In a tight spot: an analogy-bound gap in the Hungarian verbal paradigm

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Abstract

In this paper we describe a phonotactically unmotivated gap in the paradigm of C*s*-final verb stems in Hungarian. We show that the forms in the cells where the missing forms would occur must be licensed by other forms in some designated cells of the verbal paradigm. These latter forms, however, are missing in the case of C*s*-stems (for independent reasons) and thus the gap is the result of the absence of this paradigmatic licensing (crucially, the missing forms are phonotactically well-formed). Thus, the gap is 'analogically-bound'.

1. Background

Recent research on defectiveness (see the papers in Baerman, Corbett and Brown 2010, Rice and Blaho 2009; Albright 2003, Sims 2009, etc.) suggests that several types of phonology-related paradigm gaps exist and that the different types of gaps may require different formal analyses.[1]

Here we concentrate on the type we called 'analogy-bound' in Rebrus and Törkenczy (2009) and aim to show that this type of defectiveness also occurs in Hungarian alongside the phonotactically motivated gaps in the paradigms of 'defective verbs' discussed in the literature (Hetzron 1975, Rebrus 2000, Siptár and Törkenczy 2000, Lukács, Rebrus and Törkenczy 2010, Rebrus and Törkenczy 2009, Rice 2005, etc.). In the case of analogy-bound defectiveness, a form realised by a certain string of segments, expected to occupy a designated cell of a paradigm (the 'target form'), is only possible if it is licensed by another form within the paradigm that contains the same string. If no such 'supporting' form exists, the cell of the target form is empty and a gap occurs. Crucially, the missing form is not phonotactically or phonologically anomalous in any way.

Hansson (1999) discusses such an analogy-bound gap in Icelandic, where the 2sg. full and clipped imperatives, which are formed by a coronal suffix, are dependent on other forms of the verbal paradigm, typically the past stem. In the case of weak stems, the past stem is also formed by a coronal suffix (which displays the same allomorphy as the imperative suffix) – these verbs always have a 2sg. full/clipped imperative form. Strong verb stems, however, form their past stem by ablaut (and not by a coronal suffix) and a subset of strong verbs (whose root ends in /nn/ or /ll/) are defective in that they lack a 2sg. full/clipped imperative form.[2] Furthermore, there is a single /nn/-final strong verb (/fɪnn-/ 'find') that (idiosyncratically) happens to have a coronal a coronal-final form (other than the past) in its paradigm. Interestingly, this verb does not have a defective paradigm: its 2sg. full/clipped imperative forms *does* exist. This (and some other facts unrelated to gaps) leads Hansson to conclude that within the Icelandic verbal paradigm, 2sg. full/clipped imperative forms are licensed by other forms (typically the past forms) in the paradigm: (i) the 2sg. full/clipped imperative form *always* exists if there is a coronal-final stem in the paradigm of the verb and (ii) /nn/ or /ll/-final verbs *only* have 2sg. full/clipped imperative forms if

[1] Tentative typologies have been proposed, cf. Baerman and Corbett (2005), Rebrus and Törkenczy (2009).

[2] They do have (archaic) root imperatives, showing that this gap is not semantically or morphologically motivated.

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there exists a coronal-final stem in the paradigm of the verb. In what follows we will show that there is a similar state of affairs (an analogy-bound gap) in the Hungarian verbal paradigm too.[3]

In (1) below we show the behaviour of stable CC-final stems in Hungarian, i.e. stems all of whose allomorphs end in CC-clusters. They are the focus of our paper. There are three types of behaviour. Some of these stems have a complete paradigm (1a), others have defective paradigms (1b) in which the forms with consonant-initial suffixes are missing, and in the third type the gaps are extended to forms in which the suffixes are (or more precisely, can be) vowel-initial (1c). The difference between (1a) and (1b) is essentially phonotactic and depends on the stem-final CC-clusters (see Section 2 below). Roots in (1c) are interesting because, in addition to the phonotactically-motivated gaps in their paradigm, they also display gaps with suffixes for which a vowel-initial alternant is available, i.e. their paradigms have phonotactically unmotivated gaps. We argue in this paper that this extension of defectiveness is analogy-bound.

(1) *CC-final stems: complete and defective paradigms*

a. No gaps, e. g. *leng* lɛŋg 'sway'

lɛŋg-ɛnɛk '3PL'	lɛŋg-ɛnɛ 'COND'	lɛŋk-hɛt 'MODAL'
lɛŋg-ɛtɛk '2PL'	lɛŋg-ɛni 'INF'	lɛŋg-vɛ 'ADVPART'
lɛŋg-ɛs '2SG'		lɛŋg-j-ɛn 'SUBJ-3SG'

b. Phonotactically motivated gaps, e. g. *vedl-*(*ik*) vɛdl- 'slough'

vɛdl-ɛnɛk '3PL'	vɛdl-ɛnɛ 'COND'	***vɛdl-hɛt** 'MODAL'
vɛdl-ɛtɛk '2PL'	vɛdl-ɛni 'INF'	***vɛdl-vɛ** 'ADVPART'
vɛdl-ɛs '2SG'		***vɛdl-j-ɛn** 'SUBJ-3SG'

c. Gaps extended to other suffixed forms, e. g. *ismersz-*(*ik*) iʃmɛrs- 'is recognisable'

iʃmɛrs-ɛnɛk '3PL'	***iʃmɛrs-ɛnɛ** 'COND'	***iʃmɛrs-hɛt** 'MODAL'
iʃmɛrs-ɛtɛk '2PL'	***iʃmɛrs-ɛni** 'INF'	***iʃmɛrs-vɛ** 'ADVPART'
		***iʃmɛrs-s-ɛn** 'SUBJ-3SG'

2. Phonotactically-motivated defectiveness in CC-stems

Phonotactically motivated defectiveness occurs in CC-stems which end in consonant clusters that do not occur word-finally or as the first two members of a CCC cluster. Typically, these stem-final clusters have rising sonority, e.g. the final cluster in the stem *sikl-*(*ik*) 'slide' (2b). The final consonant clusters of non-defective CC-stems, e.g. the final cluster in the stem *fing-*(*ik*) 'fart' (2a), have falling sonority and do occur word-finally or as the first two members of a CCC cluster. The gaps occur in the paradigm of these defective verb stems where (i) there is no suffix[4] or (ii) they are expected to combine with invariably consonant-initial suffixes (stable C-initial suffixes (2iii)). Otherwise, the paradigm of defective CC-stems is complete: they have all the expected forms with invariably vowel-initial suffixes (stable V-initial

[3] This kind of analogical dependence of certain forms on other forms within a paradigm may manifest itself in ways other than defectiveness. Hansson (1999) also shows that irregular morphophonological behaviour carries over from Icelandic past forms to 2sg. full/clipped imperatives and Steriade (2008) discusses a phenomenon in Romanian, where some segmental alternation only occurs in the derived forms of a morpheme if it also occurs in its inflectional forms. Neither of these kinds of analogical dependence result in gaps.

[4] There are only two defective stems (*sínyl-* ʃiːɲl- 'suffer' and *kétl-* keːtl- 'doubt') that are expected to have unsuffixed forms (in 3sg. present indefinite). These forms (*ʃiːɲl 'suffer 3SG.PRES.INDEF.' and *keːtl 'doubt 3SG.PRES.INDEF') do not exist. All other defective stems (about 60 stems) are required to take a suffix in every cell of their paradigms.

suffixes (2i)) and with suffixes that have both consonant-initial and vowel-initial allomorphs (alternating C/V-initial suffixes), with which they select the vowel-initial allomorph of the suffix (2ii).

(2) *Non-defective and defective types of CC-stems*

Suffix types:	i. V-INITIAL (stable)	ii. C/V-INITIAL (alternating)	iii. C-INITIAL (stable)
CC-types:			
a. falling sonority	fiŋg-ik	fiŋg-ɑnɑk	fiŋg-vɑ
b. rising sonority	ʃikl-ik	ʃikl-ɑnɑk	**GAP** *ʃikl-vɑ

These gaps occur because (i) no stem alternant other than the CC-final one is available for these stems (e.g. a VC-final alternant, available for vowel~zero stems, see Section 3 below) , (ii) no suffix alternant other than the C-initial one is available for the relevant suffixes (e.g. a V-initial alternant, available for C/V-initial suffixes, see (2) above), and (iii) the simple concatenation of the CC-final stem and the C-initial suffix would result in a phonotactically ill-formed (unattested) cluster (see Rebrus and Törkenczy 2009). These gaps are 'irreparable': the phonotactically ill-formed clusters cannot be broken up since VC-final stem alternants and VC-initial suffix alternants are not licensed for these stems and suffixes by other forms containing these stems and affixes in the paradigms in which they occur. This is summarised in (3) below:

(3) *Irreparable gaps*

i.	no instance of VC-stem alternant:	*ʃikol-	⇒	*ʃikol-vɑ
ii.	no instance of V-initial suffix alternant:	*-ɑvɑ	⇒	*ʃikl-ɑvɑ
iii.	phonotactically ill-formed CCC:	*klv	⇒	*ʃikl-vɑ

3. Paradigmatic licensing: vowel-zero stems (-CC ~ -CVC)

In this section we introduce a new type of stem. Vowel~zero stems[5] have a CC-final and a VC-final allomorph. The former occurs if a vowel-initial suffix follows and the latter occurs before a consonant-initial suffix. The behaviour of such stems suffixed with a C/V-initial (alternating) suffix is crucial here: what happens if an alternating stem combines with an alternating suffix? There are two kinds of behaviour. Some vowel~zero stems show variation[6] with C/V-initial alternating suffixes. For these vowel~zero stems (e.g. *romol- ~ roml-* 'deteriorate'), two forms are possible: one in which the CC-final stem alternant combines with the V-initial suffix alternant, and in the other, the VC-final stem alternant combines with the C-initial suffix alternant (4b). Other vowel~zero stems (e.g. *kotor- ~ kotr-* 'scrape') show no variation and only permit the VC-final stem alternant when combined with an alternating suffix, which appears in its C-initial allomorph (4c).

(4) *Stem and suffix types*

Suffix types:	3SG.PRES	i. V-INITIAL (stable)	ii. C/V-INITIAL (alternating)	iii. C-INITIAL (stable)
Stem types:				
a. CC-STEMS (stable):	fiŋg-ik	fiŋg-ok	fiŋg-ɑnɑk	fiŋg-vɑ
b. V~Ø-STEMS (alternating):	roml-ik	roml-ok	**roml-ɑnɑk / romol-nɑk**	romol-vɑ
c. V~Ø-STEMS (alternating):	kotor	kotr-ok	kotor-nɑk / *kotr-ɑnɑk	kotor-vɑ

[5] Traditionally called 'epenthetic' stems, cf. Vago (1980), Siptár and Törkenczy (2000).

[6] The alternative forms are essentially in free variation, though some stems may show a preference for one or the other.

The difference between the two types of vowel~zero stems is systematic. Those stems show variation whose 3sg indefinite present indicative (the 'base form') is formed by the suffix *-ik* (e.g. *roml-ik* 'deteriorate-3SG.INDEF') and those lack variation whose 3sg. present indefinite has no suffix (e.g. *kotor* 'scrape 3SG.INDEF'). Rebrus (2000) points out that this is not an *ad hoc* difference, but is based on the phonological shape of (i) the stem alternant that appears as part of the base form and (ii) the forms that have a stable C-initial suffix in the paradigm. We only find variation in the verbal paradigm if the stem alternants that occur in these two types of forms are different. This only happens in the case of '*-ik*' vowel~zero stems – for all other types of stems (stable CC-stems, 'non-*ik*' vowel~zero stems, etc.) the CV structure of the stem alternants that appear in the base form and the forms with a C-initial suffix is the same. This can be interpreted by assuming that there are asymmetrical analogical relationships (output-output constraints) between designated cells in the paradigm which require that the surface form that appears in them should be (partially) the same in some respect. Which cell(s) is/are the target and which cell(s) is/are the source of analogy in this relationship of paradigmatic licensing must be stipulated and may differ in different types of stems as we shall see later (cf. Finkel and Stump 2009, Ackerman, Blevins and Malouf 2009, Rebrus and Törkenczy 2008). In the Hungarian verbal paradigm the forms with C/V-initial suffixes must be paradigmatically licensed by the form that appears in the base form on the one hand and the forms with C-initial suffixes on the other (Rebrus and Törkenczy 2009). This manifests itself in variation in the case of '*-ik*' vowel~zero stems as shown in (5) below.

(5) *Optional forms are licensed by sources with non-identical stem-allomorphs*

BASE FORM	→	**FORMS WITH C/V-INITIAL SUFFIXES**	←	FORMS WITH C-INITIAL SUFFIXES
roml-ik '3SG'		**roml-ɑnɑk / romol-nɑk** '3PL' **roml-ɑni / romol-ni** 'INF' **roml-ɑs / romol-s** '2SG' etc.		romol-hɑt 'MODAL' romol-vɑ 'ADVPART' romol-j 'SUBJ.2SG' etc.
kotor '3SG'		kotor-nɑk '3PL' kotor-ni 'INF' kotor-s '2SG' etc.		kotor-hɑt 'MODAL' kotor-vɑ 'ADVPART' kotor-j 'SUBJ.2SG' etc.

4. Paradigmatic licensing: '*s~d* stems' (-C*s* ~ -CV*d*)

In this section we introduce two types of stems we have not yet discussed. The first type of stems (stable VC-stems) only have VC-final allomorphs, which appear in all the forms in the paradigm, with V-initial, C/V-initial and C-initial suffixes. *d*-stems, shown in (6a) below (e.g. *vonakod-* 'be reluctant'), are a subtype of VC-stems (they are stable VC-final where the stem-final consonant is *d*). This type of stem contrasts with *s~d*-stems (e.g. *tolakod-* 'intrude'), which alternate: they have a VC-final allomorph which is like a *d*-stem (ends in -Vd) and a CC-final allomorph whose final consonant is *s* (ends in -C*s*).[7] The distribution of these alternants is the following: the C*s*-final allomorph appears with stable V-initial suffixes[8] and the V*d*-final alternants occurs both with stable V-initial suffixes and with stable C-initial suffixes. Again, the interesting question is what happens when an alternating *s~d* stem is to combine with an alternating C/V-initial suffix. As can be seen in (6) there is split here: (i) forms where the C/V-initial suffix is a person/number suffix, show (free) variation where the V*d*-final stem-alternant combines with the consonant-initial alternant of the suffix, and the C*s*-final stem-alternant combines with the vowel-

[7] Both *d*-stems and *s~d* stems are '*ik*'-stems, i.e. the stable V-initial suffix *-ik* appears in their base form.

[8] For the sake of simplicity, we disregard derivational affixes here.

initial alternant of the suffix; (ii) forms where the C/V-initial suffix is not a person/number suffix, there is no variation -- only the -V*d*-final alternant of the stem is possible:

(6) *Optional* s~d *stems*

Suffix types:	i. V-INITIAL (stable)	ii. C/V-INITIAL (alternating)		iii. C-INITIAL (stable)
		ii/a. PERS/NUM	ii/b. OTHER	
Stem types:				
a. *d*-STEMS (stable)	vonɑkod-ik	vonɑkod-nɑk	vonɑkod-nɑ	vonɑkod-vɑ
b. *s~d*-STEMS (alternating)	**tolɑkod-ik/ tolɑks-ik**	**tolɑkod-nɑk/ tolɑks-ɑnɑk**	tolɑkod-nɑ (*tolɑks-ɑnɑ)	tolɑkod-vɑ (*tolɑks-vɑ)

We can interpret this by saying that the paradigmatic licensing relations are different/special for *s~d* stems. Normally, in the verbal paradigm, forms with alternating C/V-initial suffixes must be paradigmatically licensed by the base form *and* the forms containing stable C-initial suffixes. For *s~d* stems, the sources of the asymmetrical analogical relationships are the same, but the target is split in two: (i) forms with a C/V-initial suffix expressing person/number must be licensed by the base form (only) and (ii) forms with C/V-initial suffix expressing some morphosyntactic dimension other than person/number must be licensed by forms with a stable C-initial suffix (only). This manifests itself in variation in the person/number forms of *s~d* stems with C/V-initial suffixes (since there is variation in the base form itself) while there is no variation (and only the V*d*-final stem alternant appears) with other C/V-initial suffixes (since only one form, the one containing the V*d*-final stem alternant, occurs with stable C-initial suffixes), cf. Rebrus and Törkenczy (2007). This is shown in (7) below:

(7) *Paradigmatic licensing relations in* s~d *stems*

BASE FORM →	FORMS WITH C/V-INITIAL SUFFIXES		← FORMS WITH C-INITIAL SUFFIXES
	PERSON/NUMBER	OTHER	
tolɑkod-ik / tolɑks-ik	**tolɑkod-nɑk / tolɑks-ɑnɑk**	tolɑkod-nɑ (*tolɑks-ɑnɑ)	tolɑkod-vɑ (*tolɑks-vɑ)
	tolɑkot-tok / tolɑks-otok	tolɑkod-ni (*tolɑks-ɑni)	tolɑkod-nɑk (*tolɑks-nɑk)
	etc.	etc.	etc.

5. Defectiveness extended: phonotactically unmotivated gaps

The paradigmatic licensing relations described above can explain a curious, phonotactically unmotivated gap in the paradigm of some Hungarian verbs. Just as there are Hungarian verb stems that are similar to *s~d* stems, but have only one stem allomorph, which is -V*d*-final (V*d*-stems whose C*s* allomorph is missing, see (6a)), there exist some stems[9] that have a C*s* allomorph only. These stems are stable CC-stems which end in clusters (e.g. *rs*) that do not occur as the first two members of a CCC cluster (in verbs). Accordingly, these stems have phonotactically motivated paradigm gaps where forms with stable C-initial suffixes are expected to occur (in exactly the same way and for the same reason as the defective stems discussed in Section 2). Curiously, however, these stems also have gaps with *some* C/V-initial alternating suffixes, specifically, with those that do not express person/number. This is shown in (8b), where an *s~d* stem (*vereked-*(*ik*) vɛrɛkɛd- 'fight') is also shown for comparison (8a):

[9] There are only two stems of this kind: *ismersz-*(*ik*) iʃmers- 'become recognised as' and (more-or-less obsolete) *hallsz-*(*ik*) hɑls- 'be heard'.

(8) *Defective and non-defective types of* s(~d)*-stems*

Suffix types:	i. V-INITIAL (stable)	ii. C/V-INITIAL (alternating) ii/a. PERS/NUM	ii/b. OTHER	iii. C-INITIAL (stable)
Stem types:				
a. *s~d*-stem	vɛrɛkɛd-ik / vɛrɛks-ik	vɛrɛkɛd-nɛk / vɛrɛks-ɛnɛk	vɛrɛkɛd-nɛ (*vɛrɛks-ɛnɛ)	vɛrɛkɛd-vɛ (*vɛrɛks-vɛ)
b. C*s*-stem	iʃmɛrs-ik	iʃmɛrs-ɛnɛk	**GAP** *iʃmɛrs-ɛnɛ	**GAP** *iʃmɛrs-vɛ

Note that (i) the new type of gap has no phonotactic motivation: C/V-initial suffixes have vowel-initial alternants and intervocalic C*s* clusters are well-formed (compare the non-existing conditional form *iʃmɛrs-ɛnɛ with the existing present indicative form iʃmɛrs-ɛnɛk in (8b)); (ii) the new type of gap (shaded in 8b) occurs exactly where *s~d* stems show no variation with C/V-initial suffixes, a state of affairs we claimed is due to the fact that the relevant forms are paradigmatically licensed by the forms with C-initial suffixes in the paradigm of *s~d* stems. If we assume that paradigmatic licensing works in the same way in *s~d* stems and C*s*-stems, we can explain the phonotactically unmotivated gaps (and the lack of variation) in C*s*-stems. These gaps occur because the forms with C/V-initial suffixes not expressing person/number are paradigmatically licensed only by those with stable C-initial suffixes and the latter do not exist in the paradigm of C*s*-stems for phonotactic reasons. No form is paradigmatically licensed in the cells in question -- therefore no such forms exist and phonotactically unmotivated defectiveness arises. Since these stems are stable CC-final, a -V*d* stem-alternant is unavailable and cannot be used to 'repair' these gaps. This is summarised in (9):

(9) *Irreparable analogically-bound gaps*

– no licensing source of the C*s*-stem:	*iʃmɛrs-C...	⇒	*iʃmɛrs-ɛnɛ
– no instance of V*d*-stem alternant:	*iʃmɛrɛd-	⇒	*iʃmɛrɛd-nɛ

6. Conclusions

We have shown that the interaction of analogical licensing relations within the paradigm and lexical constraints on stem- and suffix types can result in variation and paradigmatic gaps. We do not offer a formal analysis here (and leave this intricate problem for future research).[10] Variation occurs if (i) the relevant cell is targeted by more than one licensing source whose requirements are incompatible or (ii) the licensing source itself shows variation. An analogy bound gap occurs (i) if there exist paradigmatic licensing requirements on the target cell(s) in question, (ii) but such licensing is lacking for some reason.

The phonotactically unmotivated gap we focussed on in this paper is analogically-bound precisely in this sense. The gap itself has no phonotactic motivation, but is induced by another, phonotactically motivated gap: the absence of the licensing source (for phonotactic reasons) deprives other forms in the paradigm from paradigmatic licensing and these forms are systematically absent.

References

Ackerman, Farrell, James P. Blevins, and Robert Malouf. 2009. In: James P. Blevins and Juliette Blevins (eds.). *Analogy in Grammar: Form and Acquisition*. Oxford: Oxford University Press. 54-82.

[10] We are working on an analysis that interprets these licensing relations as asymmetrical output--output constraints that determine the shape of the allomorphs.

Albright, Adam. 2003. A Quantitative Study of Spanish Paradigm Gaps. In: G. Garding and M. Tsujimura (eds.). *WCCFL 22. Proceedings*, Somerville, MA: Cascadilla Press, 1–14.

Baerman, Matthew and Greville Corbett. 2005. Typological aspects of defectiveness. Paper read at the Fifth Mediterranean Morphology Meeting, Fréjus, France, 15-18 September 2005

Baerman, Matthew, Greville G. Corbett and Dunstan Brown (eds.). 2010. *Defective Paradigms: Missing forms and what they tell us*. Oxford: Oxford University Press.

Finkel, Raphael and Gregory Stump. 2009. Principal parts and degrees of paradigmatic transparency. In: James P. Blevins and Juliette Blevins (eds.). *Analogy in Grammar: Form and Acquisition*. Oxford: Oxford University Press. 13-53.

Hansson, Gunnar Ólafur (1999). 'When in doubt.' Intraparadigmatic dependencies and gaps in Icelandic. In: Pius N. Tamanji, Mako Hirotani, and Nancy Hall (eds.) *Proceedings of NELS* 29. Amherst, MA: GLSA. 105-19.

Hetzron, Robert (1975). Where the grammar fails. *Language* 51:4. 859-872.

Lukács, Ágnes, Péter Rebrus and Miklós Törkenczy. 2010. Defective verbal paradigms in Hungarian – description and experimental study. In: Matthew Baerman, Greville G. Corbett and Dunstan Brown (eds.) *Defective Paradigms: Missing forms and what they tell us*. Oxford: Oxford University Press. 85–102.

Rebrus, Péter. 2000. Morfofonológiai jelenségek. In Kiefer Ferenc (ed.) *Strukturális magyar nyelvtan, 3. kötet: Morfológia*. Budapest: Akadémiai Kiadó. 763-949.

Rebrus, Péter and Miklós Törkenczy. 2007. Phonotactically unconstrained paradigmatic defectiveness: The case of s~d alternation in Hungarian. Poster presented at the *Old World Conference in Phonology 4,* Rhodes, Greece 18–21 January.

Rebrus, Péter and Miklós Törkenczy. 2008. Morfofonológia és a lexikon. In: *Strukturális magyar nyelvtan IV. A lexikon*, Kiefer Ferenc (ed.) Budapest: Akadémiai Kiadó. 683–786.

Rebrus, Péter and Miklós Törkenczy. 2009. Covert and overt defectiveness in paradigms. In: *Modeling ungrammaticality in optimality theory*, Curt Rice and Sylvia Blaho (eds.) London: Equinox Publishing. 195–234.

Rice, Curt. 2005. Optimal gaps in optimal paradigms. *Catalan Journal of Linguistics* 4:155–170.

Rice, Curt and Sylvia Blaho (eds.). 2009. *Modeling Ungrammaticality in Optimality Theory*. London: Equinox Publishing.

Sims, Andrea D. 2009. Why paradigmatic gaps are, and aren't, the result of competing morphological patterns. *CLS* 43(2), 267-281.

Siptár, Péter and Miklós Törkenczy. 2000. *The Phonology of Hungarian*. Oxford: Oxford University Press.

Steriade, Donca. 2008. A pseudo-cyclic effect in Romanian morphophonology. In Asaf Bachrach and Andrew Nevins (eds.). *Inflectional Identity*, Oxford: Oxford University Press. 313-360.

Vago, Robert M. (1980). *The Sound Pattern of Hungarian*. Washington: Georgetown University Press.