Icelandic vowel length and representational theories of phonology*

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The purpose of this article is to provide a critical evaluation of two modern representational theories of phonology (Standard Government Phonology and Strict CV) by confronting them with the phenomenon of vowel quantity distribution in Modern Icelandic. It will be demonstrated that the extant theories face several serious problems when all facets of the phenomenon are taken into account. It will be argued that Icelandic is a very good material to bring out the inadequacies of both theories. SGP fails especially due to constant violation of the Projection Principle. Strict CV also incorrectly predicts vowel length in several more complicated cases, especially due to the surface-based nature of the lengthening rule. Also, a very problematic case of apparent melodic conditioning for morphosyntactic domain resolution will be discussed.

Keywords: *Government Phonology, Icelandic, phonology, Strict CV, vowel length*

1 Introduction

Phonological theory aims at attaining a level at which it will be possible to account for all attested (and only those) phonological phenomena in all human languages. Among the theories that have so far been proposed, two major groups can be identified. The first is *overgenerating* theories (including most notably SPE - Chomsky & Halle 1968, and Optimality Theory - Prince & Smolensky 1993), which use omnipotent mechanisms producing both attested and unattested patterns. The second group includes *undergenerating* theories, which use very restrictive mechanisms which are more probable models of human phonological competence, but often fail to successfully account for various bodies of data. These theories comprise especially representation-based approaches, like Government Phonology.

The purpose of this paper is to critically evaluate two modern representational theories of phonology (Standard Government Phonology and Strict CV) against the phenomenon of vowel length distribution in Modern Icelandic. It will be demonstrated that neither SGP nor Strict CV (as it stands now) successfully explains the distribution of vowel length in Icelandic when all facets of the phenomenon are taken into account. What is more, the phenomenon shows several inadequacies of the extant approaches. Although no full-fledged analysis will be put forward (the paper is intended as being mainly negative and of general relevance for the theory of GP), some suggestions will be made as to what a satisfactory representational explanation should contain. Also, some directions for further research will be fleshed out, with the hope that the thread will be picked up in the nearest future.

* I would like to thank Tobias Scheer and Shanti Úlfsbjörninn for discussing with me several issues raised in this article during the EGG Summer School in Wrocław. The comments made by the anonymous reviewer also certainly contributed to raising the quality of the paper. Obviously, all flaws are only mine.

It is an important caveat that the paper basically takes into account only two 'dialects' of Government Phonology: the standard model practiced by Gussmann (2002, 2006ab), and Strict CV exercised in the work of Scheer (2004, 2012). Obviously, there is a lot of work in Government Phonology which is noticeably distinct from these two embodiments of the theory. Undoubtedly, other versions of the framework would sometimes make different predictions with regard to the phenomena described in this article. Nevertheless, the main point of departure for the present paper is *the already existing accounts of Icelandic data*. It is, however, undisputable that other work in Government Phonology at least has a potential to prove useful while trying to find a solution for the problems raised in this article.

The basic facts pertaining to the distribution of long and short vowels are available in every textbook of Icelandic (Einarsson 1945: 4-5, Kress 1982: 19). Long vowels may occur only in the stressed position, in several phonologically defined configurations:

a) _#, e.g. *bú* [pu:] 'farm'
b) _V, e.g. *lúi* [ˈlu:i] 'weariness' *búa* [ˈpu:a] 'to live'
c) _CV, e.g. *taka* [ˈtʰa:kʰa] 'to take', ráða [ˈrau:ða] 'to rule'
d) _C#, e.g. *þak* [θa:kʰ] 'roof', *hús* [hu:s] 'house'
e) _*ptks+jvr*, e.g. *sötra* [ˈsø:tʰra] 'to slurp', *nepja* [ˈnɛ:pʰja] 'bad weather', *götva* [ˈkø:tʰva] 'to discover', *flysja* [ˈflɪ:sja] 'to peel'
f) _*bdg+r* only in loanwords, e.g. *Madríd* [ˈma:trit], *febrúar* [ˈfɛ:pruar]

Before all other clusters only short vowels may occur:

g) *hestur* [ˈhɛstʏr] 'horse', *kambur* [ˈkʰampʏr] 'comb', *snerta* [ˈsnɛrta] 'to touch', *finna* [ˈfɪnna] 'find', *labba* [ˈlappa] 'walk'

This state of affairs arose in Icelandic as a result of a change named by Haugen (1976: 258) *the great quantity shift*. Most probably it operated between the 16th and 18th centuries. In Old Icelandic the rules of syllable structure were much less constrained, with both long and short vowels occurring before both single consonants and consonant clusters or geminates. The shift led to a significant limitation of possible syllabic configurations, basically introducing complementary distribution between vocalic and consonantal length in stressed syllables.

It is most commonly assumed that vowel length is not distinctive. All vowels are underlyingly short and are lengthened in "stressed open syllables". A competing, but much less popular view is that vowels are basically long, but they are shortened in various strictly specified environments. A still different hypothesis is that vowel quantity in Icelandic is distinctive, but to a very large extent predictable (for arguments see Árnason 1998).

Varying explanations for this pattern of quantity distribution have been proposed in a wide range of frameworks. For instance, Malone (1953) and Haugen (1958) provide an explanation within classical taxonomic phonemics, Anderson (1969ab) offers a treatment which makes use of rule-based generative phonology, Murray & Vennemann (1983) develop a syllable-based account of lengthening, Booij (1986) offers a description couched within the model of Prosodic Phonology.

Modern representational approaches are represented by Gussmann (2002, 2005, 2006ab), who worked within Standard Government Phonology, and Scheer (2004) using the Strict CV theory.

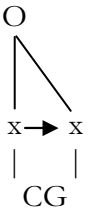
2 Icelandic vowel length in Standard Government Phonology

Standard Government Phonology (KLV 1985, 1990, Charette 1991, Harris 1994) is a very restrictive model of phonology which was proposed as a response to the highly overgenerating rule-based generative paradigm.[1] One of the main contributions of Government Phonology is a highly reduced version of traditional syllabic arborescence, which disposes of e.g. ternary branching or constituents like 'appendix'. In Government Phonology, all constituents may be maximally binary branching, with the proviso that all segments need to be syllabified. Let us analyse all possibilities:

(1)

Non-branching onset

(2)

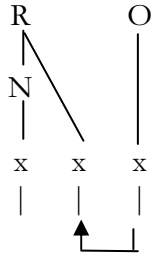


Branching onset

(3)

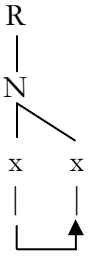
Non-branching rhyme

(4)



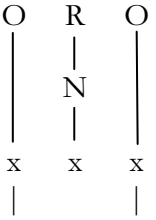
Branching rhyme

(5)



Branching nucleus

(6)



Bogus cluster

As one can easily infer from figures 1-6, an onset may either not branch (as in example a) or branch (example b), and the rhyme may either not branch (example c), branch to accommodate a coda (example d), or branch at the level of the nucleus to

[1] The anonymous reviewer points out that Standard Government Phonology is „a framework which is rather outdated now and has virtually no proponents". Even though mosts GP-ists advanced their views and turned to various forms of Strict CV or to GP 2.0, several relatively recent publications written within the traditional model include Gussmann 2007, Bloch-Rozmej 2008, Pöchtrager 2010. Also, it is hoped that some criticism of SGP laid out in this paper may be of use for linguists working in more up-to-date frameworks, who certainly don't want their current models to fail to account for such a common phonological process as open syllable lengthening/closed syllable shortening.

accommodate a long vowel or a diphthong (example e). Word-final consonants are universally believed to be onsets (Harris & Gussmann 1998, 2002). Arboreal structure is accompanied by government and licensing relationships holding between respective constituents. Thus, within a branching onset, the first consonant (governor) contracts Constituent Government with the following consonant (governee). Also, within a branching rhyme, a coda (which is not a constituent in SGP, being relegated to the status of a rhymal complement) needs to be governed by the following onset. This type of government is known as Interconstituent Government. In both cases the governor cannot be less complex than the governee, whereby complexity is calculated as a number of elements making up a given segment.

Thus, consonant clusters typically involve one of the two types of government: Constituent (branching onsets) or Interconstituent (coda-onset clusters). There are, however, some clusters in which neither kind of government can be contracted, for instance [tl]. Such clusters are assumed to be two distinct onsets separated by an empty nucleus. They are usually dubbed bogus clusters, presented in figure (6).

The syllabic structure (organised according to the principles laid out above) is assumed to be stored in the lexicon. Thus, resyllabification is impossible in the course of further derivation. This is secured by the phonological Projection Principle:

> Governing relations are defined at the level of lexical representations and remain constant throughout phonological derivation. (KLV 1990: 221)

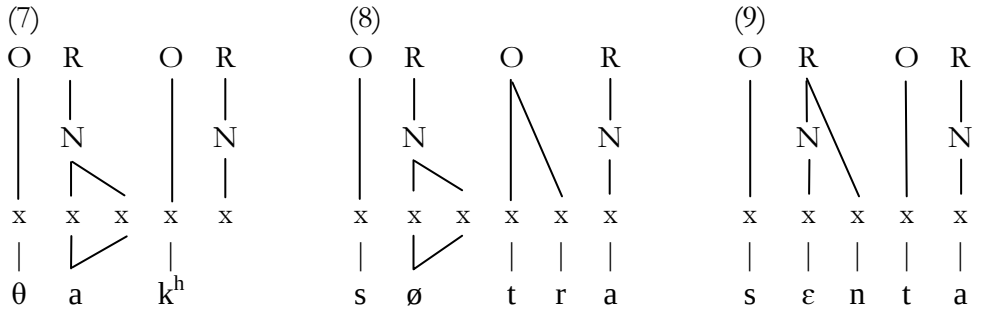
The Projection Principle is the cornerstone of Government Phonology, with numerous empirical arguments for its existence (KLV 1990). Taken altogether, Government Phonology provides a very restrictive inventory of possible syllabic structures. It will be argued, however, that restrictiveness is a double-edged sword, when it fails to account for linguistic data.

Government Phonology was applied to the study of Icelandic in a number of publications by Gussmann (1999, 2000, 2002, 2003, 2006ab, 2011 and some other). Three of these are devoted mainly to the topic of Icelandic vowel length: (2006ab, 2011), it occupies also a relatively large part of his (2002) introductory handbook of phonology. Additionally, Gussmann (2001) is a decent overview of previous treatments of the problem. It will be demonstrated that Icelandic data led Gussmann to abandon some of the key ingredients of the original GP model.

Gussmann's explanation of the distribution of vowel length is included in the following statement:

> Stressed rhymes in Modern Icelandic must branch either in having a long nucleus or in having a short vowel and a consonant in the rhymal position. (2006a: 32)

Examples of phonological structures compatible with Gussmann's proposal are presented below:



The Government Phonology account covers all examples and has several unquestionable advantages. For example, it naturally explains the long vowel in monosyllabic words ending in a single consonant, like *þak* [θa:kʰ] 'roof' and *hús* [hu:s] 'house'. Since word-final consonants are no longer codas, but onsets, a long vowel preceding them is the expected state of affairs. Note that in order to explain the non-coda behaviour of word-final consonants traditional syllabic theories need to introduce special mechanisms of dubious nature, like *extrametricality* (Kiparsky 1984: 153, Booij 1986). This is not the case in Government Phonology.

Nonetheless, the Icelandic data and Gussmann's attempt to handle them pose two theory-internal problems.

First of all, as it was mentioned above, not all consonant clusters can be coda-onset clusters. A coda should always be less complex than the following onset, or, in the worst case, it may be of equal complexity. It cannot, however, be more complex. Nevertheless, this is what the Icelandic data seem to reveal. Note forms like *emja* [ˈɛmja] 'wail', *hefja* [ˈhɛvja] 'heave', *biðja* [ˈpɪðja] 'ask', *evri* [ˈɛvrɪ] 'upper', *veðra* [ˈvɛðra] 'erode', *sofna* [ˈsɔpna] 'fall asleep', *ugla* [ˈʏkla] 'owl'. Traditionally, in Government Phonology it is assumed that the semivowel [j] consists of {I} only, and [r] contains only {A}. It is doubtful whether such structures can licence anything in the preceding coda, be it a fricative ([v] or [ð]) or a nasal.

Gussmann, being perfectly aware of the problem, offers two possible solutions. The first is to analyse Icelandic sonorants as consisting of more elements than it is traditionally assumed. For instance, it is possible to postulate that [j] is a palatal fricative and contains the noise element {h}. The second proposal is to review complexity condition for coda-onset clusters:

> [T]he case forces us to reassess the licensing requirements and specifically the role of complexity in government (…). [T]he Icelandic facts cast doubt on the role of complexity understood as element computation in automatically determining the governor/governee status. (2006a: 32)

Whereas the first proposal introduces idiosyncrasy only to the analysis of the Icelandic language, the second one has more far-reaching consequences for the whole theory of Government Phonology. It would entail abandoning one of the main ingredients of the model, as advocated since the very beginning of the existence of the theory (Harris 1990).

The second problem pertaining to Icelandic data is much more serious. The principle of branching rhymes introduces numerous vowel length alternations into paradigms:

(10)

heim [hei:m] 'world, acc. sg.'	*heims* [heims] 'gen. sg.'
gulur [ˈkʏ:lʏr] 'yellow, nom. sg.'	*gulra* [ˈkʏlra] 'gen. pl.'
sæl [sai:l] 'blessed, fem.'	*sælt* [sai̥lt] 'neut.'
ljúf [lju:v] 'dear, fem.'	*ljúfri* [ˈljuvrɪ] 'dat. sg.'
dæmi [ˈtai:mɪ] 'I judge'	*dæmdi* [ˈtaimtɪ] 'I judged'

Resyllabification is ubiquitous and concerns most Icelandic lexemes. The same consonant is syllabified as an onset in the forms on the left, and as a coda on the right. If the depicted pairs of forms are phonologically related, this phenomenon flies in the face of the Projection Principle.

Gussmann does not mention the Projection Principle, advocating at the same time the phonological conditioning of the alternation. Since he does not take an overt stance as to the position of the Principle in the theory, it is not easy to infer whether his incarnation of GP should possess such a mechanism, but some statements suggest that it should not. For instance, he argues the "non-preservation – or non-existence – of the syllabic identity of the morpheme" (2006a: 22). Consider also the following quotation:

> The vowel length regularity clearly shows that the same morpheme – *fagur/fagr(an)* – has two different representations, one with the voiced velar spirant in the onset and one with the same consonant in the rhymal complement position. In other words, we are once again led to reject the classical generative shibboleth of 'one morpheme – one phonological representation'. Phonological representations of linguistic forms must be determined solely by phonological criteria and there is no obvious or necessary reason why different phonetic shapes of a morpheme should be fully accountable by phonological regularities, i.e. why they should all be reducible to a common denominator. (…) The only argument in favour of a single representation is nothing more than the dogma of single underlying representation for each morpheme. Icelandic vowel length shows quite dramatically that the dogma has to be jettisoned as phonology clearly determines the representations on the basis of phonological effects rather than a priori conditions like single 'underliers'. (Gussmann 2006a: 33)

This is a very controversial statement for several reasons. It is not clear to what level of linguistic structure the length alternations actually belong.

First, since the phonological configuration plays the crucial role, one could think of a phonological process, but phonological processes *per definitionem* operate on one underlying representation. It is not clear how phonology can 'establish' or 'determine' underlying representations, and on what material. This implies a dynamic process of syllabification, which produces two surface forms (but not representations!): with a short and with a long vowel. This is very much incompatible with the GP line of thinking.

It is curious what lexicon looks like in Gussmann's view and what he actually meant by 'representations'. One option is that it does not contain any syllabic structure, unlike what is commonly held among GP-ists (and what equals to the rejection of the Projection Principle). It contains only a string of segments, which are associated with syllabic arborescence within the course of derivation - this is named 'determining of representations'. Nevertheless, since his representations are not stored, but are effects of computation over a string of segments, this influences the whole classification of his theory on the representation vs. computation scale. Even though he uses many theoretical tools typical for GP, like the whole constituent structure, empty nuclei, and government and licensing relations, Gussmann's (2006a) model of Government

Phonology would not be a representational theory, since representations do not exist *a priori*. It would be most appropriate to call it Derivational Government Phonology. Nonetheless, it is possible that Gussmann actually meant something else.

A different (and probably the correct) reading of Gussmann's proposal is that the lexicon contains not an unsyllabified string of segments, but simply two underlying representations (as he overtly says). The 'determining of representations' would then take place during the process of language acquisition. Icelandic children would construct two underlying representations on the basis of surface vowel length fluctuation.[2] But in such a case, the link between the two representations is missing. Why could both of them be realisations of the same lexical item? The self-imposing solution is phonologically conditioned allomorphy. Thus, two alternants have different underlying representations, which are selected on the basis of phonological criteria. This proposal saves the Projection Principle, but suffers from a serious flaw of a different kind. If we assume that almost every Icelandic lexeme has two separately stored allomorphs, one with a long and one with a short vowel, we double the storage. This is a very unrealistic theory of the lexicon. Recall that a similar English alternation keep ~ kept was moved by Kaye (1995: 312) into morphophonology, but this is wholly acceptable, since it concerns only a couple of lexicalized and phonologically non-parsable forms, whereas in Icelandic the alternation is a living phonological regularity which is valid for the whole language. It is very unlikely that speakers of Icelandic store almost every morpheme twice. For this reason, phonological means should be exploited to express the regularity, without recourse to positing distinct underlying representations for both forms.

Even though this paper concentrates primarily on Gussmann's way of handling the phenomenon (since his publications are devoted specifically to the Icelandic data), it cannot be left unmentioned that there has also been another way of explaining the process of open syllable lengthening/closed syllable shortening in Standard Government Phonology. In order to complete the picture and to present the overall lacking potential of SGP to account for this phenomenon, an alternative view will also be addressed. Kaye (1990) is one of the founding papers of the theory, where the author introduces the principle of coda licensing. He scrutinises also the phenomenon of closed syllable shortening, providing examples from languages like Yawelmani and Turkish. The author concludes that the process actually does not have anything to do with closed syllables, contrary to what is traditionally is assumed. His explanation is advanced along a different way of reasoning, which is already reminiscent of the Strict CV approach. In his account, all alternating vowels are underlyingly long, i.e. associated with two skeletal positions. All clusters provoking shortening are assumed to be bogus clusters and enclose an empty nucleus. Kaye's generalisation runs as follows:

> A long vowel shortens when the following nucleus is the licensed empty nucleus. (Kaye 1990: 317)

It is necessary to admit that this way of explaining closed syllable effects is devoid of the problems accompanying Gussmann's proposal, but its disadvantage lies in the lack of logical connection between the process and its environment. Why should a vowel

[2] This process is by no means incompatible with the assumption that syllabic arborescence is stored. This idea does not exclude the possibility of the existence of a syllabification algorithm, since the syllabic structure somehow needs to find its way into the lexicon. Note that people learn new words all life long, and they also need to be syllabified.

shorten when the following nucleus is a licensed empty nucleus? In the theory of SGP there is no mechanism, no lateral force, no constituent interaction, which would be able to explicate this kind of relation between two nuclei. A successful theory of phonology should be able to provide a precise reason for a lengthening/shortening. Only then it could be said to have an explanatory value. Kaye's generalisation actually constitutes a reformulated observation, rather than an explanation.

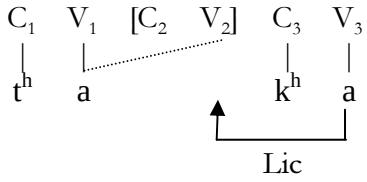
To sum up, regardless of how one would formulate the lengthening rule in Standard Government Phonology, some complications appear. If we state that rhymes always need to branch, we violate the complexity condition on licit coda-onset clusters. If we say that the stems of words like *gulur* and *gylra* share the same underlying representation, we violate the Projection Principle. If we move the alternation into morphophonology, we arrive at an unrealistic theory of the lexicon. Finally, if we follow Kaye (1990) and state that vowels are shortened before a licensed empty nucleus, it still remains unclear why the process takes place at all. All these factors contribute to the fact that it is hardly possible to express Icelandic tonic lengthening as a phonological process in Standard Government Phonology. The framework simply was not created to deal with vowel length alternations governed by a phonological process. Given that, it is necessary to admit that Gussmann (2006a) quite impressively squeezed out of SGP as much as it was possible. It ended up, however, in the rejection (or at least a rigorous redefinition) of the Projection Principle and the Coda Licensing Principle. The case of Icelandic lengthening proves unambiguously that Standard Government Phonology in its original formulation is not successful at explaining all phonological phenomena (especially the ones pertaining to alternations of vowel length) and that alternative accounts are welcome.

3 Icelandic vowel length in Strict CV

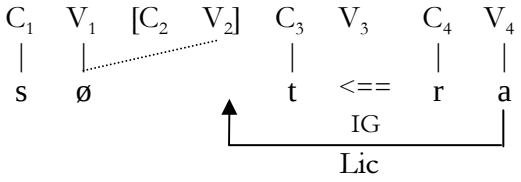
Strict CV theory, laid out mainly in Scheer (2004), is one of the most recent developments of Government Phonology. It takes the lateral idea of GP into its logical end by completely disposing of arboreal structure and placing the responsibility on two lateral forces: government and licensing. The theory develops Lowenstamm's (1996) proposal that constituent structure boils down to the sequence of strictly alternating onsets and nuclei. In Strict CV a CV slot (an onset followed by a nucleus) is the smallest possible phonological unit. Neither a C nor a V can exist in isolation. The consonantal position may be simply empty, i.e. not associated with any phonetic substance. The vocalic position is normally pronounced. If we need an unpronounced nucleus, i.e. when we face a consonant cluster, some special conditions need to be fulfilled, gathered under the notion of ECP (*Empty Category Principle*). One possibility is that the empty nucleus is governed by the following nucleus. Another is that it is enclosed within the domain of Infrasegmental Government. The latter takes place in obstruent-sonorant sequences, where the sonorant can govern the preceding obstruent. A still different way to satisfy ECP is exercised by domain-final empty nuclei: these are parametrically governed.

Scheer (2004: 255-259) formulates an overall, cross-linguistically relevant theory of tonic lengthening. He proposes that stress projects an additional empty CV slot coming immediately after the stressed vowel. The melody of the stressed vowel can spread into the empty V slot on condition that the latter is licensed. Relevant Icelandic examples are depicted below:

(11)



(12)



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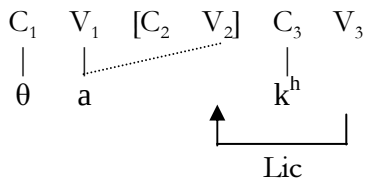
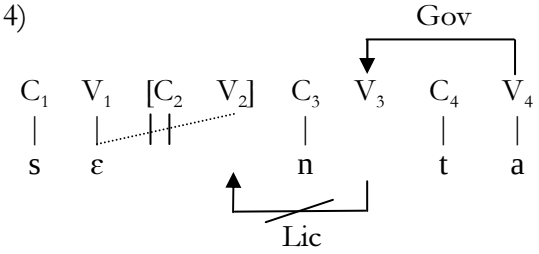


(14)



In example (11) V_3 can licence V_2, hence the melody from V_1 can spread on it and the vowel comes out long. In example (12) V_3 is enclosed within the domain of Infrasegmental Government, which means that its lateral forces are disabled and that it is invisible for V_4. This is why V_4 may reach V_2 and licence it. In example (13) an important property of the model is presented. FENs (Final Empty Nuclei) are parametrically either laterally enabled or disabled, i.e. they can licence and govern or they cannot do so (Scheer & Ziková 2010, Scheer 2012: 166). In Icelandic the parameter is on, which means that FENs can licence a CV provided by stress and vowels in simple CVC words are always long. Finally, example (14) depicts a word with a coda-onset cluster, in which the vowel is necessarily short. V_4 governs V_3, hence V_4 cannot licence V_2 and the vowel from V_1 cannot spread onto it.

Scheer's account successfully overcomes both weaknesses of Standard Government Phonology described in the previous section.

First, the problem of complexity condition on coda-onset clusters disappears, since in Strict CV there is no mechanism of Coda Licensing. All clusters which are not domains of IG are bogus clusters, with an empty nucleus demanding government. It does not matter what melodic structure the flanking consonants have, and words like *senda* with falling sonority behave exactly like *biðja* or *evri*, which have rising sonority slopes.

Second, in Strict CV there is no problem of resyllabification, since all consonants are onsets anyway. What is more, the proposed solution is purely phonological and the mechanism operates on a single representation for every word under discussion.

Nevertheless, it needs to be emphasised that Scheer's account is not perfect either, since there are several complications of theory-internal and empirical nature. Some of them may be overcome quite easily, by introducing cosmetic changes to the theory. Some other cast doubt on the whole mechanism of lengthening and architecture of the phonological system.

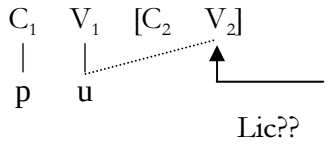
3.1 Monosyllabic CV words

Scheer asserts that licensing is an indispensable criterion for the empty CV slot to have the melody from the preceding vowel spread: "the complement of alternating long

vowels must be licensed. Vocalic melody cannot spread onto unlicensed targets" (Scheer 2004: 265). There are cases in which this condition appears not to be fulfilled.

First of all, there is no obvious source of licensing in monosyllabic CV words. Consider the following example:

(15)



There is no nucleus coming after V_2. Therefore it should not be licensed and the vowel should emerge as short, but it doesn't. A similar problem occurs in many other languages with tonic lengthening (e.g. Italian). Scheer (2004) does not include such examples in his account. This is certainly a gap of his proposal.

A welcome modification of the model would be introducing parametric licensing, which was proposed by Zdziebko (2010: 172, 2012: 89) to account for lengthening in domain-final position in Scottish varieties of English. Also Scheer (p.c.) indicates that the CV provided by stress is parametrically licensed when it is domain-final. If domain-final empty nuclei can be parametrically governed (this is the condition on their very existence), they can also be parametrically licensed. This is most probably the best (or the only?) thing to do. However, a question which arises is whether the stress-induced CV should be any different from other CVs in the representation. Preferably it should not, since an additional type of phonological object ("a CV provided by stress") would have to be recognised. This would be a factor limiting the restrictiveness of the theory.[3] Assuming that it is not different, one should try to answer why only this final empty CV should undergo parametric licensing? It would be more logical to assume that all domain-final empty CVs in a representation may be parametrically licensed. Zdziebko (2010:172) formulates the Final Nucleus (FN) licensing parameter:

(16) License FN [ON]/OFF

Actually, Zdziebko's proposal goes even one step further. His parameter licences all final nuclei, be it empty or not. This is a strong formulation, which is probably worth rethinking, unless it is convincingly demonstrated that licensing produces some effect on final phonetically expressed nuclei. So far, the only postulated working of the parameter is that spreading may occur onto an empty licensed nucleus from the preceding nucleus. It has no effect on FENs coming immediately after consonants, and no effect on phonetically expressed final nuclei. Of course, it is possible that it accidentally does not produce a noticeable result, but in order to postulate such a parameter more properties

[3] The anonymous reviewer points towards another problem: since Scheer's intervocalic licensing applies in the same conditions as Proper Government, the licenser/governor needs to be able to distinguish their targets. This implies that there *is* a difference between the CV provided by stress and other CVs, indeed. Note that Scheer and Ziková (2010: 420) give priority to government over licensing in cases when both could apply. This suggests that long vowels should never surface. This is another flaw of Scheer's proposal which could be added to the ones described in the main body of the present article.

should be identified for which it could be responsible. Exploring the effects of parametric licensing of final nuclei would be a research-conducive area, but for the time being, it is more economical to propose that only FENs are licensed by a parameter.

Thus, parametric variation at the right edge of domains would look in the following way: parametric government would be responsible for the existence of word-final empty nuclei. FENs can be also parametrically licensed or not. Normally, it should not produce any noticeable result. It manifests itself only in systems with tonic lengthening and related phenomena. In such cases, the CV provided by stress is parametrically licensed and monosyllabic CV words can always have a long vowel on the surface.

Note, however, that the positive setting of the parametric government of FENs is not the prerequisite for the positive setting of the parametric licensing. Languages without 'true' FENs may also have tonic lengthening. Italian is the case in point: whereas there are no consonant-final words (except a few loanwords), there is tonic lengthening and it applies also to monosyllabic words. This means that Vs in the CV provided by stress in monosyllabic words are the only FENs in this language. Consequently, only they are affected by the Final Licensing parameter.

An alternative way of dealing with the lack of licensing in monosyllabic CV words could be postulating the existence of a template for a minimal word. Minimal word requirements are common in various languages of the world, and sometimes lead to phonological modifications which are otherwise inexplicable. The standard example is provided in Mester (1994: 22). The vowel in the Latin form *dā* 'give, imp. sg.' is lengthened only to satisfy the minimal word requirement (which happen to be equal to two moras in Latin). The vowel of the stem is lexically short, as evidenced in the infinitive *dăre* and by all other paradigmatic forms. The argument put forward in the moraic framework may be easily reformulated in Strict CV by stating that the minimal word in Icelandic must span over two CV slots. This is a promising result, but it is necessary to recognize that it would introduce a disjunction into the explanation of causality of vowel lengthening in Icelandic.

3.2 The fate of the empty CV in closed syllables

Another problem with Scheer's theory is that it is not clear what happens to the empty CV in closed syllables, like *senda*. It is not licensed, which is why the melody from the preceding nucleus fails to colonize it. But note that it is also ungoverned. If the empty CV stays in the representation, the ECP demands that there are no ungoverned nuclei. Since there is no source of government, the ECP is not satisfied and the representation is ill-formed. If, however, the empty CV is removed from the representation, the process of "removing" should be somehow formalized and justified. It is a controversial move, since it would suggest that we may remove any CV slots from the representation whenever it is convenient. This should not be possible, especially when we once again emphasise that this CV should not be different from any other CV slots.

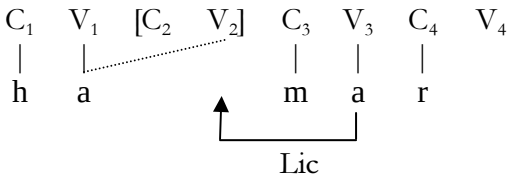
This problem is of a much wider provenience that one may think, since it provokes questions about the integrity of the skeleton in Strict CV. In Standard Government Phonology removing skeletal slots was banned due to the Projection Principle and the Structure Preservation. Most skeletal positions were involved in the net of static lateral relations and removing any slot would change one of them, even though some slots happen to have no associated melody and thus not to be pronounced on the surface. However, in its original formulation the Projection Principle is of no use in Strict CV,

because licensing and government relations belong to computation anyway. An exception is Infrasegmental Government, which is defined in the lexicon (Scheer 2012: 145, see also the discussion in the next section). Hence, if we assume that the Projection Principle is still valid in Strict CV, its only effect would be assuring that the relation of Infrasegmental Government is not broken within the course of derivation. If it does not exist, there should be a different tool which assures that it is impossible to remove skeletal positions from the representation. As a matter of fact, the very mechanism of stress inducing a CV insertion is suspicious, since it also modifies the underlying prosodic structure. Phonological operations definitely should be able to do things like link, delink, and spread melodic units, but the skeleton itself should always remain intact. Probably a constraint like *Skeleton Integrity*, which bans any modification of the prosodic structure, is necessary.[4] This is still missing from the theory.

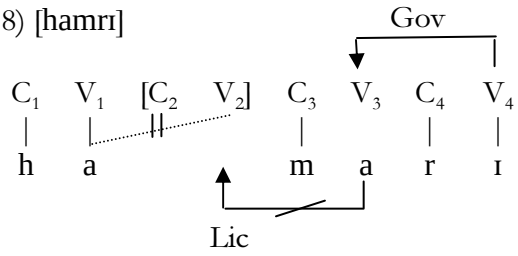
3.3 The nature of "branching onsets"

A still different complication arises in cases in which the "branching onset" is created by a vowel-zero alternation. First, examine the following example:

(17) [ha:mar]



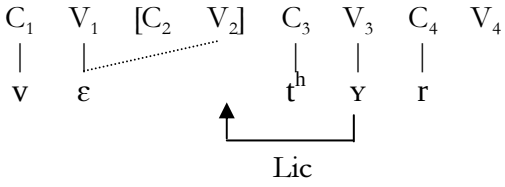
(18) [hamrɪ]



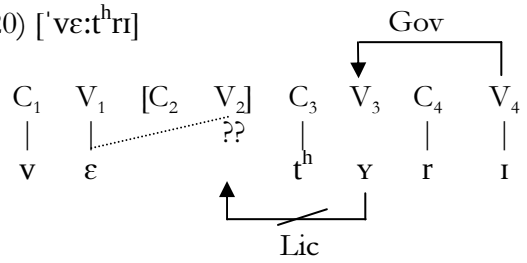
In the word *hamar* ['ha:mar] 'hammer, nom, sg.' V_3 is ungoverned, hence it can fulfil its lateral duties and license the CV provided by stress. This is why the vowel is long. In the dative form *hamri* ['hamrɪ] V_3 is governed, which is why it is delinked and laterally disabled. Therefore V_2 remains unlicensed and the stressed vowel is pronounced short. In this way Scheer's account correctly predicts the length alternation between *hamar* and *hamri*. Note, however, that similar behaviour could be expected before all clusters arising as a result of vowel ~ zero alternation. This seems not to be the case:

[4] It is worth pointing out that the postulated principle of *Skeleton Integrity* is not in conflict with Scheer's (2012) Direct Interface. Boundary information may be still represented in phonology as an empty CV slot, since it does not influence the skeletal representations of morphemes *per se*, but is inserted between morphemes.

(19) [ˈvɛːtʰʏr]



(20) [ˈvɛːtʰrɪ]



In example (20) V_4 also governs V_3. For this reason V_3 should not be able to licence V_2. However, both *vetur* 'winter, nom. sg.' and *vetri* 'dat. sg.' have a long vowel. This particular *tr* cluster is not a branching onset in Strict CV terms, i.e. it cannot be a domain of Infrasegmental Government, since it hosts a vowel ~ zero alternation. It is a bogus cluster and it should be preceded by a short vowel. The theory does not predict the possibility of IG being secondarily established. Even if it did, it would still be more natural to expect a short vowel, since otherwise it would have to be assumed that lateral forces may be redefined and that derivation may at some point move backwards. This is incompatible with Scheer and Ziková's proposal that phonological computation proceeds invariably from right to left (2010: 428).

A question of a very similar nature is whether IG can be established on a morpheme boundary. "Branching onsets" which provoke lengthening sometimes are created by concatenating an inflectional ending. Compare the following data:

(20)	*flata* [ˈfla:tʰa] 'flat, acc. sg. fem.'	*flatrar* [ˈfla:tʰrar] 'gen.sg.'
	lík [li:kʰ] 'similar, fem.'	*líkri* [ˈli:kʰrɪ] 'dat.sg.'
	ljót [ljou:tʰ] 'ugly, fem.'	*ljótra* [ˈljou:tʰra] 'gen.pl.'
(21)	*ljúf* [lju:v] 'dear, fem.'	*ljúfri* [ˈljuvrɪ] 'dat. sg.'
	góð [kou:ð] 'good, fem.'	*góðra* [ˈkouðra] 'gen.pl.'

If the adjectives in (20) are stored in the lexicon as CVC simplexes, this would imply IG being a dynamic process. Otherwise, these "branching onsets" should behave like bogus clusters. This poses a fundamental question: is Infrasegmental Government a piece of computation (like Licensing and Government) or exists in the representation prior to it? Scheer (2012: 145) asserts that Infrasegmental Government "defines a TR cluster as a branching onset in the lexicon". This is irreconcilable with the data presented

in (20). Also, storage of the whole paradigm would not be probable, judging by the full productivity.[5]

What is conspicuous in these data is the surface-based nature of the conditioning environment of lengthening: it does not take place before any abstractly defined "domains of Infrasegmental Government", but before *surface* clusters of *ptks* + *jvr* (and *bdg* + *r* in loanwords). The frameworks of Government Phonology and Strict CV demand, however, different representations for "true" branching onsets, different for branching onsets enclosing an alternation site, and still different for clusters arising as a result of morphological concatenation. The latter two should behave like bogus clusters. A stance should be taken about the representation of such clusters and about the status of Infrasegmental Government in the theory.

3.4 Peculiar behaviour of stem-final fortis plosives

The problem presented in this subsection is a challenge not only for Strict CV, but for many other phonological theories. It concerns the behaviour of fortis plosives on morpheme boundaries and its interaction with the rule of lengthening. The data come predominantly from Gussmann (2002: 181-184).

The addition of the gen. sg. *-s* ending to a CVC stem almost always blocks lengthening:

(22)	*heim* [hei:m] 'world, acc. sg.'	*heims* [heims] 'gen. sg.'
	dal [ta:l] 'valley, acc. sg.'	*dals* [tals] 'gen. sg.'

But when the stem ends in a fortis plosive, length is often retained (with the aspiration being released, at least in the northern dialect). When it is not, the plosive undergoes lenition to a plain plosive or a fricative. The forms appear to be in free variation:

(23)	*tap* [t^{h}a:p^{h}] 'loss'	*taps* [t^{h}a:p^{h}s] or [t^{h}aps] or [t^{h}afs]
	rit [rɪ:t^{h}] 'writtenwork'	*rits* [rɪ:t^{h}s] or [rɪts] or [ris:]
	bak [pa:k^{h}] 'back'	*baks* [pa:k^{h}s] or [paks] or [paxs][6]

Even though not all possible words with stem-final fortis plosives have all three variants (token frequency appears to play a role here, see Lindqvist 2010: 69 for discussion), the pattern is still very conspicuous.

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[5] A different view of Infrasegmental Government which reinterprets the force as established in the course of derivation is advocated by Zdziebko (2012: 97). This proposal appears to be much more adequate for analysing Icelandic data. Nevertheless, it also does not predict the possibility of establishing Infrasegmental Government over a floating vowel.

[6] These transcriptions are applicable only to the northern dialect, the so-called *harðmæli*, in which aspiration is released in fortis plosives word-initially, intervocalically, and word-finally. In the southern dialect, *linmæli*, which is usually considered 'standard Icelandic' and is a basis for handbooks, only word-initial plosives are aspirated. Nevertheless, the delineated length phenomena are equally relevant for both dialects. Thus, *taps* in *linmæli* may pronounced as [t^{h}a:ps] or [t^{h}aps] or [t^{h}afs], whereas *dals* only as [tals].

Similar behaviour with respect to length can be observed in compounds and words with stressed suffixes. In most cases the vowel in compounds is short, unless the stem ends in a fortis plosive or /s/.

(24)	*von* [vɔ:n] 'hope'	*vonlegur* [ˈvɔnlɛɣʏr] 'reliable'
	vonlaus [ˈvɔnlœʏs] 'hopeless'	
	haf [ha:v] 'ocean'	*hafkola* [ˈhavkɔla] 'sea breeze'
	vor [vɔ:r] 'spring'	*vorkuldi* [ˈvɔr̥kʏltɪ] 'spring chill'
	rauður [ˈrœʏ:ðʏr] 'red'	*rauðleitur* [ˈrœʏðlɛitʰʏr] 'reddish'
(25)	*brosa* [ˈprɔ:sa] 'to smile'	*broslegur* [ˈprɔ:slɛɣʏr] 'smiling'
	bak [pa:kʰ] 'back'	*bakpoki* [ˈpa:kʰpʰɔcʰi] 'rucksack'
	hvítur [ˈkʰvi:tʰʏr] 'white'	*hvítleitur* [ˈkʰvi:tʰlɛitʰʏr] 'whitish'

Sequences like [tʰl] and [sl] are certainly not branching onsets (since they never are morpheme-internally); it definitely cannot be proposed for [kʰpʰ]. Also, it is clearly not the property of the suffix that causes/blocks lengthening (since it produces different results in different words), but the melodic structure of the final consonant of the stem.

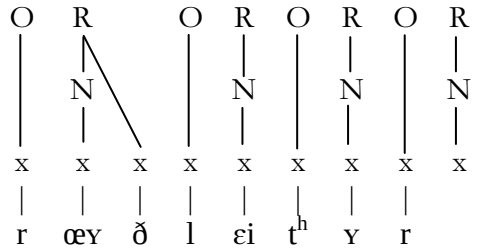
An aim at which the system seems to be striving is clear: an excessively complex expression containing {H} refuses to be syllabified in the coda, i.e. to occur after a short vowel. What we observe is a conspiracy of different effects leading to it.[7] Both the retention of length and the lenition of the plosive before *-s* are two of such effects. Preaspiration may be considered another instantiation of this conspiracy. In the preaspiration process a complex fortis plosive which would be syllabified as a coda is split into [h] and a lenis plosive.

The peculiarity of the phenomenon consists in the impossibility to say unambiguously how many domains are involved, when respective morphemes are concatenated, i.e. domain resolution is conditioned by complexity of the final consonant of the stem. It looks like normally compounds/gen. ending merge into one phonological domain, when the first consonant of the second morpheme can make a coda out of the last consonant of the first morpheme. Since fortis plosives cannot be syllabified as a coda, the first morpheme remains a separate phonological domain. Hence, in the word *rauðleitur* there is one phonological domain: the [l] looks to the left, makes its coda out of the [ð], and the vowel comes out short. In contrast, in the word *hvítleitur* the [l] looks to the left, but it cannot make a coda out of [tʰ], hence the first morpheme remains in a separate phonological domain.

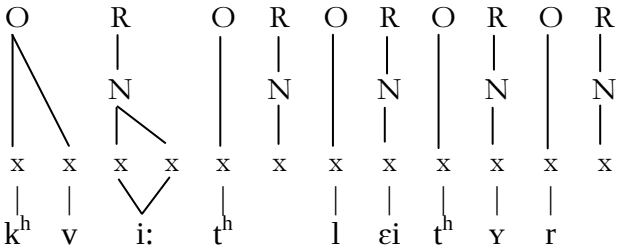
Before the perspective of Strict CV on the problem is analysed, it is worth taking a look at how Standard Government Phonology handled (or rather failed to handle) the problem. Gussmann (2002: 184) interprets the phenomenon along the lines of the syllabification requirements, according to which fortis plosives always need to be syllabified in the onset. He assumes a dynamic syllabification algorithm, which makes full use of empty nuclei. Figures (26) and (27) depict representations of *rauðleitur* [ˈrœʏðlɛitʰʏr] 'reddish' and *hvítleitur* [ˈkʰvi:tʰlɛitʰʏr] 'whitish':

[7] The notion of conspiracy was introduced into phonology by Kisseberth (1970).

(26)



(27)



This proposal is empirically adequate and allows us to cover almost all examples. However, what is missing is a representation for the morpheme boundary. *Hvítleitur* can have a long vowel *only* because the cluster arises on a morpheme boundary. If underlying /tʰl/ is morpheme-internal, the vowel comes out short and the plosive is preaspirated: *ætla* [ˈaihtla] 'intend'. The boundary is the culprit and if Gussmann's syllabification operated blindly, it would not distinguish between *hvítleitur* and *ætla*, returning the same result in both cases: either lengthen the vowel, or produce preaspiration. A syllabification algorithm which does not consider the boundary makes a false prediction and fails to account for the difference of vowel length in these examples.

Segments which behave in this way include not only the three fortis plosives, but also /s/, which sometimes syllabifies as a coda (morpheme-internally, e.g. *taska* [ˈtʰaska] 'bag', *veisla* [ˈveisla] 'party'), and sometimes as an onset (when stem-final, e.g. *brosgjarn* [ˈproːscartn̥] 'funny', *broslegur* [ˈprɔːslɛɣʏr] 'smiling'). This is why Gussmann (2002: 187-93) dubs it a 'double agent'. Árnason (2011: 197) correctly points out the arbitrary nature of this suggestion and lack of autonomous explanation for the dichotomy. What is really at issue here is not the double life of /s/, but interface activity, the representation of which is missing from SGP.

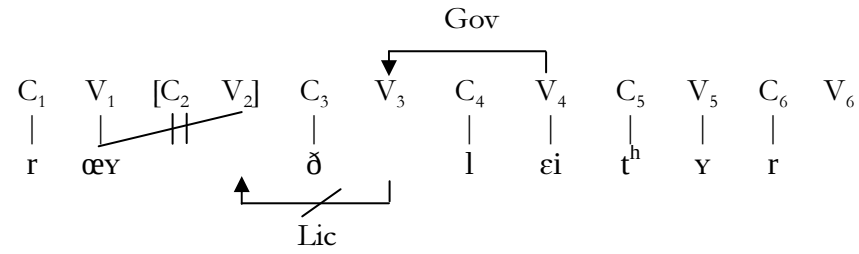
As Scheer (2012: 145) points out, there has never been any way to represent a morpheme/word boundary in Standard Government Phonology. Neither the melody nor syllabic arborescence (onsets, nuclei, rhymes) qualify for this purpose. This is why such data as the above mentioned Icelandic case are unsolvable with traditional SGP tools.

Within Strict CV representation for boundary information is an inherent (and very important) part of the framework. Scheer (2012) introduces a theory of morphology-phonology interface, known as *Direct Interface* (DI). The cornerstone of DI is that it disallows the presence of purely morphosyntactic vocabulary in the phonological representation. Such a move violates modularity. This is why diacritic symbols like # or + cannot function as phonological entities: they cannot be addressed or instructed by phonological computation in any way, they are incomprehensible in a strictly modular

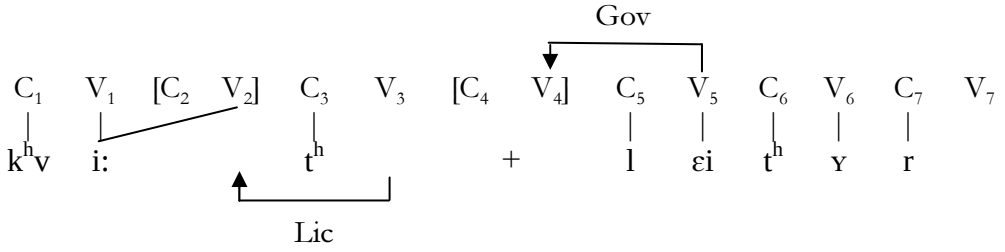
world. However, whenever morphosyntactic boundaries really play a role in phonology, i.e. whenever there are processes which take place (or are blocked) in the presence of the boundary, a way needs to be identified to represent these boundaries. The requirement of DI is that they should be represented as truly *phonological units* and defined in phonological vocabulary. This boils down to empty syllabic space, expressed in a form which is dependent on the analyst's framework: an empty skeletal position, an empty mora, or an empty CV slot. Thus, a # or a + present in the morphosyntax is translated into phonological vocabulary and manifests itself (in Strict CV) as an empty CV unit. Possible effects of the empty CV are that it provides syllabic space for some processes to occur or, in other cases, it blocks some processes which call for adjacency.

Figures (28) and (29) depict possible Strict CV representations for *rauðleitur* 'reddish' and *hvítleitur* 'whitish'. In the former case the suffix attaches synthetically, i.e. it does not produce the empty CV. In the latter example, the morpheme boundary translates into an empty CV slot, thanks to which the vowel of the suffix cannot reach V_3. Thus, V_3 (being domain-final) is laterally enabled, can license V2 and the word can surface with a long vowel.

(28)



(29)



The Strict CV representation is superior to the SGP one also with respect to the requirements of the interface between morphosyntax and phonology, since it provides us with a uniform way of representing a morpheme boundary. However, what still remains unsolved is the explanation for the trigger for translation. Translation of boundary information into a CV slot cannot take place in arbitrarily selected contexts, or be dependent on phonological factors. This is always decided by the morphosyntax, and different morphemes have different properties in this respect. It would be desirable to state unambiguously whether the gen. sg. *-s* ending or the *-leitur* suffix attaches synthetically or analytically, or whether it produces an empty CV or not. It cannot be both. The issue should be decided by morphosyntax and be an inherent property of this particular morpheme. Here, the process seems to be phonologically conditioned.

Of course, an appealing solution would be to postulate that phonological domains in compound words are determined lexically, i.e. stored in the lexicon for every lexical

item. In such a way *rauðleitur* would have one phonological domain, because it is stored as a simplex, and *hvítleitur* is stored as bimorphemic (or dynamically derived), which manifests itself also in its phonological behaviour. Probably for some words it is the case, but this cannot be the whole truth, since this does not account for full productivity. The data in (24) and (25) show the productive, living pattern, in which the degree of dependence on phonological factors is astonishing and cannot be considered accidental. Also, this certainly would not work for the genitive *-s*, partly due to the variation involved, and partly due to the fact that inflection is universally believed to be computed rather than stored.

Also, in compounds demonstrated in (24) and (25) the domain vacillations are evidenced by other phenomena. Note that in *vorkuldi* [ˈvɔr̥kʏltɪ] 'spring chill' the process of sonorant devoicing by the following fortis plosive takes place. This is an additional piece of evidence for adjacency of the two consonants on the skeleton (or for their belonging to the same domain, or for the absence of the empty CV between them). Besides, words like *bakpoki* [ˈpa:kʰpʰɔcʰi] 'rucksack' are bizarre from the phonotactic point of view. Even putting the phenomenon of vowel length aside for a moment, the phonetic sequence of two aspirated fortis plosives [kʰpʰ] is not a usual thing to have domain-internally. The workings of the boundary are here unquestionable.

An empirically adequate generalisation would be the following: if the stem ends in a fortis plosive or /s/, concatenate inflectional/derivational suffixes analytically (which translates into: provide an empty CV). If the stem ends in any other consonant, concatenate inflectional/derivational suffixes synthetically (=do not provide an empty CV). In other words, translation of boundary information in Icelandic appears to be determined by melodic factors.

The traditional story is that domains are provided by morphosyntax; phonology normally does not have the power to "destroy" the boundary between them, or to influence it in any way. Also, specifically within Strict CV, it cannot simply remove the boundary-induced CV when the melodic structure of neighbouring consonants meets some complexity requirements. It is also doubtful whether the failure of a representation-based explanation can be compensated for by phase-based phonology. The phase structure for one and the same suffix, like *-leitur*, should be uniform for all cases in which it occurs: either [root-suffix], or [[root]suffix], and cannot be dependent on melodic conditioning.

The causality of interface phenomena *always* lies in the morphosyntax. This is (or at least should be) true for every framework of phonology and modularity-faithful theory of phonology-morphosyntax interface. With this in mind, Icelandic data are a big challenge.

4 Conclusion

The paper demonstrated that current representational approaches to phonology have several drawbacks, which make it impossible to provide a satisfactory account of Icelandic vowel lengthening. We can observe a classical conflict between a restrictive theory and a set of data which do not "fit in". Icelandic data put Standard Government Phonology in a very unfavourable situation - the kind of constituent structure postulated there, when combined with the Projection Principle, is very difficult to be married with systems involving tonic lengthening. Scheerian Strict CV allows a much better formulation of the regularity, but there are some minor complications which demand

either modifying some principles of the model or analyzing tonic lengthening in a different way.

Especially the surface-based nature of clusters provoking lengthening should be taken into account: since Icelandic "branching onsets" sometimes contain a nucleus and sometimes not, but still behave in the same way with respect to length, it is worth considering that lengthening belongs to some post-lexical component (the existence of which the architecture of CVCV does not contain), or to phonetic implementation (note the feeding relationship of the rule). The peculiar behaviour of *p*, *t*, *k*, *s* on morpheme boundaries definitely calls for closer examination.

On the whole, a successful representational account of Icelandic vowel length should:

1. provide a *phonological* explanation of the process;
2. explain why CV words have a long vowel (licensing-based accounts have a problem here, unless parametric licensing, or a similar mechanism, is assumed);
3. explain why CVC words have a long vowel (classical syllabic approaches fail);
4. explain why only *ptks+jvr* and *bdg+r* clusters provoke lengthening and no other clusters;
5. explain the surface based-nature of the lengthening (problems for theories without more than one derivational stage); and
6. explain the peculiar behaviour of *ptks* on morpheme boundaries (problems for all theories of phonology-morphosyntax interface).

An alternative approach to the phenomenon of lengthening in Icelandic (and Faroese) was presented in Fortuna (2013ab). A modification of the Strict CV theory argued there allows us to overcome some of the difficulties mentioned in this paper, although by no means all. A still different line of research towards length phenomena was envisaged in Pöchtrager (2006), one of the founding works of GP 2.0, a new, very promising version of Government Phonology. One way or another, it is hoped that progress in linguistic theory will one day bring a solution to all problems addressed in this article.

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