

**RE-PRESENTING THE PAST:
CONTRAST AND UNIFORMITY IN
HUNGARIAN PAST TENSE SUFFIXATION**

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1. *Introduction**

This paper addresses past tense suffixation for a restricted set of verb types in Hungarian. In the first part of the paper we present the past: we provide a concise overview of Hungarian past tense formation (§2.1), then comment on the scope of previous analyses (§2.2) and focus on two classes of verbs the past tenses of which are, under previous treatments, lexically conditioned (§2.3). In section 3, we re-present the past: we show that a great deal of systematicity can in fact be found in these verbal forms. We offer an account relying on the notions of contrast and uniformity among paradigmatically related inflected forms and analyze the additional factors that can modify their effect.

First (§3.1), we make the observation that in the case of verbs ending in an alveolar stop, vowel epenthesis between verb stem and the past tense suffix can be related to the perceptual contrast between the hypothetical non-epenthetic variant of the past tense form and the corresponding present tense form. The less contrast the direct attachment of the suffix would realize, the more there is a tendency to epenthesize, i.e., to have the epenthetic variant as the attested form.

Second (§3.2), we examine verb stems ending in a vowel+*d*. Non-epenthetic suffixation in all past tense forms of these verbs realize a sufficiently robust contrast in relation to the corresponding present tense forms and therefore considerations of paradigmatic contrast alone do not motivate epenthetic variants to occur. We show, however, that the choice of epenthetic variant is strongly predicted by present tense forms again. Verbs that take the suffix *-ik* in the basic present tense form (3rd person, singular, indefinite conjugation) predominantly take the epenthetic variant in the corresponding past tense form. Verbs that take no suffix in these present tense forms have a tendency to select for the non-epenthetic variant. We argue that this constellation is predicted by the uniformity of paradigmatic forms in terms of metrical structure.

Third (§3.3), we go on to discuss how and why additional factors such as usage frequency, word length and stability of phonetic environment also have an impact on the choice of past tense forms. We provide additional evidence from *ll*-final stems which support our findings.

We analyze data with the help of two descriptive principles, the principle of contrast and the principle of uniformity. In section 4, we discuss how the approach presented here relates to current linguistic frameworks.

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2. Presenting the past

2.1 Hungarian past tense morphology

In this subsection we give a concise overview of Hungarian past tense suffixation (see e.g., Abondolo 1988 : 155–178 for a thorough description). Table 1 shows a sample past tense subparadigm of a Hungarian verb, the verb *ver* ‘hit’.¹

| definiteness ► person ▼ number ► | INDEFINITE | | DEFINITE | |
|-------------------------------------|-------------------|---------------------|-------------------|---------------------|
| | SING | PLUR | SING | PLUR |
| 1ST | ver- <u>t</u> -em | ver- <u>t</u> -ünk | ver- <u>t</u> -em | ver- <u>t</u> -ünk |
| 2ND | ver- <u>t</u> -él | ver- <u>t</u> -etek | ver- <u>t</u> -ed | ver- <u>t</u> -étek |
| 3RD | ver- <u>t</u> | ver- <u>t</u> -ek | ver- <u>t</u> -e | ver- <u>t</u> -ék |

Table 1: Past tense subparadigm of *ver* ‘hit’

The individual inflected forms contrast in terms of person, number and definiteness of object, henceforward PND features. PND features are marked by the suffixes of the verb forms. The same suffixes all appear also in other tense/mood subparadigms (i.e., present, imperative and conditional). Past tense is marked with a suffix (underlined in table 1) that comes between the stem and the PND markers. Note that both the stem and the past tense suffix are uniformly realized (as *ver* [ver] and *t* [t], respectively) throughout the entire past tense subparadigm of *ver*.

2.1.1 Direct and indirect suffixation

Table 2 exhaustively enumerates the patterns of past tense suffixation, each illustrated with sample verb forms.

Note that the past tense suffix is not always realized the same way. However, all the variants contain a voiceless alveolar stop, i.e., either long [t:] when preceded by a vowel (rows 1–3 and 5–6), or short [t] when preceded by a consonant (rows 4 and 6–7). Past tense forms do not always lend themselves to straightforward morphological segmentation: the past forms in line 6 of table 2 show that a stem-final alveolar stop can merge with the past suffix to appear as long [t:] when after a vowel ([ɔkɔt:]) or short [t] when the alveolar is after a consonant ([montuŋk]). In order to avoid complications, rather than enumerating past tense allomorphs, we will classify the suffixation patterns themselves. Past tense forms that contain a vowel between the stem and the [t:] are said to exemplify the *indirect suffixation* pattern (rows 1–3 of table 2).^{2,3} If no vowel appears between the phonological

¹ Throughout the paper we mostly use orthographic forms like *ver* to represent verbs, and only use phonetic transcription like [ver] when relevant. Note that “long” accents like in *á* [a:], but not “short” ones like in *ö* [ø], indicate vowel length in Hungarian orthography. Doubled letters like *tt* stand for geminates [t:].

² The actual vowel before [t:] is always one of -o [o], e [ɛ], or ö [ø] chosen as dictated by vowel harmony. Since this is not specific to the past tense, we can safely ignore it here.

³ We deliberately chose not to use the term ‘epenthetic’ for this pattern in order to avoid its unwanted non-descriptive implication that forms exhibiting this pattern are derived from the concatenation of morphemes by vowel insertion.

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| VARIANT | EXAMPLES | | |
|---------|------------|---|---------------------------|
| 1 | -ott [ot:] | kap <u>ott</u> ‘get.PAST.3SG.INDEF’ fut <u>ott</u> tunk ‘run.PAST.1PL.INDEF’ | } indirect suffixation |
| | 2 | -ett [ɛt:] | |
| 3 | | -ött [øt:] | |
| 4 | -t [t] | ver <u>t</u> ‘hit.PAST.3SG.INDEF’ ver <u>t</u> tünk ‘hit.PAST.1PL.INDEF’ | } direct suffixation |
| 5 | -tt [t:] | lő <u>tt</u> ‘shoot.PAST.3SG.INDEF’ lő <u>tt</u> tünk ‘shoot.PAST.1PL.INDEF’ | |
| 6 | -t [t(ɔ)] | akad <u>t</u> [ɔkɔt:] ‘exist.PAST.3SG.INDEF’ mond <u>t</u> tünk [montuŋk] ‘say.PAST.1PL.INDEF’ | |
| 7 | -t [t] | men <u>t</u> ‘go.PAST.3SG.INDEF’ vol <u>t</u> tünk ‘be.PAST.1PL.INDEF’ | |

Table 2: Patterns of past tense suffixation

material of the stem and the alveolar stop in the past form, we say that past tense is formed by *direct suffixation* (rows 4–7).

Our main concern in this paper is to explore the factors that influence the choice between direct and indirect suffixation in past tense forms. First we review the well-known intra-paradigmatic regularities of past tense forms, i.e., to what extent the type of suffixation depends on the shape of PND features.

2.1.2 Basic and non-basic forms

In table 3 we show some past tense subparadigms with directly suffixed forms set in italics.

| PND | SINGULAR | | | PLURAL | | | |
|-----|----------|-------------------|-------------------|------------------|--------------------|---------------------|-------------------|
| | 1ST | 2ND | 3RD | 1ST | 2ND | 3RD | |
| 1 | INDEF | <i>ver-t-em</i> | <i>ver-t-él</i> | <i>ver-t</i> | <i>ver-t-ünk</i> | <i>ver-t-etek</i> | <i>ver-t-ek</i> |
| | DEF | <i>ver-t-em</i> | <i>ver-t-ed</i> | <i>ver-t-e</i> | <i>ver-t-ük</i> | <i>ver-t-étek</i> | <i>ver-t-ék</i> |
| 2 | INDEF | <i>lép-t-em</i> | <i>lép-t-él</i> | <i>lép-ett</i> | <i>lép-t-ünk</i> | <i>lép-t-etek</i> | <i>lép-t-ek</i> |
| | DEF | <i>lép-t-em</i> | <i>lép-t-ed</i> | <i>lép-t-e</i> | <i>lép-t-ük</i> | <i>lép-t-étek</i> | <i>lép-t-ék</i> |
| 3 | INDEF | <i>vet-ett-em</i> | <i>vet-ett-él</i> | <i>vet-ett</i> | <i>vet-ett-ünk</i> | <i>vet-ett-etek</i> | <i>vet-ett-ek</i> |
| | DEF | <i>vet-ett-em</i> | <i>vet-ett-ed</i> | <i>vet-ett-e</i> | <i>vet-ett-ük</i> | <i>vet-ett-étek</i> | <i>vet-ett-ék</i> |

Table 3: The distribution of direct and indirect suffixation: past tense subparadigms of *ver* ‘hit’, *lép* ‘step’ and *vet* ‘sow’

Note that the distribution of the two types of suffixation patterns (direct and indirect) within a particular verb’s past tense subparadigm is by no means random. For some verbs the

type of suffixation is consistent for all past tense forms (direct for *ver* ‘hit’ (row 1) and indirect for *vet* ‘sow’ (row 3) throughout the whole past tense subparadigm), while it varies for others (e.g., *lép* ‘step’, cf. row 2). Even in this latter case (row 2), however, all forms are consistently direct except for one form in the paradigm: the 3rd person singular indefinite (shaded cell). As a consequence, when we consider suffixation patterns, we need to concentrate only on one morphological opposition, namely that of 3rd singular indefinite (3SG.INDEF) versus all other forms. The 3SG.INDEF form has unmarked features for all the morphosyntactic dimensions of person, number and definiteness, therefore we will call it the *basic* member of the past tense subparadigm. Similarly, we will refer to the present tense 3rd singular indefinite form as the *basic* present form. The basic member is meant to stand in opposition with the *non-basic* members of a tense subparadigm which comprise any subparadigm member with at least one marked value for a PND feature.⁴ As said, the non-basic past forms of a paradigm are always consistent with respect to the type of suffixation, therefore we will use only one form, the 1st person plural indefinite (glossed 1PL.INDEF, e.g., *vertüink* ‘hit.PAST.1PL.INDEF’), to illustrate the behavior of non-basic forms.

2.1.3 Stem grade and generalizations

With the help of the notions we introduced we can give a summary of table 3. With respect to the allomorphy of past tense forms, verbal paradigms can be categorized into the following three classes: (i) the basic member and the non-basic members are uniformly directly suffixed (row 1 of table 3, e.g., *ver*: *vert* ‘hit.PAST.3SG.INDEF’, *vertüink* ‘hit.PAST.1PL.INDEF’); (ii) all the non-basic members are directly suffixed, but the basic member is indirectly suffixed (row 2, e.g., *lép*: *lépett* ‘step.PAST.3SG.INDEF’, *léptüink* ‘step.PAST.1PL.INDEF’); and (iii) the basic and the non-basic forms are uniformly indirectly suffixed (row 3, e.g., *vet*: *vetett* ‘sow.PAST.3SG.INDEF’, *vetettüink* ‘sow.PAST.1PL.INDEF’). These three patterns cover all the cases and partition past tense subparadigms. It makes sense to assume that the choice of paradigms is a property of verbal lexemes. This property is called *stem grade* after Abondolo (1988 : 155–156), i.e., grades I, II, and III imply membership in the paradigms (i), (ii) and (iii) of table 3, respectively, as summarized in table 4.

| STEM GRADE | EXAMPLE STEM | BASIC | | NON-BASIC | |
|------------|-------------------|---------------|----------|-------------------|----------|
| | | FORM | TYPE | FORM | TYPE |
| I | <i>ver</i> ‘hit’ | <i>vert</i> | direct | <i>vertüink</i> | direct |
| II | <i>lép</i> ‘step’ | <i>lépett</i> | indirect | <i>léptüink</i> | direct |
| III | <i>vet</i> ‘sow’ | <i>vetett</i> | indirect | <i>vetettüink</i> | indirect |

Table 4: System of stem grades

⁴ Note that in basic past forms, the past tense suffix is word-final, while in non-basic forms it is followed by other suffixes (overt PND markers). So the basic–non-basic opposition is actually one of singly and multiply suffixed past tense forms (Siptár & Törkenczy 2000).

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The following points summarize the relevant generalizations about Hungarian past tense suffixation and define the terminology used in this article. (i) The presence and the absence of an epenthetic vowel after the stem define two patterns of past tense suffixation: indirect and direct, respectively. (ii) The 3rd person singular indefinite form of each tense sub-paradigm is called the basic member, the other members being non-basic. (iii) The type of suffixation pattern is consistent within the set of non-basic members of the past sub-paradigm of every verb. (iv) The type of suffixation in basic and non-basic forms defines a classification of the past tense paradigms: the system of stem grades. There are three stem grades. Stems of grade I form all their past tense forms with the direct suffixation pattern; stems of grade II have an indirectly suffixed basic past form and directly suffixed non-basic forms; stems of grade III have all their past tense forms of the indirect suffixation pattern.

2.2 *The scope of previous analyses*

The prediction of stem grade proves to be an interesting area of study in Hungarian morphophonology (see Abondolo 1988 : 155–178 for a review of the facts). Stem grade of a verb is for the most part predictable from the phonological shape of the verb, more specifically the last consonant(s) of the verbal stem. In other words, past tense allomorphy seems to be to a large extent phonologically conditioned. Table 5 enumerates all the existing patterns except for stems with final geminates and stems with final alveolar stops which we discuss later. The relevant generalization for these patterns is the following: if the stem ends in a coronal sonorant, its stem grade is I, if it ends in a consonant cluster other than [ŋg], its grade is III, otherwise its grade is II.

| PHONOLOGICAL PATTERN | | STEM GRADE | EXAMPLES |
|-------------------------------------|----------------------------------|------------|--|
| FINAL CONSONANT(S) | SPELLING/PRONUNCIATION | | |
| n | [n] alveolar nasal | I | <i>von</i> ‘drag’, <i>bán-ik</i> ‘treat’ |
| ny | [ɲ] palatal nasal | I | <i>hány</i> ‘vomit’ |
| j | [j] palatal glide | I | <i>váj</i> ‘hollow’, <i>toj-ik</i> ‘lay eggs’ |
| l | [l] liquid | I | <i>tol</i> ‘push’, <i>tel-ik</i> ‘fill (intr)’ |
| r | [r] liquid | I | <i>ver</i> ‘hit’, <i>szar-ik</i> ‘shit’ |
| m | [m] labial nasal | II | <i>nyom</i> ‘press’ |
| v | [v] labial fricative | II | <i>hív</i> ‘call’, <i>dív-ik</i> ‘be trendy’ |
| k | [k] voiceless velar stop | II | <i>lök</i> ‘push’, <i>lak-ik</i> ‘live’ |
| p | [p] voiceless labial stop | II | <i>kap</i> ‘get’, <i>kop-ik</i> ‘wear off’ |
| g | [g] voiced velar stop | II | <i>vág</i> ‘cut’ |
| b | [b] voiced labial stop | II | <i>dob</i> ‘throw’ |
| gy | [j] voiced palatal stop | II | <i>fogy</i> ‘decrease’, <i>vágy-ik</i> ‘wish’ |
| sz | [s] voiceless alveolar fricative | II | <i>lebasz</i> ‘tell off’, <i>úsz-ik</i> ‘swim’ |
| s | [ʃ] voiceless palatal fricative | II | <i>mos</i> ‘wash’, <i>es-ik</i> ‘fall’ |
| z | [z] voiced alveolar fricative | II | <i>néz</i> ‘look’, <i>áz-ik</i> ‘get soaked’ |
| ng | [ŋg] velar nasal–stop cluster | II | <i>rajong</i> ‘rejoice’, <i>füng-ik</i> ‘fart’ |
| other C ₁ C ₂ | when C ₂ ≠ t/d | III | <i>ajz</i> ‘excite’, <i>rajz-ik</i> ‘swarm’ |

Table 5: *Phonological conditioning of stem grade*

As suggested by the definition of direct vs. indirect suffixation, the variants of the past tense marker can be naturally related to each other: they show vowel–zero alternation on the one hand (*l^ép-ett* vs. *ver-t*), and consonant length alternation on the other (*l^ép-ett* vs. *ver-t*). Previous studies of the Hungarian past tense suggested that in indirect forms a vowel is epenthized between stem and suffix.⁵ Similar cases of (mid-vowel) epenthesis are common in other phonotactically motivated alternations in Hungarian (e.g., accusative suffixation, see Siptár & Törkenczy 2000: 214–268). Length alternation of *t* seen among the variants is also paralleled by a general allophonic alternation resulting from “automatic” phonological processes (*ibid.*: 286–293).

The phonological conditioning of the allomorphy and the phonological relatedness of the alternants make past tense suffixation a viable candidate for phonological explanation. Most generative analyses of Hungarian past tense suffixation recognized this as primary motivation for their approach.

2.2.1 Generative approach and local conditioning

Generative phonology takes the view that phonological regularities in morphologically complex forms are explained as the result of phonological rules which constrain the way their component morphemes can be combined. In particular, they assume that phonological representations of affixed forms originate in the concatenation of the underlying phonological representations of stem and affix. This abstract structure is then successively transformed by phonological rules into surface representations that are interpreted by the phonetic component.⁶

Virtually all existing analyses of Hungarian past tense formation embrace these tenets of generative grammar (Vago 1980; Abondolo 1988; Kornai 1994; Siptár & Törkenczy 2000; Rebrus 2000). They hold that variants of the past tense morpheme are derived from a common underlying representation. This underlying representation contains

⁵ The most straightforward motivation for such analyses is that they are supposed to derive epenthesis from phonotactic restrictions. In the ideal case insertion of a vowel can be characterized as a strategy to repair a syllable structure violation. The success of this explanation crucially hinges on whether and to what extent the phonotactic restrictions operative for past tense epenthesis can be induced from data independently of the past tense forms they are supposed to explain.

It has to be noted in the literature that such a straightforward phonotactic explanation is difficult since the attested clusters that occur in past tense forms are in non-trivial relationship to the clusters that occur elsewhere. For instance, verbs ending in fricatives ([ʃ], [s] and [z], spelled *s*, *sz* and *z*) such as *mos* ‘wash’ trigger epenthesis although in principle they would form legitimate clusters with the following [t] in a directly suffixed past tense form yielding **most* ‘wash.PAST.3SG.INDEF’ as evidenced by morphemes containing such a cluster (e.g., *fest* [feʃt] ‘paint (v)’). Conversely, verbs ending in palatal nasal like *hány* [haːɲ] ‘vomit’ have direct past tenses (*hányt* [haːɲt] ‘vomit.PAST.3SG.INDEF’), although the resulting consonant cluster [ɲt] is not attested within morphemes (they, however, do occur in accusative forms like *lányt* = *lánny* + *-t* ‘girl.ACC’). These are serious problems for a general phonological account (Siptár & Törkenczy 2000: 221–223).

⁶ Alternatively: the underlying representations are modified so that they accommodate to the phonological constraints restricting surface forms. This broad characterization is meant to refer to a wide range of phonological theories within the generative tradition including Lexical Phonology, Government Phonology and even earlier versions of Optimality Theory.

no vowel: the epenthetic vowel is inserted as to avoid conflict with phonotactic restrictions in the direct suffixation pattern. Since analytical machinery to handle phonologically motivated epenthesis as well as (de)gemination are supposed to be part of grammar, accounts of the past tense invoked them to describe systematicity in the data. Most relevant studies aspired to elaborate on the specifics of an analysis along these lines (cf. Kornai 1994 : 90–114, Rebrus 2000 : 840–843, Siptár & Törkenczy 2000 : 221–223, 244–256). Space limitations prevent us from going into the detailed discussion of the merits and drawbacks of any of these particular approaches. Instead, we will confine ourselves to a number of general observations which at the same time set out the theoretical goals of this paper.

2.3 *Beyond phonological conditioning*

Generative theories of grammar assume that derivations of individual inflected forms are independent of each other. In fact, they hold that the derivation of a complex form is a function of the representations of its component morphemes and the types of phonological domains the relevant type of morphological combination involves (and, trivially, the applicable phonological rules and their order). In this sense, paradigmatic relations among the inflected forms themselves are taken into account only to the extent that some information about the paradigm or the pattern of suffixation may be incorporated in the abstract lexical representations of morphemes. Properties of individual surface forms derived from the same lexeme are thought to share features only as a result of commonalities in their underlying component morphemes or by virtue of being subject to the same phonotactic constraints and phonological rules. Any systematicity in the past tense, then, is predicted to be a consequence of (i) morpheme representations and (ii) phonological rules manipulating these representations. This prediction emerges as a corollary of the basic tenets of a generative architecture.

Any generative theory of past tense suffixation, however, has to face the limits of phonological conditioning. Although the generalizations formal phonological approaches can account for have extensive descriptive coverage, there are some residual problems these accounts seemed to have to give up on. Among these we focus on two types of verbs: *t/d*-verbs and *ll*-verbs. Both types are defined by the shape of their stems: the group of *t/d*-verbs contains verbs ending in a [t] or [d] (table 6), *ll*-verbs have stem final orthographic *ll* [l(:)] (table 7).

| PHONOLOGICAL PATTERN | | EXAMPLES | | |
|----------------------|------------------------------|---------------------|--------------------|--------------------------|
| NAME | DESCRIPTION | GRADE I | GRADE II | GRADE III |
| <i>Vd</i> | vowel + <i>d</i> | <i>akad</i> ‘exist’ | <i>tud</i> ‘know’ | — |
| <i>Vt</i> | vowel + <i>t</i> | — | <i>ugat</i> ‘bark’ | <i>hat</i> ‘take effect’ |
| <i>Cd</i> | vowel + consonant + <i>d</i> | — | <i>mond</i> ‘say’ | <i>old</i> ‘solve’ |
| <i>Ct</i> | vowel + consonant + <i>t</i> | — | — | <i>tart</i> ‘hold’ |

Table 6: *t/d*-verbs: stem grade is not strictly phonologically conditioned

| STEM GRADE | EXAMPLES |
|-------------|--|
| GRADE I | <i>áll</i> ‘stand’, <i>száll</i> ‘fly’, <i>szökell</i> ‘skip’, <i>lövell</i> ‘spurt’, <i>kevesell</i> ‘consider too few’, <i>szégyell</i> ‘be ashamed’, <i>rivall</i> ‘shout’, <i>jótáll</i> ‘guarantee’, <i>rühell</i> ‘despise’, <i>sugall</i> ‘suggest’, <i>helytáll</i> ‘cope’, <i>kicsinyell</i> ‘consider too small’ |
| GRADE III | <i>rosszáll</i> ‘disapprove’, <i>hullik</i> ‘fall’, <i>hall</i> ‘hear’, <i>vall</i> ‘plead’, <i>kell</i> ‘must’, <i>ellik</i> ‘give birth’, <i>illik</i> ‘fit’, <i>züllik</i> ‘spree’, <i>pitymallik</i> ‘morning comes’ |
| VACILLATING | <i>sokall</i> ‘consider too expensive’, <i>sarkall</i> ‘encourage’, <i>torkollik</i> ‘lead into’, <i>furcsáll</i> ‘consider strange’, <i>drágáll</i> ‘consider too expensive’, <i>sárgállik</i> ‘be yellow’, <i>nyilall(ik)</i> ‘(pain) shoot’, <i>mállik</i> ‘peel off’, <i>pállik</i> ‘(skin) rot’ |

Table 7: *ll*-verbs: stem grade of verbs ending in orthographic *ll* is not strictly phonologically conditioned

As shown in tables 6 and 7, both classes are rather heterogeneous with respect to stem grade. It seems that there is not much in the local phonemic representation of the underlying stem morphemes which could be correlated with the pattern of suffixation for these classes of verbs. Likewise, the hesitations in the case of *ll*-verbs do not seem to be expected given only local phonemic factors. Given these facts, the assumption that stem grade is categorical and is conditioned solely by the stem’s underlying phonological representation is untenable in general. This tacit assumption, however, is a necessary corollary of any account in generative phonology, which leaves no option other than “exceptional status” for some stems (presumably implemented by arbitrary lexical marking). Stem grade, at least for verbs in the classes in question, has to be treated as “lexically conditioned” (see Siptár & Törkenczy 2000: 223, 256, 264–269). This is tantamount to acknowledging (in fact, claiming) that any systematicity in stem grade in these heterogeneous classes falls outside the explanatory scope of generative phonology.

3. *Re-presenting the past*

In this section we show that regularities in stem grade can in fact be found for *t/d*-verbs as well as *ll*-verbs. In order to reveal and explain these, however, we need to take a sharp turn from the generative formalist tradition and approach our empirical problems from a usage-based perspective. We will identify some factors that all play a role in predicting stem grade: contrast and uniformity between inflected forms of the paradigm, usage frequency, word length, and stability of stem alternants.

3.1 *Contrast and stem grade*

3.1.1 Function, cue and the Principle of Contrast

In order for a semantic or morphosyntactic distinction to be communicated effectively, its phonological marking should provide reliable cues to the hearer to identify either of the contrasting categories. The expressions of the opposing categories are to be sufficiently distinct so that the hearer can confidently classify forms in the relevant dimension.

In fact, – taking the utility of expressing an opposition for granted – the functional fitness of the marking of a distinction is proportional to the salience of the contrast between the forms realizing the opposing categories. We will call this the *Principle of Contrast* and use it to scale the fitness of morphological patterns in terms of their efficiency for marking a morphosyntactic distinction.

For instance, tense distinction is unlikely to be effectively communicated if the past tense form of a verb is identical to the present tense form (for identical PND features). Other contextual cues that are not immanent in a word-form (such as word order, agreement, etc.), if available, could in principle be invoked by the hearer to disambiguate meaning. In the case of Hungarian, however, no grammatical marking external to the verb is available in the utterance that could resolve a potential tense ambiguity. Therefore, formal cues to the present/past distinction are to be located within inflected verb forms.

3.1.2 Degrees of contrast

The Principle of Contrast is by and large complied with in most present–past forms: in the case of direct suffixation, such as *ver* ‘hit.PRES.3SG.INDEF’ vs. *vert* ‘hit.PAST.3SG.-INDEF’ or *verink* ‘hit.PRES.1PL.INDEF’ vs. *vertink* ‘hit.PAST.1PL.INDEF’, present–past opposition is saliently marked in phonology (the underlined part). This is even more so in the indirect pattern where an extra syllable in the past tense provides a robust contrast with the present form, e.g., *vet* ‘sow.PRES.3SG.INDEF’ vs. *vetett* ‘sow.PAST.3SG.INDEF’ or *vetink* ‘hit.PRES.1PL.INDEF’ vs. *vetettink* ‘hit.PAST.1PL.INDEF’.

Contrast, however, is not always marked so saliently. Consider basic present and basic past forms of *Vd*-verbs, e.g., the present–past pair *akad* [ɔkɔd] ‘exist.PRES.3SG.INDEF’ vs. *akadt* [ɔkɔt:] ‘exist.PAST.3SG.INDEF’ or *akadunk* [ɔkɔduŋk] ‘exist.PRES.1PL.INDEF’ vs. *akadtunk* [ɔkɔtuŋk] ‘exist.PAST.1PL.INDEF’. The contrasting forms share the property of having a final alveolar stop, but this stop differs in voicing as well as length in the two forms. Alternatively, voicing and length of the stem-final consonant is not preserved in the past form.⁷

In table 8 (overleaf) we list the various subclasses of *t/d*-verbs and juxtapose their base (basic present tense form) with their hypothetical directly suffixed basic past tense.⁸

For a *Vt*-verb, say *ugat* [ugɔt] ‘bark.PRES.3SG.INDEF’, direct suffixation would yield hypothetical **ugatt* [ugɔt:] as the basic past form. The two forms differ only in consonant length but not in voicing. This means that the expression of contrast between present and past is less saliently marked than in the case of *Vd*-verbs. For a *Cd*-verb, the hypothetical direct past contrasts with the present in voicing but not in length (cf. *mond* [mond] vs. **mond* [mont] ‘say’). Clearly, direct past tense suffixation of the ‘*Vt*-verb’ and the

⁷ There are phonological contexts (e.g., a following obstruent) that neutralize this contrast, obscuring the cues to tense distinction. Here, in assessing phonological contrasts, we restrict our attention to the word form in isolation.

⁸ In more traditional terminology our hypothetical forms are derived by attaching the suffix *-t* directly to the stem and let automatic surface processes like degemination after consonants and regressive voice assimilation apply to yield the form.

| TYPE | STEM | BASIC | | CONTRAST | |
|-----------|---------------------|---------|-------------|----------|--------|
| | | PRESENT | DIRECT PAST | VOICING | LENGTH |
| <i>Vd</i> | <i>akad</i> ‘exist’ | [ɔkɔd] | [ɔkɔt:] | ✓ | ✓ |
| <i>Vt</i> | <i>ugat</i> ‘bark’ | [ugɔt] | *[ugɔt:] | | ✓ |
| <i>Cd</i> | <i>mond</i> ‘say’ | [mond] | *[mont] | ✓ | |
| <i>Ct</i> | <i>tart</i> ‘hold’ | [tɔrt] | *[tɔrt] | | |

Table 8: Contrast between basic members in the present and past tense for *t/d*-verbs

‘*Cd*-verb’ groups results in a phonologically weaker tense contrast than in the ‘*Vd*-verb’ group. The directly suffixed basic past form of a *Ct*-verb would be extreme in so far as it would be identical to the present basic form (cf. *tart* [tɔrt] ‘hold.PRES.3SG.INDEF’ vs **tartt* [tɔrt] ‘hold.PAST.3SG.INDEF’).⁹

In sum, the contrast between present and the hypothetical directly suffixed past form turns out to be marked to different degrees in the various classes of verbs: (i) both voice and length contrast for *Vd*-verbs (ii) either only voice or only length contrast for *Cd*- and *Vt*-verbs, respectively; and (iii) neither voice nor length contrast for *Ct*-verbs (see table 8).¹⁰ Therefore we can rank the subtypes of *t/d*-verbs according to the degree of contrast that a hypothetical directly suffixed basic past tense form would realize in relation to the basic present form (degrees i, ii, iii, above): we call the resulting partial order “contrast ranking” (see table 9).

| TYPE | DEGREES OF CONTRAST | BASIC PAST FORMS | |
|-----------|-------------------------------|------------------|-----------|
| | | DIRECT | INDIRECT |
| <i>Vd</i> | (i) $Vd \leftrightarrow Vt$ | [ɔkɔt:] | [ɔdot:] |
| <i>Vt</i> | (ii) $Vt \leftrightarrow Vt$ | — | [ugɔtot:] |
| <i>Cd</i> | (ii) $Cd \leftrightarrow Ct$ | — | [mondot:] |
| <i>Ct</i> | (iii) $Ct \leftrightarrow Ct$ | — | [tɔrtot:] |

↑
fitness
threshold

Table 9: Degrees of contrast and the distribution of direct suffixation in basic past tense forms of *t/d*-verbs

⁹ Note that hypothetical forms like [mont:] or [tɔrt:] are not valid candidates since they are not only alien to the past suffixation pattern but also alien to Hungarian phonotactics in that no consonant + geminate sequences exist (cf. footnote 8).

¹⁰ In fact, contrast between hypothetical directly suffixed form and the present tense form decreases as the stem’s similarity to the generalized past tense pattern, i.e., ‘consonant + [t]’ increases.

3.1.3 Contrast and the distribution of direct suffixation in basic forms

Due to the Principle of Contrast, the contrast ranking in table 9 actually reflects the functional fitness of hypothetical directly suffixed forms. If functional pressures have an impact on the synchronic structure of language, then – taking past tense patterns as well as present tense forms for granted – we predict that the distribution of the actual directly suffixed basic forms is predicted by our contrast ranking. That is, the existence of actual directly suffixed past tense forms realizing a particular degree of contrast to their base entails the existence of forms with a higher degree of contrast. This prediction turns out to be valid. Table 9 shows the distribution of actual directly suffixed basic forms. We see that the critical cut-off line, the *fitness threshold*, for direct suffixation is between contrast degrees (i) and (ii): some *Vd*-verbs have a direct past form (e.g., *akad* ‘exist’), but all verbs in the other groups have only indirect ones.¹¹

3.1.4 Non-basic members and prevocalic environment

For non-basic members of the paradigm, the comparison of present forms with hypothetical directly suffixed past forms (see table 10) gives the same contrast ranking as the one we obtained for basic members (cf. table 9).

| TYPE | STEM | NON-BASIC | | CONTRAST | |
|-----------|---------------------|-----------|-------------|----------|--------|
| | | PRESENT | DIRECT PAST | VOICING | LENGTH |
| <i>Vd</i> | <i>akad</i> ‘exist’ | [ɔkɔduŋk] | [ɔkɔt:uŋk] | ✓ | ✓ |
| <i>Vt</i> | <i>ugat</i> ‘bark’ | [ugɔtuŋk] | [ugɔt:uŋk] | | ✓ |
| <i>Cd</i> | <i>mond</i> ‘say’ | [monduŋk] | [montuŋk] | ✓ | |
| <i>Ct</i> | <i>tart</i> ‘hold’ | [tɔrtuŋk] | *[tɔrtuŋk] | | |

Table 10: Contrast between non-basic members in the present and past tense for *t/d*-verbs

In the spirit of the Principle of Contrast, we predict that the distribution of the directly suffixed past tense forms for non-basic members is predicted by this same contrast ranking. The validity of this prediction is shown in table 11 (overleaf) which gives actual directly suffixed forms in the various subclasses of *t/d*-verbs.¹²

Note that, as opposed to the basic past form, non-basic members have vowel-initial PND markers, i.e., the *t* of the past tense always occurs in a prevocalic environment. It is well known that both length and voice distinctions for stops are enhanced by a following vowel, and therefore the contrasts realized by voice and length distinctions are perceptually more salient in prevocalic position. This means that the present–past contrast for the same lexeme is more robustly marked for non-basic members than for basic

¹¹ The issue of what determines grade for *Vd*-verbs is taken up later in section 3.2.

¹² The verbs *hatottunk* [hɔtɔt:uŋk] ‘affect.1PL.INDEF’, *toldottunk* [tɔldɔt:uŋk] ‘lengthen.1PL.INDEF’ in table 11 show that contrast only restricts the direct suffixation: the possibility of direct suffixation does not imply that indirect is disallowed. However, since indirect suffixation is less economical, indirect suffixation is expected to have additional motivation. This is taken up in sections 3.2 and 3.3.

| TYPE | DEGREES OF CONTRAST | | NON-BASIC PAST FORMS | |
|-----------|---------------------------------|--------------------------------|----------------------|--------------|
| | | | DIRECT | INDIRECT |
| <i>Vd</i> | | (i) $VdV \leftrightarrow Vt:V$ | [ɔkɔt:uŋk] | — |
| <i>Vt</i> | (ii) $VtV \leftrightarrow Vt:V$ | | [ugɔt:uŋk] | [hɔtot:uŋk] |
| <i>Cd</i> | | (ii) $CdV \leftrightarrow CtV$ | [montuŋk] | [toldot:uŋk] |
| <i>Ct</i> | (iii) $CtV \leftrightarrow CtV$ | | — | [tɔrtot:uŋk] |

fitness threshold ↓

Table 11: Degrees of contrast and the distribution of direct suffixation in non-basic past tense forms of *t/d*-verbs

members. Therefore, we expect for all verbs that the existence of a directly suffixed basic past form entails the existence of directly suffixed non-basic forms. Surely this allows for cases in which the allomorph is not the same across the past tense paradigm. Such mixed paradigms, however, are only expected in one direction: indirect basic and direct non-basic forms. This expectation is borne out as is already apparent from the number of stem grades.

The same interaction of suffixation type and paradigm slot is seen within our “exceptional class” of *t/d*-verbs. While some *Vt*- and *Cd*-verbs (e.g., *ugat*) have indirect basic past form (*ugatott* ‘bark.PAST.3SG.INDEF’) and direct non-basic forms (*ugattunk* ‘bark.PAST.1PL.INDEF’), the opposite situation never occurs. Note that this distribution of suffixation types shows that allomorph selection for *t/d* verbs, although lexically conditioned, is phonologically constrained (depending on whether a vowel follows). In order to incorporate this in a generative analysis, the lexical distinction that is responsible for allomorph selection has to be encoded as part of the phonological representation of the stem so that constraints on syllabification which are ultimately responsible for vowel epenthesis can be sensitive to it. Such a solution would create ambiguities and is probably hard to implement without recourse to novel representational devices.

Table 12 summarizes our findings about the relationship between stem grade, verb type and degree of contrast with the present tense form and stem grade.

In sum, we find that attaining a certain degree of contrast is a necessary condition of direct suffixation. The degree of contrast depends on the phonological form of the stem as well as that of the PND suffix. Considerations of contrast can only impose a lower bound on stem grade and there is further within-category variation in three out of the four phonological classes: *Vd*-verbs can be grade I or II, *Vt*- and *Cd*-verbs can be grade II or III (see table 6).

CONTRAST AND UNIFORMITY IN HUNGARIAN PAST TENSE SUFFIXATION

| TYPE | DEGREES OF CONTRAST CONTEXT —# —V | DIRECT FORM | | MINIMUM GRADE WITH SAMPLE STEMS |
|--------------|---|---------------|----------------|---|
| | | <i>Vd</i> | (i) ↗ (i) ↗ | NB [ɔkɔt:uŋk] |
| <i>Vt/Cd</i> | (ii) ↗ (ii) ↗ | B [ɔkɔt:] | | |
| | (iii) ↗ (iii) ↗ | NB [ugɔt:uŋk] | II | <i>nevet</i> ‘laugh’, <i>küld</i> ‘send’ <i>mutat</i> ‘show’, <i>hord</i> ‘carry’ <i>szület-</i> ‘be born’, <i>mond</i> ‘say’ |
| | | B *[ugɔt:] | | |
| <i>Ct</i> | | NB *[tɔrtuŋk] | III | <i>oszt</i> ‘deal’, <i>önt</i> ‘pour’ <i>márt</i> ‘dip’, <i>fest</i> ‘paint’ <i>felejt</i> ‘forget’, <i>olt</i> ‘put out’ |
| | | B *[tɔrt] | | |

Table 12: Degrees of contrast and stem grade in *t/d*-verbs

3.1.5 Contrast and phonetic detail

Though *Vt*-verbs can be grade II as well as III, it seems that there is a within-category regularity: all the verbs whose final *t* is preceded by a long vowel are grade III. This latter subgroup (*VVt*-verbs) includes monosyllabic verbs like *fűt* [fy:t] ‘heat’ or *tát* [tat:] ‘gape’, and polysyllabic ones like *bocsát* [botʃa:t] ‘excuse’ or *segít* [ʃegi:t] ‘help’ and more than a thousand other verbs ending in *-ít* [i:t] which, being a productive deadjectival derivational suffix, makes the pattern an open class (the single exception, *lát* [la:t] ‘see’, is taken up later). Other *Vt*-verbs with short V are either monosyllabic and grade III, like *hat* ‘take effect’ (taken up in section 3.3), or polysyllabic and grade II. This latter subgroup also contains thousands of verbs and is open ended due to various derivational patterns.

Recall that hypothetical directly suffixed forms of *Vt*-verbs would, in principle, contrast with their present forms in the length of the final stop. Length contrasts, however, are suppressed after a long vowel: many languages lack vowel-length contrast before geminates (in fact Hungarian also only has a distinction on morpheme-boundaries). It is fairly plausible to assume that the difference in the salience of the length contrast that *VVt*-verbs are able to support is responsible for their differential behavior, i.e., the long vowel in *segít* [ʃegi:t] ‘help’ would make length contrast weaker in the hypothetical present–past pair [ʃegi:tyŋk]–*[ʃegi:t:tyŋk] than it is in the case of a short-vowel verb like *ugat* ‘bark’, [ugɔtʉŋk]–[ugɔt:uŋk]. This difference can quite naturally partition *Vt*-verbs, positioning *VVt*-verbs on the other side of the fitness threshold in the contrast ranking. We only have to assume that the same Principle of Contrast that discriminates between phonemic patterns, is also sensitive to such subphonemic details of surface phonetic forms as non-contrastive variation in geminate length. Note that any other account based on general phonotactic constraints is bound to fail because long vowel + [t:] sequences do exist on morpheme

boundaries even in past tense forms, e.g., *kiríttunk* [kiri:t:uŋk] ‘stick out.PAST.1PL.INDEF’, cf. *kirí* [kiri:] ‘stick out.PRES.3SG.INDEF’.

To sum up, the Principle of Contrast can provide a unified account for some lower-bound generalizations on when direct suffixation for *t/d*-verbs is possible. This single factor alone predicts stem grade categorically for all *VVt*- and *Ct*-verbs.¹³

3.2 Uniformity and stem grade

3.2.1 Morphologically conditioned allomorphy?

Consider stem grade variation among *Vd*-verbs. There are two major subtypes within this class (see table 13): *Ad*-verbs have stems ending in *-ad* [ɔd] or *-ed* [ɛd] and are grade I, while *Od*-verbs have stems ending in *-od* [od], *-ed* [ɛd] or *-öd* [ød] and are all grade II.¹⁴

| <i>Ad</i> -verbs | <i>Od</i> -verbs |
|--|--|
| <i>rothad</i> ‘rot’, <i>szárad</i> ‘dry’ | <i>kezdődik</i> ‘start’, <i>fejlődik</i> ‘develop (intr.)’ |
| <i>ijed</i> ‘get frightened’, <i>ébred</i> ‘wake’ | <i>vörösödik</i> ‘blush’, <i>igazodik</i> ‘align’ |
| <i>mered</i> ‘stare’, <i>dülled</i> ‘bulge’ | <i>uralkodik</i> ‘rule’, <i>működik</i> ‘function’ |
| <i>tesped</i> ‘languish’, <i>vigad</i> ‘amuse oneself’ | <i>rázkódik</i> ‘shake’, <i>bánkódik</i> ‘grieve’ |
| <i>ráförmed</i> ‘snarl at’, <i>eleped</i> ‘long for’ | <i>vonakodik</i> ‘hesitate’, <i>veszekedik</i> ‘quarrel’ |

Table 13: Major types of *Vd*-verbs

In traditional descriptions, it has been assumed that these verbs are morphologically complex¹⁵ and it is the derivational morpheme attached to the base that is responsible for determining their stem grade. There are several problems with this proposal: first, most of the verbs do not easily lend themselves to morphological decomposition: many items have no obvious stem (e.g., *tesped* ‘languish’, but no **tesp-*, *viaskod-ik* ‘struggle’, but no **vias(k)-*). Second, the patterns range from entirely idiosyncratic to totally transparent: even stems that can be decomposed into formatives tend to have non-compositional meanings. Third, relating stem grade difference to derivational morphology does not account for the specific choice of past tense pattern: under that approach the opposite situation, namely that *Ad*-verbs are grade II and *Od*-verbs are grade I, would be equally conceivable. As we will show, natural causes of this specific choice of past tense suffixation can in fact be revealed, hence providing a novel explanation to the puzzle of *Vd*-verbs.

¹³ Note that there are other morphophonological patterns in the language which seem to be sensitive to the *VVCC* sequences (also if the two *C*’s are not necessarily identical) in that an epenthetic vowel breaks up the two consonants if the directly suffixed variant would result in a *VVCC* sequence, cf. *segít* + *-nek* = *segítenek* ‘help.PRES.3PL.INDEF’ vs. *nevet* + *-nek* = *nevetnek* ‘laugh.PRES.3PL.INDEF’.

¹⁴ In fact, there are three other classes of *Vd*-verbs (each with fewer than 20 verbs). One group patterns with *Ad*-verbs (e.g., *fogad* ‘receive’) but are grade II, the other contains verbs ending in *-kod/ked/köd* and are grade II (e.g., *nyomkod* ‘push’). Due to space limitations, we do not discuss these in this paper. The third group contains monosyllabic *Vd*-verbs and is discussed below.

¹⁵ In fact, the two groups can be described morphologically. Both grade groups form an open class due to productive derivational patterns.

3.2.2 Principle of Uniformity

Several authors have argued that morphology can be reworked in terms of paradigmatic relations among surface forms. Recurrence of form and meaning throughout the paradigm can be expressed with uniformity constraints between morphologically complex items, obviating the need for underlying representations and abstract units like morphemes (among others Bybee 1985, 2001; Burzio 1996, 2002; Myers 1999; Kenstowicz 2001).

There are very important consequences of this approach which all counter generative practice: (i) comparisons are made between surface forms of whole words (as opposed to abstract underlying representations or morphemes); (ii) more than one paradigmatic relation can play a role in determining the phonological shape of a form (Burzio 1998; Steriade 1997); (iii) intra-paradigmatic relations are not equally important: their strength is a function of the degree of their semantic or morphosyntactic relatedness (Bybee 1985); and (iv) paradigmatic relations trigger phonological uniformity between inflected forms; the closer the two forms in meaning (morphosyntax), the more uniform they are (Bybee *op.cit.*).

In sum, surface characteristics of more than one paradigmatically related word can play a role in determining the phonological shape of an inflected form by imposing uniformity constraints to an extent that is proportional to their relatedness. Roughly speaking, forms in a paradigm that are more similar in morphosyntactic content tend to be more uniform in phonological form. We will call this the *Principle of Uniformity*.

The consistent choice of past suffixation pattern among non-basic past forms can be viewed as an effect of the Principle of Uniformity. In grade I and grade III, in fact, the pattern of suffixation (direct and indirect, respectively) is identical across PND features, yielding a uniform past tense subparadigm. Uniformity is realized in terms of a common shared subsequence: the basic past form (e.g., *vert* 'hit.PAST.3SG.INDEF' vs. *vertüink* 'hit.PAST.1PL.INDEF' and *vetett* 'sow.PAST.3SG.INDEF' vs. *vetettüink* 'sow.PAST.1PL.INDEF'). In grade II, on the other hand, intra-paradigmatic uniformity is realized in terms of *metrical consistency* (equal number of syllables): the linking vowel in the indirect suffix of the basic past form supplies the extra syllable that is present in non-basic forms due to the overt PND markers (e.g., *lépett* 'step.PAST.3SG.INDEF', *léptüink* 'step.PAST.1PL.INDEF'). It seems, then, that some form of uniformity is achieved in all three grades *within* the past tense subparadigm. Taken this for granted, we investigate paradigmatic relations *across* the tense categories, and see if they have an impact on past tense forms.

3.2.3 Uniformity and stem grade: the case of *Vd*-verbs

The basic present and basic past form of a lexeme share all PND features (as well as the lexical content the lexeme expresses) and we expect this paradigmatic relation to be reflected in phonological uniformity between them. In other words, phonological properties of basic present forms might have an impact on past tense allomorphy by virtue of uniformity. This provides the key to resolve the puzzle of *Vd*-verbs.

As table 13 shows, *Od*-verbs are predominantly *ik*-verbs, i.e., their basic present is formed by attaching the suffix *-ik* to the stem (e.g., *rakodik* 'load.PRES.3SG.INDEF', stem

is *rakod-*), while *Ad*-verbs are not, i.e., their present basic form is identical to their stem (e.g., *akad* ‘EXIST.PRES.3SG.INDEF’). Therefore, basic past tense forms of *Ad*-verbs will be metrically consistent with (i.e., having the same number of syllables as) the basic present form if and only if they are formed by direct suffixation, i.e., *akad* (basic present) and *akadt* [ɔkɔt:] (direct basic past) both have two syllables, while **akadott* [ɔkɔdot:] (hypothetical indirect basic past) has three. For *Od*-verbs, the reverse is true: due to the vowel in the past suffix, the indirectly suffixed basic past form is metrically consistent with the basic present, i.e., *rakodik* (basic present) vs. *rakodott* [rɔkɔdot:] (basic past), whereas the direct one is not, cf. **rakodt* [rɔkɔt:] (hypothetical basic past). In the spirit of the Principle of Uniformity, then, the direct basic past form has actually higher functional fitness for *Ad*-verbs, whereas the indirect one is fitter for *Od*-verbs. We predict that, all other things being equal, the actual distribution of suffixation pattern reflects this functional fitness. This prediction is borne out and explains the case of *Vd*-verbs.

In sum, the factor conditioning the stem grade of *Vd*-verbs, *ik*-verb status, turns out to be morphological in nature indeed. The parallelism between *ik*-verb status and indirect suffixation is a consequence of a natural phonological parallelism between basic present forms of a shape ‘stem’ + *-ik* and indirectly suffixed forms of the shape ‘stem’ + *Vtt*. This phonological parallelism between surface inflected forms is enforced by the functional principle of paradigmatic uniformity. In fact, the tendency of preferring indirect suffixation for *ik*-verbs shows up at various other points in Hungarian past tense suffixation lending further support to our analysis. We will review these next.¹⁶

3.2.4 Indirect suffixation and *ik*-verbs

Exceptional verbs of the so called *tesz-vesz* type, like *vesz* [ves] ‘take’ form their past tenses by suffixing a vowel-final alternative stem (e.g., *ve-*), yielding forms like *vett* [vɛt:] ‘take.PAST.3SG.INDEF’. The two exceptions, *eszik* [ɛsik] ‘eat’ and *iszik* [isik] ‘drink’, form their basic past by suffixing a *-v*-final alternative stem, yielding *evett* [ɛvɛt:] and *ivott* [ivɔt:], respectively (their non-basic past forms pattern with *vesz*, cf. *vettünk* and *ettünk*). Both types of alternative bases (vowel-final and *v*-final) occur in other inflected forms of every verb in the class (also *e-* for *eszik* as in *e-het* ‘he can eat’ and also *vev-* for *vesz* as in *vev-ő* ‘buyer’). Due to the availability of alternative stems, verbs could have two basic past forms, however, only one exists: the one that retains metrical consistency across tenses throughout the whole paradigm of each verb (*vesz–vett/*vevett*, *eszik–evett/*ett*).

Verbs with stems ending in *-ud/üd* such as *hazudik* ‘lie’ provide another example. The interesting case is only the basic form. While it could in principle be formed by direct suffixation (e.g., **hazudt* [hɔzɔt:]), the preferred form is the one metrically consistent with the present basic form (e.g., *hazudik–hazudott/*hazudt*).

Consistency is also observed with homophonous verb stems such as *ér-* ‘touch-/ripen’ or *tör-* ‘break (tr.)/break (intr.)’. One of the meanings in each verb is in fact an

¹⁶ We emphasize that uniformity is just one of the competing forces that have an impact on the shape of past tenses. Compliance with uniformity cannot incur phonotactic violations (e.g. *kap–kapott/*kapt* ‘get’). Where phonotactics is less restrictive, however, paradigmatic uniformity can have its impact.

ik-verb, i.e., *ér* ‘touch’, *érik* ‘ripen’ and *tör* ‘break (tr.)’, *török* ‘break (intr.)’. Although all the other paradigmatic forms are homophonous, the two possible basic past tenses have split lexically: the availability of two alternative past forms makes it possible for the two meanings to formally contrast. On the one hand, such a split serves the general functionality of *homonymy avoidance* conforming to the Principle of Contrast. On the other hand, the form that maintains uniformity with the present tense is always the preferred or the only alternative as evidenced by present–past pairs like *ér–ért/*érett* ‘touch’, *tör–tört/*törött* ‘break (tr.)’ and *érik–érett/*ért* ‘ripen’, *török–törött/tört* ‘break (intr.)’.

Somewhat similarly to this pattern, some verbs show occasional upshift of grade: instead of direct suffixation, the basic or all members of the past subparadigm are formed with indirect suffixation (upshift to grade II and III, respectively). Note, most verbs showing upshift of stem grade are *ik*-verbs, exactly where the indirect pattern is more functional in terms of its uniformity with the basic present form, e.g., *tojik–tojt/*tojott* ‘lay egg’, *múlik–múlt/*múltott* ‘pass’.

3.2.5 Uniformity and epenthetic stems

Uniformity between present and past can also predict past tense forms of another type of exceptional class of verbs, called ‘epenthetic stems’ (e.g., *kotor* ‘scoop’), that show stem-internal vowel–zero alternation. These verbs have two stem-variants: the zero alternant ends in a consonant cluster (*kotr-*) and is used before vowels in inflected forms (e.g., *kotrom* ‘scoop.PRES.1SG.DEF’), while the other has a vowel breaking up the two consonants (*kotor*) and is used as the base in other inflected forms (e.g., *kotorjam* ‘scoop.SUBJ.1SG.DEF’) as well as in isolation. Due to its two suffixation types, past tense formation can satisfy the prerequisites for either environment. Therefore, some of these verbs could, in principle, have alternative past tense forms, e.g., hypothetical **kotrott-* and *kotort-* for the stem *kot(o)r* (Siptár & Törkenczy 2000: 250–251). Note that both hypothetical past tense forms have the same number of syllables which happen to be the same as that of the present. This means that metrical consistency is not at stake when making a choice. We find, however, that preferred basic past tense forms of epenthetic verbs are uniform with the basic present form in some other sense: they have the same stem alternant. If the verb is an *-ik* verb, the zero alternant is used, e.g., basic present–past pairs *fürdik–fördött/*fürödt* ‘bathe’, *ugrik–ugrott/*ugort* ‘jump’, if the verb is not an *ik*-verb, always the non-zero alternant is picked, e.g., *kotor–kotort/*kotrott*. In both cases, uniformity of stem alternant tends to be maintained. Hesitations occur exactly where there are also hesitations in the present tense forms in question: the relevant verbs are optional *-ik* verbs (e.g., *fuldok(o)l-* ‘drown’, cf. basic present–past pair *fuldokol/fuldoklik–fuldokolt/fuldoklott*).

Prevocalic environments boost consonantal contrasts, whereas preconsonantal position tends to suppress phonetic properties that cue consonant distinctions and often trigger neutralization. Therefore, vowel-initial suffixation serves the purpose of keeping stem-final consonants reasonably stable, and thereby the paradigm more uniform. Along these lines we can reassess the effect of uniformity as regards *ik*-verbs and their basic past tense. Given that both the *-ik* suffix and the indirect past form provides prevocalic environment,

the quality of the stem-final consonant is kept constant in basic forms. This interpretation would predict that upshift of grade for *ik*-verbs is less motivated if the different prosodic environments do not alter the phonetic properties of the stem-final consonants. This prediction turns out to be valid. Verbs with stems ending in *-n* never have indirect forms even if they are *ik*-verbs (e.g., *bán-ik-bánt/*bánott* ‘treat’). Since *n* is realized the same in intervocalic position (*bánik* [ba:nik]) as before the alveolar stop of direct past tense patterns (*bánt* [ba:nt]), the use of indirect suffixation is not motivated. Upshift alternatives for verbs ending in *l* or *r* do exist and it is precisely these consonants which are prone to vocalization in coda position.

In sum, paradigm uniformity is at work at various levels of formal similarity. For paradigms with lexically distinct allomorphs in the present and the past (e.g., the case of *vesz-vett/*vevett* ‘take’ vs. *eszik-evett/*ett* ‘eat’), uniformity is achieved (only) in terms of metrical structure. For paradigms with phonologically conditioned stem allomorphy, uniformity holds in terms of identical stem alternants in paradigmatically related forms (the case of *ugrik-ugrott/*ugort* vs. *kotor-kotort/*kotrott*). For paradigms with phonologically stable stems, uniformity boils down to the maintenance of (the phonetic properties of) the stem final consonant or consonant cluster (this issue is taken up in the next subsection). Table 14 summarizes the main findings of this subsection.

| TYPE | STEM | BASIC FORM | | DESCRIPTION |
|-------------------------|------------------------|------------|------------|---|
| | | PRESENT | PAST | |
| Ad/Od-verbs | <i>akad</i> ‘exist’ | [ɔkɔd] | [ɔkɔt:] | direct past only if metrically consistent with the present |
| | <i>rakod-</i> ‘load’ | [rɔkɔdik] | [rɔkɔdot:] | |
| <i>tesz-vesz-</i> verbs | <i>ve(v)-</i> ‘take’ | [ves] | [vet:] | stem allomorph picked to yield metrically consistent basic forms |
| | <i>e(v)-</i> ‘eat’ | [esik] | [ɛvet:] | |
| lexical split | <i>ér</i> ‘touch’ | [e:r] | [e:rt] | split past tenses consistent with basic present of the same sense |
| | <i>ér-</i> ‘ripen’ | [e:rik] | [e:ret:] | |
| upshift | <i>fáj</i> ‘hurt’ | [fa:j] | *[fa:ɔt:] | upshifted form acceptable only if metrically consistent |
| | <i>toj-</i> ‘touch’ | [tojik] | %[tojot:] | |
| epenthetic stems | <i>kot(o)r</i> ‘scoop’ | [kotor] | [kotort] | past picked so as to keep stem allomorph uniform |
| | <i>ug(o)r-</i> ‘jump’ | [ugrik] | [ugrot:] | |

Table 14: Uniformity and stem grade: *ik*-verbs and indirect suffixation

3.3 Additional determinants of stem grade

In the following, we will present several further factors which play a role in determining the stem grade. Their impact can be observed in the way they interact with paradigm uniformity.

3.3.1 Frequency

Uniformity between the forms of a paradigm is functional in that it helps relate inflected forms, which in turn facilitates the processing of individual inflected forms. This consideration has special importance if the lexeme is relatively rare. It is well known

that familiarity with lexical items can facilitate retrieval, therefore other factors such as paradigm uniformity become less important.¹⁷ In other words, the more frequent a lexeme, the greater the variance tolerated within its paradigm. In our special case, this means that, other things being equal, uniformity between present and past forms is observed more consistently for infrequent verbs than for frequent ones. The validity of this prediction can be illustrated with a number of examples. Among monosyllabic *VVt*-verbs, *lát* [la:t] ‘see’ is the only one that is grade II, allowing direct suffixation of non-basic past forms, while the other verbs such as rhyming *tát* [ta:t] ‘gape’ are grade III. ‘Exceptional’ *lát* which is non-uniform with respect to consonant length across tenses ([la:tuŋk]–[la:t:uŋk]) is by far the most frequent among *VVt*-verbs.

We can explain the upshift pattern of *Cd*-verbs in the same vein. Here, the expression of contrast is salient enough to permit grade II verbs such as very frequent *kezd* [kɛzd] ‘begin’, but we also find grade III verbs like the phonologically congruent but rarer *küzd* [kyzd] ‘strive’. Indirect suffixation in the latter case prevents the final consonant cluster from neutralization and keeps consonant qualities stable throughout the paradigm, but no such uniformity seems to be motivated for the frequent verb. In general, the other grade II stems of this class (*mond* ‘say’, *küld* ‘send’, *hord* ‘wear/carry’) are very frequent, whereas hesitating stems (e.g., *száguld* ‘hurtle along’) and grade III verbs (*old* ‘solve’)¹⁸ have low usage frequency.

In sum, compliance with uniformity is sensitive to frequency: infrequent words tend to preserve their base consonant more consistently.

3.3.2 Word length

Uniformity of the paradigm implies fitness in terms of enhanced processability. If a word is longer, relative importance of the last consonant to cue retrieval is smaller. Therefore, we predict that, other things being equal, uniformity is more consistently realized with shorter words. This prediction is borne out and can account for various previously unexplained generalizations in past tense formation.

All monosyllabic *Vd*-verbs are grade II (e.g., *ad* ‘give’), whereas polysyllabic non-*ik* *Vd*-verbs can be grade I (e.g., verbs in the ‘Ad’ group like *akad* ‘get stuck’). Similarly, monosyllabic *Vt*-verbs with short V are grade III (e.g., *hat* ‘take effect’), in sharp contrast with their polysyllabic counterparts which are all grade II (e.g., *ugat* ‘bark’).

All four monosyllabic non-*ik* *ll*-verbs that have short vowel (*hall* ‘hear’, *kell* ‘must’, *vall* ‘plead’, *hull* ‘fall’) are grade III, while most polysyllabic ones (*sugall* ‘suggest’, *so-kall* ‘consider expensive’, etc.) allow all directly suffixed alternants (i.e., can be grade I).¹⁹

¹⁷ It is exactly for this same reason why universally, lexical items with high usage frequency are able to maintain idiosyncratic features and are often morphologically irregular, exceptional, suppletive while infrequent ones tend to be analogically leveled to conform to the regular pattern (Bybee 1985).

¹⁸ Grade III forms of the stems *old* ‘solve’, *told* ‘lengthen’, *áld* ‘bless’, *mosd-ik* ‘wash (refl)’ are also motivated to avoid homonymy with inflected forms of *olt* ‘put out’, *tol* ‘push’, *áll* ‘stand’ and *mos* ‘wash (tr.)’, respectively (see also Abondolo 1988: 165).

¹⁹ This is consistent with the degree to which /l:/ is shortened in base forms. We note that length of /l:/ in *hall* ‘hear’ and *kell* ‘must’ prevails also due to homonymy avoidance given the existence of the verbs *hal* ‘die’ and *kel* ‘get up’.

In sum, compliance with uniformity is sensitive to word length: shorter verbs tend to preserve their base consonant more consistently.²⁰

3.3.3 Stability and variation in phonetic detail

The importance of phonetic detail was already emphasized in section 3.1 in connection with the VVt-verbs (explaining grade difference between verbs like *ugat*, grade II and *bocsát* ‘excuse’, grade III). Now we will examine verbs ending in orthographic *ll* in detail and show how the intricate interaction of phonetic tendencies and their stability have an impact on the choice of stem grade.

Hungarian [l] is an unstable sound in general in that it can be dropped in coda position in certain sociolects. Also, orthographic *ll* is quite often shorter than a true geminate and the degree of reduction is lexically conditioned. The reduction of geminate [l:] is a natural phonetic process since, due to extensive coarticulation with surrounding sounds, length distinction for [l] is not easy to perceive. This is especially true after long vowels where [l:] is consistently shorter. Reduction of [l:] is also dependent on the right-side context: it undergoes extensive shortening (usually called degemination) before consonants while tends to retain length before a vowel. These phonetic considerations turn out to be important for past tenses.

Table 15 displays verbs with stems ending in *ll*.

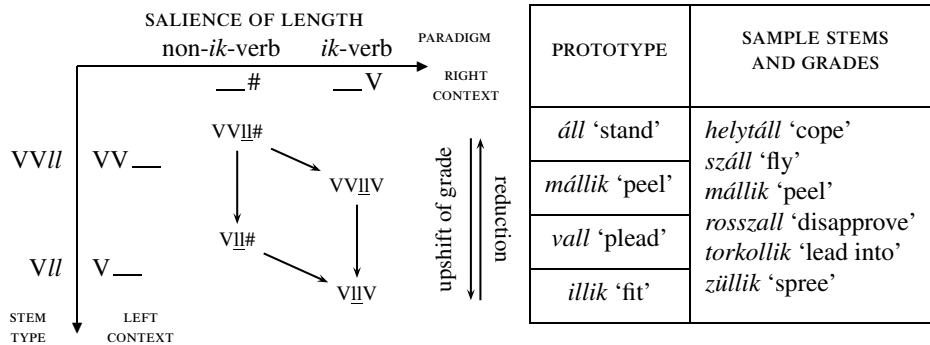


Table 15: ll-verbs: phonetic environment of ll and stem grade

²⁰ Note that the tendency of length-dependent base uniformity is found in other morphological patterns in Hungarian. When the suffix *-gat/get* is attached to monosyllabic verbs, a vowel appears after the stem in forms like *veregget* ‘hit repeatedly’ = *ver* ‘hit’ + *GAT*. No vowel appears if the stem has already two syllables (e.g., *keverget*, *kever* ‘mix’ + *GAT* ‘mix repeatedly’). Monosyllabic verbal stems form their causative by attaching an *-at/et* suffix (e.g., *veret* ‘make sy hit’ = *ver* ‘hit’ + *AT*), while polysyllabic ones take the suffix *-tat/tet* (e.g., *kevertet* ‘make sy mix’ = *kever* ‘mix’ + *TAT*). In both cases, the final consonants of monosyllabic stems will be found in a prevocalic environment in the resulting derived forms, whereas those of polysyllabic verbs will be in preconsonantal position. As pointed out earlier, the former context preserves all consonantal distinctions.

Consider the left context first. If we compare stems ending in a short vowel + [l:] (*Vll*-verbs) and ones ending in *-áll* [a:l(ɾ)] or *-éll* [e:l(ɾ)] (*VVll*-verbs), we find that those in the latter group have systematically lower grades. The verb *áll* [a:l(ɾ)] ‘stand’ is grade I (with occasional upshift till grade III), while *vall* [vɔ:lɾ] ‘plead’ is grade III. In a grade III paradigm, indirect suffixation provides the uniform prevocalic environment that enhances maintenance of perceived length. The fitness of such a paradigm is greater for verbs with more stable length in other paradigmatic forms, i.e., greater for *Vll*-verbs than for *VVll*-verbs.

The context on the right is also important. The perception of the length of [l:] is relatively easier if it is followed by a vowel than in coda position. Prevocalic environment in the *ik*-form stabilizes the length of [l:] which prevails in past tense forms. This is enabled by indirect suffixation, so we predict grade III to be more functionally fit to *ik*-verbs of the ‘*ll*-verb’ class. Indeed, all the *ik*-verbs seem to prefer grade III (*mállik* ‘peel (intr.)’, *feketéllik* ‘be black’, etc.), while their non-*ik* counterparts (*áll*, *szégyell* ‘be ashamed’, etc.) prefer grade I direct suffixation.

The effect of the left environment (vowel length) shows up even within the class of *ik*-verbs. *ik*-verbs in the ‘*VVll*-verb’ group (*mállik*, *feketéllik*, etc.) tend to vacillate, but *ik*-verbs in the ‘*Vll*-verb’ group (*züllik* ‘spree’, *ellik* ‘give birth to’, etc.) are stably grade III. Even given the stable prevocalic environment, [l:] is more salient after a short vowel than after [a:] and [e:] and therefore its length is more consistently retained. This seems to have an effect on past tense allomorphy in the sense that stable length favors uniform indirect suffixation.

In sum, prevalence of a phonological feature of a stem depends on the stability of the environments that enhance its perceptibility. Uniformity with respect to a phonological property is more compelling in cases when it is better perceived and realized more consistently in other paradigmatic forms.

4. Conclusion

In the first part of the article we argued that any regularity in the stem grade of *t/d*-verbs and *ll*-verbs falls outside the explanatory scope of generative approaches. Generative frameworks of phonology assume that morphophonological alternations are conditioned by abstract phonological representations of underlying morphemes and the inflected forms in a paradigm are derived from these with the help of general phonological rules. Since the verbs in both classes examined in our paper are homogeneous under these abstract conditions, but heterogeneous with respect to past tense inflection, a generative analysis has to treat stem grade as arbitrary and register it as a lexical feature.

In the second part of the article we revealed a great deal of systematicity in the stem grade within the two classes. We showed that direct reference to paradigmatic relations and an examination of phonological contrast and uniformity between paradigmatically related surface forms can help formulate regularities that go well beyond those predicted by shared abstract morphemes and general phonological rules. We argued that functional considerations like the Principle of Contrast and the Principle of Uniformity provide a

natural explanation for some regularities in the distribution of past tense suffixation patterns. It was shown that compliance with these functional principles is sensitive to usage frequency and word length in a way that is functionally motivated. We showed that, crucially, the uniformity of form pertains to a level of granularity that non-redundant abstract phonological representations are unable to represent. The factors we identified were all shown to be independently relevant in determining past tense suffixation in the sense that the actual distribution of suffixation patterns among verb types can be predicted from their natural degree of functional fitness in every dimension.

Our findings reveal that the generative methodology might be too restrictive. Instead, focus on paradigmatic relations and the functionally motivated principles of contrast and uniformity prove successful in accounting for some generalizations in Hungarian past tense allomorphy. Since these principles are ultimately grounded in functional biases of language use, they call for a usage-based, functionalist approach (Langacker 1987; Bybee 2001). Unfortunately, this paradigm, to our knowledge, lacks a canonized formal apparatus that would allow us to express our generalizations.

Enriching generative theories of synchronic grammar with functionally motivated constraints (such as recent Optimality Theory, see e.g., Hayes 1999) is a possible way to integrate the insights of functionalist accounts into the generative tradition. In fact, our Principle of Contrast and Principle of Uniformity are paralleled in recent work within Optimality Theory (Kenstowicz 2001). Functional Optimality Theory also seems useful to describe linguistic subsystems in terms of their functional fitness along various dimensions and therefore would provide a plausible framework to formalize our own findings. Nevertheless, we remain agnostic as to the possible formalization of our results, because it is difficult to imagine that a functionalist explanation can eventually get round diachrony since it is in the dynamism of language use and language evolution that functional pressures really operate.

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