɻ/+/ˈbanan/	[ˈd̥banan]	*d'Banann*	'the banana'
Neut. Sg.	/da:t/+/ʀəɻ/	[d̥ʀəɻ]	*d'Réi*	'the deer'
Neut. Sg.	/da:t/+/kant/	[tkant]	*d'Kand*	'the child'
Pl.	/dəɻ/+/ˈkʀiɕəʀ/	[ˈtkʀiɕɐ]	*d'Krich-er*	'the war-PL'
Pl.	/dəɻ/+/pləɻ/	[tpləɻ]	*d'Pléi*	'the plough-PL'

Contrary to the examples in (9) this condition of external sandhi gives rise to several otherwise not allowed syllable onsets like **tfʀ-*, **tk-*, which violate the sonority hierarchy. Again, the most important result of this process is to profile the left-hand side of the phonological word. Thus, in Luxembourgish rendering the left boundary of the word seems to be preferable to sticking to the principle of keeping syllable structures as simple as possible. If the domain of the syllable were the guiding phonological category in this sandhi, then one would expect some kind of repair to take place. However, a possible vowel insertion to remedy this violation is not attested.

Comparable developments have taken place for the syllable coda. In line with several Central Franconian dialects, Luxembourgish was subject to an unexceptional apocope of word-final shwa, which turned former Middle High German CVCV-words into CVC-words (MHG *mitte* > *Mëtt* 'center', *wuche* > *Woch* 'week', *suoche* > *Sich* 'search', *hecke* > *Heck* 'hedge', *seife* > *Seef* 'soap'). By this development, a previously open syllable was changed into a closed one, which is dispreferred in syllable languages.

Several contexts are traceable where complex word-final codas arose after the shwa was syncopated in the morphological suffix *-es* (11).

(11)	[gəˈkaɻməs]	*Gekeimes*	>	[gəˈkaɻms]	*Gekeims*	'germination'
	[gəˈtʀæɻpəs]	*Geträipes*	>	[gəˈtʀæɻps]	*Geträips*	'bowel'
	[ænəs]	*(leschten) Endes*	>	[æns]	*Enns*	'after all'

The superlative suffix *-st* is invariably attached to all adjectives even when highly marked codas are the consequence (12). Whereas even a word language like Standard German has developed a phonologically conditioned allomorph containing shwa to facilitate syllabification (*-st* ~ *-est*), Luxembourgish accepts coda clusters with three elements.

(12)	*Luxembourgish*		*German*		
	[ʃəɻnst]	*schéin-st*	[ʃø:ns.tə]	*schön-ste*	'beautiful-SUPERL'
	[bʀe:tst]	*breet-st*	[bʀaɻ.təs.tə]	*breit-este*	'wide-SUPERL'

When also taking fast speech forms into account, even more complex codas may turn up (cf. variants like *zwanzeg* [ˈtswɑntsəɕ] > [ˈtswɑntsɕ] 'twenty', *fofzeg* [ˈfoftsəɕ] > [foftsɕ] 'fifty').

Furthermore, Luxembourgish has developed a pseudo-suffix *-s* (with yet unclear semantics and morphological function), which is quite frequently added to function words. Again, this consonant amounts to the complexity of the coda (13).

(13)	*an engem*	>	*an engems*	'into one'
	schonn	>	*schonns*	'already'
	obschonn	>	*obschonns*	'although'
	nodeem	>	*nodeems*	'after'
	duerop	>	*drops*	'afterward'

A peculiar case of shwa loss is observable in polysyllabic, inflected words containing two unstressed syllables following the stressed initial syllable. While the full form, which is also the orthographically correct form, retains all syllables and exhibits a fairly simple syllable

structure, a new and very frequent variant has emerged in which the penultimate syllable is syncopated (14); the syllable boundary is indicated by '.'.

(14)	*Fenster-en*	[ˈfəns.tə.ʀən]	>	[ˈfəns.tʀən]	'window-PL'
	Eemer-en	[ˈeː.mə.ʀən]	>	[ˈeːm.ʀən]	'bucket-PL'
	dréchen-en	[ˈdre.ɕə.nən]	>	[ˈdreɕ.nən]	'dry-PL'
	wichteg-en	[ˈviɕ.tə.ʒən]	>	[ˈviɕt.ʒən]	'important-PL'
	trëppel-en	[ˈtʀə.pə.lən]	>	[ˈtʀəp.lən]	'trip-INF'

Conrad (2010) has shown that the disyllabic form already dominates for certain words and this underlines the importance of the trochee for Luxembourgish. Again, we are confronted with the abandonment of a syllable language feature (CV syllable structure) in favor of a word language feature (more complex syllable structure). What is instructive here is that it is always the syllable immediately adjacent to the stressed syllable that gets reduced, while the final syllable always stays intact. Two word-related aspects are responsible for this asymmetry. Firstly, due to the preference for trochees, pre-tonic or post-tonic syllables are affected first. Syllables that are further away are protected. Secondly, the final syllable carries important morphological information (e.g. number, case or person), which in Luxembourgish seems to be protected from reduction. It should have become clear with these examples that word-related aspects like morphological structure shape the phonological form. If Luxembourgish were to belong to the syllable language type, one would expect a stronger tendency to protect unstressed syllables as well as to avoid complex onsets or codas. Instead, one finds a partial increase in syllabic complexity.

The last feature to be discussed in this section refers to the linking-element *-s*, which has been analyzed by Nübling and Szczepaniak (2008) as a means of optimizing the phonological word in Standard German. More specifically, the linking *-s* enables clearer rendering of the juncture in compounds. It turns out that the linking *-s* in general affects even more compounds in Luxembourgish than in German (15a). Furthermore, while in Standard German a linking *-s* is systematically not allowed when the first word of the compound ends with an open syllable, this blocking does not exist in Luxembourgish (15b).

		Luxembourgish	*German*	
(15)	a.	*Äerdbier-s-kuch*	*Erdbeer-kuchen*	'strawberry cake'
		Fussball-s-terrain	*Fussball-platz*	'football ground'
	b.	*Vodka-s-glas*	*Vodka-glas*	'glas for vodka'
		Büro-s-artikel	*Büro-artikel*	'office supplies'
		Konto-s-stand	*Konto-stand*	'account balance'
		Auto-s-assurance	*Auto-versicherung*	'car insurance'
		Auto-s-steier	*Auto-steuer*	'car tax'
		Allé-s-match	*n.a.*	'first leg'

This indicates that Luxembourgish takes greater benefit from the linking *-s*, which brings it closer to a word language.

5. Phenomena related to the syllable and the phonological word at the same time

This section is devoted to two prominent cases of external sandhi, which demonstrate the relevance of the domains of the syllable and the phonological word at the same time. It will be

discussed how these features could be related to the syllable language/word language dichotomy. Both phenomena are rather frequent and therefore pertinent and important features of Luxembourgish phonology.

5.1 *n*-rule

The first feature concerns the final alveolar nasal, which is deleted according to the structure of the onset of the following word (so called *n*-rule or *n*-deletion). In a simplified version of this phonological rule every word-final *-n* is protected from deletion only if the following word starts either with a vowel or with the consonants *t, d, ts, n* or *h*. If this criterion is not met, the nasal gets deleted. Some examples of preservation (bold face) and deletion (underscore) are given in (16).

(16) *n-rule in Luxembourgish*

	Preservation		*Deletion*	
a.	*de**n** Auto*	'the car'	*de_ Patron*	'the employer'
	*de**n** Dëlpes*	'the idiot'	*de_ Bauer*	'the farmer'
	*klenge**n** Tuerm*	'small tower'	*klenge_ Kueb*	'small raven'
	*e**n** Zuch*	'a train'	*e_ Land*	'a country'
	*e**n** Haus*	'a house'	*e_ Kaffi*	'a coffee'
b.	*Fritte**n**dëppen*	'chip pan'	*Fritte_bud*	'snack bar'
	*Zoppe**n**teller*	'soup plate'	*Zoppe_läffel*	'soup spoon'
c.	*Wäi**n** drénk-en*	'wine drink-INF'	*Wäi_ sich-en*	'wine get-INF'
	*(si) gi**nn** heem*	'(they) go home'	*gi_ virun*	'move on'
	*ka**nn** drénk-en*	'can drink-INF'	*ka_ maach-en*	'can do-INF'
	*hu**nn** ugefaangen*	'have started'	*hu_ gesicht*	'have searched'
	*u**n**zefänken*[7]	'in order to start'	*u_fänk-en*	'start-INF'

This phonological rule applies across the board to all word classes and affects in most cases the morphological suffix *-en* (16a). Additionally the *n*-rule is also found in compounds (16b) and in syllables containing vowels other than shwa (16c). It is thus always the right-hand context that determines preservation or deletion of the nasal. Although this is an (early) postlexical rule, speakers adhere to this rule almost without fail. Given that *-en* belongs to the most frequent syllable types, the *n*-rule operates quite frequently.

The phonological explanation given in Gilles (2006) assumes that all final *-n* are extrasyllabic in Luxembourgish, i.e. the nasal is realized phonetically only if it can be phonologically integrated into a syllable. In order to render this phonological licensing possible, various conditions have to be taken into account:

- The following word begins with a vowel: In cases like *en Apel* 'an apple', the extrasyllablic nasal can be integrated into the following syllable due to postlexical resyllabification ([ən] + [aː.pəl] > [ə.naː.pəl]), a feature similar to the *liaison* in French. This is possible because Luxembourgish, in contrast e.g. to Standard German, lacks the glottal stop in vowel initial syllables. After resyllabification the nasal forms part of the onset of the following syllable. It is not regarded as extrasyllabic anymore and is therefore protected from deletion. A similar effect occurs when the word at the right-hand side

[7] Form of the so-called 'extended infinitive' used in infinitive clauses.

begins with the fricative [h], which is phonetically weak in Luxembourgish and phonologically transparent for resyllabification.

- The following word begins with a homorganic obstruent [t, d, ts]: In combinations like *den Tuerm* 'the tower', the nasal is retained because together with the following alveolar obstruent it constitutes a partial ambisyllabic geminate [nt]. This is possible because [n] and [t] share all C-place features (cf. Clements and Hume 1995 for the discussion of the relevant feature geometries). Thereby the nasal is at least partially part of the following syllable and this is sufficient to syllabify this former extrasyllabic consonant. Deletion is again blocked.
- The following syllable begins with a heterorganic consonant, e.g. [p, k, ʃ]: In instances like *de_ Chauffer* 'the driver', the following onset is occupied by a consonant, which does not allow the formation of a partial geminate, because its C-place features are different. Therefore resyllabification is impossible and the nasal retains the status of an extrasyllabic consonant. In the phonological representation the nasal is thus not licensed and gets deleted subsequently as stray material.

This phonological description focuses extensively on the structural notion of the syllable, i.e. on syllabic licensing and resyllabification. In fact, the *n*-rule cannot be described properly without crucial reference to the phonological properties of the syllable. It seems logically consistent to assume that the *n*-rule is thus an example of the particular importance of the syllable in Luxembourgish.

Nevertheless, if one takes a closer look at the domain of application, the predominant importance of the syllable becomes less obvious. Of course, this external sandhi takes place at a syllable boundary, but this boundary is always a word boundary, too. In order to attribute the *n*-rule to the domain of the syllable only, one has to find contexts without an interfering word boundary. Word-internal combinations of '-n + heterorganic, heterosyllabic consonant' are limited to the coronal consonants, i.e. *z, ʃ, l, ɕ*, because word-internal clusters of nasal and non-coronal consonants are always homorganic (*Bank* [bɑŋk] 'bank', *pompel-en* [ˈpompələn] 'pump-INF', *Gromper* [ˈgʀɔmpɐ] 'potato'). In the coronal context, it turns out that the nasal is always retained word-internally regardless of the consonant the next syllable begins with. A form like *Ronschel* [ʀon.ʃəl] 'pucker' is correct although the *n*-rule is violated, *[ʀo_.ʃəl] is clearly ungrammatical. The further examples in (17) demonstrate that the *n*-rule is not applicable at word-internal syllable boundaries.

(17) *Blocking of n-rule inside of the phonological word*

Zënsen	[[tsə**n**]$_{σ}$[zən]$_{σ}$]$_{ω}$	*[[tsə_]$_{σ}$[zən]$_{σ}$]$_{ω}$	'interest rate'
Bensin	[[bæ**n**]$_{σ}$[zin]$_{σ}$]$_{ω}$	*[[bæ_]$_{σ}$[zin]$_{σ}$]$_{ω}$	'fuel'
Ronschel	[[ʀo**n**]$_{σ}$[ʃəl]$_{σ}$]$_{ω}$	*[[ʀo_]$_{σ}$[ʃəl]$_{σ}$]$_{ω}$	'pucker'
klunsch-en	[[klu**n**]$_{σ}$[ʃən]$_{σ}$]$_{ω}$	*[[klu_]$_{σ}$[ʃən]$_{σ}$]$_{ω}$	'sway-INF'
perséinlech	[[pæɐ]$_{σ}$[zəɪ̯**n**]$_{σ}$[ləɛ]$_{σ}$]$_{ω}$	*[[pæɐ]$_{σ}$[zəɪ̯_]$_{σ}$[ləɛ]$_{σ}$]$_{ω}$	'personally'
Ween-chen	[[veː**n**]$_{σ}$[ɐən]$_{σ}$]$_{ω}$	*[[veː_]$_{σ}$[ɐən]$_{σ}$]$_{ω}$	'cart-DIM'

These word-internal contexts indeed have the most descriptive power to determine the domain of application of the *n*-rule: this phonological rule is susceptible only for the right edge of the phonological word, which, of course, always coalesces with the syllable boundary too. Furthermore, for this phonological analysis one has to keep in mind the crucial assumption of this phonological analysis that final *-n* in Luxembourgish is extrasyllabic. According to the assumptions of Lexical Phonology those extrasyllabic segments can only be attributed to the edges of words and are not permitted word-internally (Wiese 2000: 47f). Hence, the word-internal nasals in (17) cannot be subject to the *n*-rule anyway.

The evidence that the *n*-rule does not exclusively depend on the presence of any syllable boundary is further supported by its partial sensitivity to morphological factors. Words ending with the feminine suffix *-in* (18a), the negation prefix *on-* (18b) or the word formation suffix *-ioun* (18c) block the *n*-rule. Here, regardless of the following context, the nasal is retained. If the syllable was the decisive domain of application, then this dependence on morphological factors would not be relevant for the *n*-rule.

(18) *Blocking of n-rule for word formation affixes -in, on-, -ioun*

a.	*Léier-i**n** geschwat*	**Léieri_ geschwat*	'talked to the teacher-FEM'
	*Manger-i**n** verluer*	**Manageri_ verluer*	'lost the manager-FEM'
b.	*o**n**méiglech*	**o_méiglech*	'impossible'
	*o**n**gerecht*	**o_gerecht*	'unjust'
c.	*Natiou**n** gegrënnt*	**Natiou_ gegrënnt*	'foundation of nation'
	*Regiou**n** verloossen*	**Regiou_ verloossen*	'leaving the region'

In concluding this discussion on the *n*-rule, we are left with an intricate interwovenness of the domains of the syllable and the word. Without any doubt, deletion or preservation of final *-n* has to be explained with regard to the notion of the syllable, because it simplifies the syllable coda. As for the domain of application, however, the *n*-rule is categorically blocked within phonological words and occurs only across the boundaries of phonological words. Although syllable structure is optimized by the *n*-rule, it cannot unambiguously be described as a syllable-related feature only. Thus, for the discussion here, it seems that the *n*-rule can neither be considered a typological feature of a syllable language nor of a word language. In further research it will have to be discussed how the domain of optimization and the domain of application are related to each other.

5.2 Resyllabification and voicing assimilation

The next feature relates to resyllabification from a broader point of view. Resyllabification can occur on different levels of the phonological system (lexical and postlexical), whenever the syllable structure of the base form is restructured due to affixation or in external sandhi. This form of 'continuous syllabification' (Kenstowicz 1994: 269ff.) is dealt with here under the umbrella term 'resyllabification'. Luxembourgish allows resyllabification in many more cases than e.g. Standard German. Similar to Standard German, resyllabification takes place within the phonological word, when a shwa-initial, inflectional or derivational suffix is added. As shown in (19), a syllable-final consonant moves into the onset of the following syllable (or forms an ambisyllabic consonant, if the preceding syllable ends with a short vowel). (19b) also shows that obstruent final devoicing ('Auslautverhärtung') is cancelled after resyllabification and the underlying voiced consonant shows up.

(19) *Word-internal resyllabification*

a.

Kraaft	/kʀa:ft/	[kʀa:ft]	+ /-en/	*Kräften*	[kʀæf.tən]	'power(-PL)'
Sprooch	/ʃpʀo:x/	[ʃpʀo:x]	+ /-en/	*Sproochen*	[ʃpʀo:.xən]	'language(-PL)'
Reef	/ʀe:f/	[ʀe:f]	+ /-er/	*Reefer*	[ʀe:.fɐ]	'circle(-PL)'
Präis	/pʀæ̯ɪs/	[pʀæ̯ɪs]	+ /-er/	*Präisser*	[pʀæ̯ɪ.sɐ]	'price(-PL)'

	op	/op/	[op]	+ /-en/	*open*	[oṗən]	‘open(-PL)’
b.	*Scheif*	/ʃɑɻv/	[ʃɑɻf]	+ /-en/	*Scheiwen*	[ʃɑɻ.vən]	‘pad(-PL)’
	Kees	/keːz/	[keːs]	+ /-en/	*Keesen*	[keː.zən]	‘cash register(-PL)’
	Blat	/blaːd/	[blaːt]	+ /-er/	*Blieder*	[bliə.dɐ]	‘leaf(-PL)’
	héich	/heiʑ/	[həɻɕ]	+ /-en/	*héijen*	[həɻ.ʑən]	‘high(-INF)’

Due to the absence of a syllable-initial glottal stop — and contrary, e.g. to Standard German — Luxembourgish also shows across-word resyllabification, which is almost compulsory when the following syllable begins with a vowel (cf. an older account in Goudaillier 1987). This kind of resyllabification is known in several languages, e.g. French and English (see Gussenhoven and Jacobs 1998: 167, where the process is called ‘Liaison’).

(20) presents examples where the final consonants move *across* the word boundary into the empty syllable onset of the following word. This modification leads eventually to a misalignment of the syllable and the phonological word. Resyllabification is indicated with ‘‿’, the boundary of a phonological word with ‘#’.

(20) *Resyllabification across word boundaries*

a.	*Sprooch ausbau-en*	[ʃpʀoːˍɣ#æu̯s.bɑu̯.ən]	‘language elaborate-INF’
	Reef apak-en	[ʀeːˍv#ɑ.paː.kən]	‘circle wrap-INF’
	Scheif ausmol-en	[ʃɑɻˍv#æu̯s.moː.lən]	‘pad color-INF’
	Kees opmaach-en	[keːˍz#op.maː.xən]	‘cash register open-INF’
	Kraaft ubidd-en	[kʀaːv.ˍd#u.biḍən]	‘power offer-INF’
b.	*war och*	[vaːˍʀ#ox]	‘was-2SG also’
	gëschter Owend	[gəʃ.tə.ˍʀ#oː.vənt]	‘yesterday evening’
	awer ech	[aː.və.ˍʀ#əɕ]	‘but I’

The instances in (20b) are decisive in showing that it is indeed resyllabification that is occurring here: The vibrant *r* has (at least) two allophones depending on the position in the syllable. When syllable-final, *r* is vocalized to [ɐ], when syllable-initial, it is realized as a vibrant [ʀ]. The non-vocalized realizations in (20b) thus clearly indicate that *r* here is no longer part of the preceding syllable but actually forms part of the syllable onset, i.e. it has resyllabified.[8]

Although clearly a postlexical process, this resyllabification is almost obligatory in Luxembourgish. The filling of otherwise empty onsets demonstrates that syllable structure is optimized at the expense of marking the word boundary, which is blurred instead. This type of resyllabification can thus be regarded as a feature of a syllable language.

However, as can already be seen in the examples in (20a), resyllabification is always associated with the concomitant process of voicing assimilation (see Zsiga 2011 for a general discussion). And as the further examples in (21) show, every resyllabified consonant undergoes voicing in external sandhi at the same time. The left-most column in (21) contains the phonological forms with the underlying coda consonants. The phonetic transcription in the second to last column then shows the resyllabified and voiced consonant when a vowel-initial phonological word is directly adjacent.

(21)

[8] This process is similar to the so-called ‘linking *r*’ of some varieties of English (see Wells 1982).

a.	/tsæɪ̯t/	*Zäit a Raum*	[tsæɪ̯.‿d#ɑ ʁæʊm]	‘time and space’
	/vælt/	*Weltall*	[væl.‿d#ɑl]	‘universe’
	/kux/	*Kuch iess-en*	[ku.‿ɣ#iə.sən]	‘cake eat-INF’
	/kaːf/	*kaf Äppel*	[kaː.‿v#æ.pəl]	‘buy.IMP[SG] apple.PL’
b.	/kleːd/	*Kleed undo-en*	[kleː.‿d#un.doː.ən]	‘dress put on-INF’
	/ʃʁɑʊ̯v/	*Schrauf andréi-en*	[ʃʁɑʊ̯.‿v#ɑn.dʁəɪ̯.ən]	‘screw turn in-INF’
	/taːz/	*Taass eidel*	[taː.‿z#ɑɪ̯.dəl]	‘cup empty’

From (21b) it also becomes obvious that final underlying voiced obstruents, which otherwise were subject to final devoicing (see 19b), regain (or rather keep) voicing in this context (/kleːd/ + /undoːən/ > [kleːt] + [un.doː.ən] > [kleː.‿d#un.doː.ən]). The process of voicing assimilation consequently overrides the effect of final devoicing.[9] Voicing assimilation itself has a natural phonetic basis, because voicing can be easily maintained between two vowels. Voicing assimilation of this kind occurs across the board and can be found for all syllable types, between words of all word classes and also within compounds. Similar patterns of resyllabification combined with voicing assimilation have been discussed for Dutch, Flemish and Limbourgish (Grijzenhout and Krämer 2000; Ernestus 2003; Hinskens 2007; Mascaró and Wetzels 2008; Noske 2008), as well as for Catalan (Lloret and Jiménez 2009; Caro Reina *this volume*). What is peculiar for Luxembourgish is that the joining of two phonological words always has to be marked by voicing assimilation (plus resyllabification).

Furthermore, if the syllable coda contains more than one obstruent or an affricate, all sounds are affected by voicing assimilation by creating a fully voiced intervocalic sequence stretching over a word boundary (22).

(22) *Resyllabification and voicing assimilation in complex coda clusters*

aacht	[aː**xt**]	‘eight’	>	*aachtanachzeg*	[aː**ɣ.‿d**ɑn.ɑx.tsəɕ]	‘88’ (lit. ‘eight and eighty’)
Gesiicht	[gə.ziː**ɕt**]	‘face’	>	*Gesiicht ukuck-en*	[gə.ziː**ʑ.‿d**u.ku.kən]	‘face watch into-INF’
bleif-s	[blɑɪ̯**fs**]	‘stay.PRES-2SG’	>	*bleif-s op*	[blɑɪ̯**v.‿z**op]	‘stay up.PRES-2SG’
Uebst	[uə̯**pst**]	‘fruits’	>	*Uebst a Geméis*	[uə̯**bz.‿d**ɑ.gə.məɪ̯s]	‘fruits and vegetables’
ganz	[gɑn**ts**]	‘whole’	>	*ganz elleng*	[gɑn.‿**dz**ə.læŋ]	‘all alone’

As far as resyllabification is concerned, it is interestingly only the last consonant of the coda that moves into the next syllable, while the remaining consonant(s) stay in their original syllabic slot. This behavior provides important evidence that voicing assimilation in fact operates independent of resyllabification. If resyllabification created the input for voicing assimilation, it would be impossible to explain why the whole coda is voiced and not only the resyllabified consonant.

By analyzing the behavior of obstruents word-internally, though, it becomes evident that voicing is not possible under this condition. In a word like *déck* /dek/ ‘thick’, the voiceless consonant is retained in the inflected form *décken* [dekən], although a vowel-initial syllable follows, but gets voiced when followed by a vowel-initial phonological word as in *déck an dënn* [de.‿gɑn.dən] ‘thick and thin’. This contrast is demonstrated in (23). Phonologically speaking, the feature ‘voice’ is neutralized across words (external sandhi), but it is preserved word-internally (internal sandhi). This incongruity of internal and external sandhi can be seen, according to Szczepaniak (2007), as indicative of a word language.

[9] Note that, in most cases, final devoicing is also part of the spelling rules of Luxembourgish (hence *Schrauf* ‘screw’ in contrast to *Schrauw-en* ‘screw-PL’), whereas across-word voicing is not marked in spelling.

(23) *Resyllabification without and with voicing assimilation*

word-internally			*across words*		
déck-en	[de.**k**ən]	‘thick-PL’	*déck an dënn*	[de.‿**g**ɑn.dən]	‘thick and thin’
Equip-en	[e.ki.**p**ən]	‘team-PL’	*Equipe ass do*	[e.ki.‿**b**ɑs.doː]	‘team is there’
Strooss-en	[ʃtʀoː.**s**ən]	‘street-PL’	*Strooss an Haus*	[ʃtʀoː.‿**z**ɑn.hæʊ̯s]	‘street and house’

It can be concluded that voicing assimilation is prone to the phonological word. Only when two phonological words join in external sandhi, voicing can take place. The identical word-internal context, on the other hand, does not trigger voicing. Resyllabification on the other hand can occur at every syllable boundary. Like in the case of the *n*-rule discussed above, we are confronted with two different phonological domains of application. Voicing assimilation thus would be attributed as a feature of a word language, while resyllabification can be regarded as a syllable language feature.

It has yet to be clarified how the two processes are related to each other. Since voicing is involved, the effect of final devoicing has to be taken into account as well. The derivations in (24a) present two sandhi constellations and illustrate the sequential order of the processes involved.

(24) *Phonological derivations of two sandhi sequences*

		bleif op ‘stay up.IMP[SG]’ /blɑɪ̯**v**/+/op/	*bleif-s op* ‘stay up.PRES-2SG’ /blɑɪ̯**vs**/+/op/
a.	1. Final Devoicing	[blɑɪ̯**f**]+[op]	[blɑɪ̯**fs**]+[op]
	2. Voicing Assimilation	[blɑɪ̯**v**.op]	[blɑɪ̯**vz**.op]
	3. Resyllabification	[blɑɪ̯.‿**v**op]	[blɑɪ̯**v**.‿**z**op]
b.	1. Final Devoicing	[blɑɪ̯**f**]+[op]	[blɑɪ̯**fs**]+[op]
	2. Resyllabification	[blɑɪ̯.‿**f**op]	[blɑɪ̯**f**.‿**s**op]
	3. Voicing Assimilation	[blɑɪ̯.‿**v**op]	*n.a.* → *[blɑɪ̯**f**.‿**s**op]

First of all, final obstruent devoicing (1) as a process of the lexical stratum clearly has to apply before all postlexical processes. Next, voicing assimilation (2) takes places by voicing *all* obstruents before a vowel-initial word boundary. After that resyllabification (3) moves the last obstruent into the onset of the following syllable. That voicing assimilation applies before resyllabification follows from the behavior of the complex coda clusters in cases like *bleif-s op* ‘stay up.PRES-2SG’: as becomes evident from (24b) voicing assimilation cannot apply in a resyllabified sequence like [blɑɪ̯**f**.‿**s**op] because the condition of a vowel-initial phonological word is not met. Hence, this possible output form *[blɑɪ̯**f**.‿**s**op] would be ungrammatical.

Resyllabification in Luxembourgish at first glance resembles *liaison* in French (see e.g. Côté 2011) and one could arguably evaluate the Luxembourgish case as a language contact feature. However, resyllabification in French has no influence on the voicing of the *liaison* consonant. In a compound like *sens unique* ‘one-way road’, the final *s* remains voiceless in French, despite the voicing-favoring context of the following vowel (i.e. [sɑ̃.‿sy.ˈnik]). However, when this loan gets integrated into Luxembourgish voicing assimilation takes place (i.e. [sɑ̃.‿zy.ˈnik]; see also Schanen 2006: 513). Thus, the similarity between French and Luxembourgish is only superficial and the phonological processes in the two languages are different. Rather, for the various kinds of voicing processes Luxembourgish

shows striking resemblances to certain varieties of Dutch (Booij 1999; Ernestus 2003). Such a kind of relationship with Germanic varieties north of Luxembourg are much more sound from a point of view of language history and deserve further investigation.

6. Discussion

In this paper, central aspects of Luxembourgish phonology have been investigated with regard to the typological distinction between syllable languages and word languages. Summarizing the results, it is possible to complement the findings of Szczepaniak (2007) in several ways (Table 2).

Table 2: Traits for syllable language and word language in Luxembourgish

Traits of a syllable language	Traits of a word language
▪ shwa in stressed syllables (native and loan lexicon) ▪ resistance to delete shwa in unstressed final syllables ▪ shwa epenthesis (decreasing, not productive any more)	▪ complex syllable structure ▪ strong influence of penultimate word stress ▪ apocope of final shwa has closed previously open syllables, thus reducing the amount of CV-syllables ▪ cliticization leading to additional complex onset clusters ▪ non-syllabic suffixes creating complex coda clusters ▪ reduction or deletion of pretonic and posttonic syllables ▪ shwa deletion in non-final unstressed syllables ▪ increased use of linking *-s*

It becomes obvious that in present-day Luxembourgish pertinent features pointing towards a syllable language are few in number or are decreasing (shwa epenthesis). In contrast, this survey reveals far more evidence of word language features. It thus seems that the phonology of Luxembourgish is on the same track as German, where Szczepaniak (2007) convincingly showed the historic development from a syllable language in Old High German towards a word language nowadays. Considering this overwhelming evidence, one could classify Luxembourgish as a word language as well. As has already been indicated by Szczepaniak (2010), some features exhibit an even stronger orientation towards the word language type than is the case for Standard German (e.g. increased use of clitics, linking *-s* or non-syllabic suffixes).

However, at least two of the phenomena of external sandhi discussed in 5.3 above pose serious challenges to the application of the typological parameter under discussion. The *n*-rule and resyllabification/voicing assimilation both exemplify how the phonological domains of the syllable and the phonological word interact with and rely on each other at the same time. While these two phenomena are clearly related to syllable structure and weaken boundaries of two adjacent syllables by resyllabification, the domain of application brings the relevance of the phonological word into play again, as both processes apply at the boundaries of phonological words only. Thus, at least for these two, quite frequent, processes, both domains are needed to capture the phonological structure adequately. In consequence, unambiguous attribution to either the syllable language or word language type seems unfeasible.

It has to remain an open issue for further discussion how the mismatch encountered in the Luxembourgish data could be reconciled with the typological differentiation of syllable languages and word languages. At least three options seem conceivable: (1) It has been proposed in Szczepaniak (2010) that Luxembourgish represents a mixed type, where both phonological categories are crucially relevant. Although appealing, this solution would imply a revision of the current theory which consists basically of *one* continuum with the prototypical syllable language and the prototypical word language as the respective end-poles. Instead, two typological continua would be necessary, one to determine the syllable language features and another one for the word language features. A language then would be classified typologically with regard to these two continua. (2) Individual features are weighted according to how prototypical they appear for either a syllable language or a word language. (3) If a process is attributed to more than one domain, the higher domain in the prosodic hierarchy would overrule the lower domains. In the present case, both processes of external sandhi would then be classified as word languages features. Further phonological as well as cross-linguistic research is needed to determine the interrelatedness of the syllable and the phonological word and the relevance of this interrelatedness for the phonological architecture as a whole.

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