RESEARCH REPORT

Analogy in inflectional change: Modification or whole-word replacement?

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With regard to change in inflection, historical linguistics fundamentally relies on the concept of morphological analogy, which is held responsible for nearly all change not attributable to phonological factors. Despite its central importance, how morphological analogy operates has never been established. Two different opinions are held in contemporary linguistics. The first position assumes that morphological analogy modifies inherited inflectional forms, making them more similar to other inflectional forms. According to the second position, in the course of morphological analogy, inherited inflectional forms are not merely modified but rather are replaced by forms created entirely anew on a model pattern already present in the grammar. This research report tries to establish what kind of data may constitute the evidence sufficient to differentiate between the two views. It argues that all relevant data point to whole-word replacement as the only mechanism of analogical change in inflection.

Keywords: morphology, inflection, inflectional change, morphological analogy, paradigmatic leveling

1. Introduction. Inflectional patterns can change in different ways and in the course of different processes. The most common processes leading to change in inflection are the following, illustrated in 1: change in the phonology of the relevant language, univerbation, and morphological analogy. In 1a, the merger of unstressed short vowels *i* and *u* in all closed syllables of eleventh-century German destroyed the inherited opposition between several case forms in the inflection of determinate adjectives (Braune & Reiffenstein 2004:62–64, 207–8, 226–27). In 1b, the univerbation of infinitives with inflectional forms of the verb ‘to take’ established a new inflectional category of inceptive future tense in Ukrainian (Danylenko 2010). In 1c, the alternation *g ~ z* in the root of several verbs was abandoned in fourteenth-century Russian by generalizing the *g* of the indicative mood 1sg (Kiparsky 1967:192).

(1) a. 9th c. German 11th c. German  
<table>
<thead>
<tr>
<th>DAT.SG.M</th>
<th>ACC.SG.M</th>
</tr>
</thead>
<tbody>
<tr>
<td>mārin</td>
<td>mārun</td>
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b. 15th c. Ukrainian 20th c. South-East Ukrainian  
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<tr>
<th>INF</th>
<th>1SG.PRS</th>
<th>1SG.FUT</th>
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<tbody>
<tr>
<td>sējati</td>
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<td>sijatymu</td>
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c. 13th c. Russian 14th c. Russian  
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<tr>
<th>1SG.PRS.IND</th>
<th>2SG.IMP</th>
<th>1SG.PRS.IND</th>
<th>2SG.IMP</th>
</tr>
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<tbody>
<tr>
<td>steregu</td>
<td>sterezi</td>
<td>steregu</td>
<td>steregi</td>
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Morphological analogy is a major factor in inflectional change, being responsible for a large part of innovations not attributable to phonological developments or univerbation. Despite the central importance of this concept, how morphological analogy actually works has never been established. Two different opinions are held, often only implicitly, in contemporary historical linguistics. The first position assumes that morphological analogy modifies inherited forms, making them more similar to other inflectional forms. In this view, the inherited Russian 2SG.IMP *sterezi* in 1c has been modified by substituting a different allomorph of the root (taken from the 1SG.PRS *steregu* etc.).
According to the second theoretical position, in the course of morphological analogy, inherited inflectional forms are not merely modified but rather are replaced by forms created entirely anew on a model already present in the grammar. In this view, the inherited Russian 2SG.IMP sterezí was not modified in its root but rather replaced as a whole with a newly created 2SG.IMP steregi, which emerged along with 1SG.PRS steregu and so forth, following the model of verbs not having the g~z alternation.

This research report aims to establish, in a first approximation, which of these two approaches to morphological analogy is more likely correct. The central point is the question of what kind of data may help reach this goal. This is systematically investigated in §§3 and 4, which constitute the core of the paper. In §3, a new empirical argument supporting the second theoretical view on morphological analogy (i.e. analogy as replacement of inflectional forms as wholes) is introduced. Arguments against this position that have been put forward in the scholarly literature are discussed in §4, and the implications of the findings for linguistic reconstruction, for our synchronic understanding of inflection, and for the relation between inflectional and derivational morphology is discussed in §5. Section 6 briefly introduces two potential restrictions on the validity of conclusions made in the previous sections. Finally, the results reached here are summarized (§7).

Before the theoretical discussion can begin, however, it seems necessary to take a closer look at the two approaches to morphological analogy and how they work in different situations (§2). This can be achieved by using two particularly well-documented but slightly more complex (than 1c above) instances of inflectional change, one taken from Latvian, a member of the Baltic branch of Indo-European (§2.1), the other from German, which belongs to the Germanic branch of the same language family (§2.2). The first case is an instance of so-called PARADIGMATIC LEVELING (also simply ‘leveling’ or ‘allomorph spreading’). The second belongs to the domain of changes in sets of inflectional endings.

2.1. Paradigmatic leveling: present-tense inflection of duot in dialects of Latvian. In archaic Central Latvian dialects of Vidzeme (historical Livonia), the root of the verb duot ‘to give’ exhibits the following alternation in its infinitive and its present-tense inflection.

(2) infinitive    1SG.PRS    2SG.PRS
    duo- ~ duom- ~ duod-

In less conservative varieties of Central Latvian spoken in Kurzeme (historical Courland), this alternation has been secondarily restricted, as shown in 3 (see Endzelīns 1923:559–60, Rudzīte 1964:130–31, Gāters 1977:124).

(3)               Vidzeme    Kurzeme
  INFINITIVE
  CONDITIONAL    duo-t      duo-t
  1SG.PRS        duom-u1 ~ duod-u
  3.PRS2         duod-Ø     duod-Ø
  1PL.PRS        duod-am    duod-am

1 Historically, the m in Latvian 1SG.PRS duomu (and similar verbs, such as ėsmu ‘I am’, ēmu ‘I eat’, iem ‘I go’) is not a part of the root morpheme but belongs to the ending (see handbooks such as Stang 1966:316–19, Endzelīns 1971:201–2). However, the fact that the present tense 1SG of all other Latvian verbs is formed with -u added directly to the root (or stem, in the case of suffix derivatives) strongly suggests duom-u (and, consequently, ėsm-u, ēmu-u, iem-u) as the most appropriate synchronic analysis.

2 In Baltic, no number distinction is made in the third person.
According to the first theoretical position on the mechanism underlying morphological analogy, this change should be analyzed as in 4. In the Central Latvian of Kurzeme, the set of root allomorphs of *duot* which originally comprised three distinct units, lost the most marked—or the least common—allomorph.

(4) Vidzeme Kurzeme
    \{duo-, duom-, duod-\} > \{duo-, duod-\}

Due to this development in the set of root allomorphs, the inherited form of the present tense 1\text{sg} *duom- u* (preserved in Vidzeme) was transformed in the less conservative varieties of Central Latvian into *duod- u* by replacing the root allomorph *duom-* with one of the two remaining allomorphs, that is, *duod-*. Since the change in the set of root allomorphs naturally did not affect inflectional endings, the marker of the present tense 1\text{sg} *u* remained in the modified inflectional form in its original shape. In other words, in the innovative Central Latvian dialects of Kurzeme the actual present tense 1\text{sg} *duod- u* contains a new root and an old inflectional marker, and the latter has not changed in this paradigmatic form at least since the beginning of the Latvian text records.

This position on change in cases of the given structure, that is, paradigm leveling, is explicitly advocated in, for instance, Andersen 2009 and Ringe & Eska 2013:152–211; see Fertig 2013:71–76 for more references and theoretical discussion.

According to the second theoretical position on the mechanism of morphological analogy, the same change in the inflectional paradigm of Central Latvian *duot* ‘to give’ is analyzed in a markedly different way. Of central importance for this theoretical position is the fact that, in Latvian, most verbs of the given inflectional class never had a similar alternation at the end of the root in their present-tense inflection. The relevant paradigmatic forms of *nest* ‘to carry’ and *cept* ‘to bake’ in all of Central Latvian are given in 5.

(5) Central Latvian

\begin{align*}
\text{INFINITIVE} & \quad \text{nes-t} & \quad \text{cep-t} \\
\text{CONDITIONAL} & \quad \text{nes-tu} & \quad \text{cep-tu} \\
\text{1SG.PRS} & \quad \text{nes-u} & \quad \text{cep-u} \\
\text{3.PRS} & \quad \text{nes-Ø} & \quad \text{cep-Ø} \\
\text{1PL.PRS} & \quad \text{nes-am} & \quad \text{cep-am}
\end{align*}

It is assumed that, in the innovative Central Latvian dialects of Kurzeme, the verb *duot* ‘to give’ lost a part of its alternating forms by secondarily joining the more widespread pattern of verbs like *nest* ‘to carry’ and *cept* ‘to bake’, as represented in 6. In other words, it is assumed that in the Central Latvian of Kurzeme, the 1SG.PRS *duod- u* (instead of *duom- u*) beside the 1PL.PRS *duod- am* (etc.) emerged by imitation of the pattern found in 1SG.PRS *nes- u* ~ 1PL.PRS *nes- am*, 1SG.PRS *cep- u* ~ 1PL.PRS *cep- am*, and so forth (so-called ‘proportional analogy’).

(6) Kurzeme

\begin{align*}
\text{1PL.PRS} & \quad \text{nes-am, cep-am, etc.} \quad \text{duod-am, etc.} \\
\text{1SG.PRS} & \quad \text{nes-u, cep-u} \quad \text{duod-u} > \text{duod-u}
\end{align*}

This view implies that the innovative present tense 1SG *duod- u* in the Central Latvian of Kurzeme is not a continuant of its inherited predecessor *duom- u* (preserved in Vidzeme) but an entirely new formation that basically replaced this predecessor. From this it follows that *duod- u* in the Central Latvian of Kurzeme does not contain a single morpheme that was previously part of the inherited *duom- u*. The fact that the inflec-
tional marker -u has the same shape in both forms, in the new one as well as the old, is then merely accidental, because the real source of -u in duod-u is not the abandoned duom-u but rather nes-u, cep-u, and so forth.


It is important to emphasize that both approaches are merely trying to establish what happened in this instance of inflectional change. The question of why the change occurred in the first place is a different issue that probably does not interfere with the way the change has proceeded. The problem of why the inherited Latvian 1sg.prs duom-u was inconvenient for speakers of innovative dialects can be addressed in a variety of ways and from different theoretical perspectives (see recently Albright 2008, 2009, Garrett 2008, Fertig 2013:102–21). However, it is difficult to imagine a reason for this change that would allow for only one of the two theoretically conceivable solutions, that is, either for modification of duom-u by replacing its root or for its replacement as a whole by a form created entirely anew.

2.2. Analogical replacement of an inflectional marker: the present tense 2sg of German preterito-prezents. Both approaches to morphological analogy are equally popular in the case of changes that target not the root morpheme or the stem of an inflectional form but the form’s inflectional marker. This can be conveniently demonstrated by using the following particularly instructive case from the history of German.

As shown in 7, in German, whose text records begin around 750, the present tense 2sg darf-t ‘you need’ and mag-t ‘you can’ were respectively transformed into darf-st and mag-st between the early thirteenth and the fifteenth centuries (Reichmann & Wegera 1993:295–304, Braune & Reiffenstein 2004:303–7, Paul et al. 2007:265–72).

(7) 12th c. German 15th c. German
1sg.prs darf mag darf mag
2sg.prs darf-t mach-t > darf-st mach-st, mag-st
3sg.prs darf mag darf mag

According to the first theoretical position on morphological analogy, which operates with modification of inherited forms, this change should be interpreted as follows. Since the beginning of the written record, the set of allomorphs responsible for the present tense 2sg has been constantly reduced, as summarized in 8. During this reduction, the rarest allomorph -i was completely abandoned, and the allomorph -t, used only in a small group of verbs with special characteristics, constantly lost ground to the allomorphs more common in the system. Somewhere between the early thirteenth and the fifteenth centuries this development led to the transformation of the inherited forms darf-t, mach-t into darf-st, mag-st, with a replacement of the inherited allomorph of the present tense 2sg -t by one of the more frequently used allomorphs, -st, in these two verbs as well. The root has been preserved in its inherited form. Note that in many dialects of German there is no phonological contrast between mach-st and mag-st, both attested since the fifteenth century, which therefore may simply be spelling variants.

(8) Present tense 2sg allomorphs
9th c. German 15th c. German 20th c. German
{-t, -st, -is(t), -ēs(t), -ōs(t), -i} > {-t, -st, -ēst} > {-st, -ēst}

The second theoretical approach to morphological analogy, working with the complete replacement of old forms by synchronically regular forms created entirely anew, sees the
same change as follows. Several verbs of the inflectional class to which German *darf* and *mag* belong possessed a 2SG ending in *-st* since the very beginning of the written record, that is, since the late eighth century. This is securely established for *kan* ‘know(s) how’, *ge-an* ‘allow(s), grant(s)’, and *ge-tar* ‘dare(s)’, whose inflection is given in 9.

(9) 12th c. German

<table>
<thead>
<tr>
<th>1SG.PRS</th>
<th>kan</th>
<th>ge-an</th>
<th>ge-tar</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SG.PRS</td>
<td>kan-st</td>
<td>ge-an-st</td>
<td>ge-tar-st</td>
</tr>
<tr>
<td>3SG.PRS</td>
<td>kan</td>
<td>ge-an</td>
<td>ge-tar</td>
</tr>
</tbody>
</table>

It may be assumed that *darf* and *mag* lost their inherited 2SG *darf-t*, *mach-t* in the process of joining this other subclass of verbs; see 10. This means that the 2SG *darf-st*, *mach-st/mag-st* emerged beside 1/3SG *darf*, *mag* simply by imitation of the pattern 1/3SG *kan*, *ge-tar* ~ 2SG *kan-st*, *ge-tar-st* (etc.).

(10) 12th–15th c. German

<table>
<thead>
<tr>
<th>1/3SG.PRS</th>
<th>kan, ge-an, ge-tar</th>
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It has to be assumed that this imitation completely replaced the inherited forms of the 2SG *darf-t*, *mach-t*. The roots of the newly created forms *darf-st*, *mach-st/mag-st* do not sound different but in reality they descend not from the roots of the old 2SG but rather from the roots of the corresponding 1/3SG *darf*, *mag*, the pivot of the change.

3. HOW TO TELL MODIFICATION FROM REPLACEMENT?

3.1. Preliminaries. In both instances of change in inflection investigated in §2—paradigm leveling in Latvian *duot* and the new present tense 2SG of the German preterito-presents—the two hypothetical mechanisms of morphological analogy generate identical results. The data do not help to establish what actually happened and/or whether inherited forms such as Central Latvian 1SG.PRS *duom-u* in Kurzeme and German 2SG.PRS *darf-t* were merely modified by replacing one morpheme and preserving the other or were replaced as wholes by forms created entirely anew on a preexisting model.

Is it not possible to find an instance of morphological analogy in which replacing a morpheme, on the one hand, and replacing the whole word containing this morpheme, on the other, would generate results that are observably different? I follow Fertig (2016: 437) in assuming that looking for instances of this latter kind might be promising. In both cases investigated in §2, the inherited inflectional forms are distinguished from their successors by just one morpheme. This is not always so. Changes leading to a difference in more than one morpheme are well known, and it is clear that both theoretical approaches to morphological analogy are equally applicable to them also. For instance, in most varieties of English the inherited past-tense participle *molt-en* is succeeded by *melt-ed* (see on this and similar cases Jespersen 1956:72–75, 78–81). The change that has to be assumed here involves both morphemes of this word: the root *molt-*, which now appears as *melt-*, and the past-tense participle marker *-en*, whose place is now taken by *-ed*. The first theoretical position on morphological analogy sees this case as an extension of a (default) stem allomorph (*melt-*) and a (default) suffix allomorph (*-ed*) (see Andersen 2015:119). The second assumes that *molt-en* as the participle of *melt* as a whole has been replaced by the new participle *melt-ed*, created on the model of *guide* ~ *guid-ed*, *await* ~ *await-ed*, and so forth. The outcomes of the change that are predicted by the two approaches seem in theory to again be identical, in this case and in all similar cases as well.
However, there is also an important difference. The first approach assumes that the evolution of *molt-en* into *melt-ed* proceeded by two clearly distinct and, at least in principle, independent operations. The first operation replaced (or modified) the root. The second replaced (or modified) the past-tense participle marker. There is a priori no reason to expect these operations to be conducted at one and the same time or in any particular chronological order. On the contrary, the first approach to morphological analogy implies that intermediate forms like †*melt-en* (only first operation completed) or †*molt-ed* (only second operation completed) should be possible.

It is important that here and in many similar cases neither operation necessarily implies or instantaneously initiates the other. Such dependencies occur in the synchrony of languages, for instance in English where nouns automatically receive -ed when used as past-tense verbs (such as *doctor* → *doctor-ed*). The situation of the *molt-en* > *melt-ed* development seems to be different. The change of *molt-en* into †*melt-en* (following the present tense *melt*) would create a pattern similar to *lade* ~ *lad-en*, *fall* ~ *fall-en*, a pattern that is clearly acceptable and tolerated in English. Similarly, the change of *molt-en* into †*molt-ed* (following *await-ed*, etc.) would create a pattern akin to *tell* ~ *tol-d*, *sell* ~ *sol-d* that is also acceptable. There is, therefore, no a priori reason to assume that the replacement of just one morpheme in the inherited form *molt-en* would automatically cause the instantaneous replacement of the other.

Yet such intermediate forms as English †*melt-en* and †*molt-ed* seem not to occur in the transmitted English texts. The failure of such forms to be robustly attested is a fact that has to be explained by additional assumptions or left to chance.

By contrast, the second approach to morphological analogy assumes the inherited past-tense participle *molt-en* either to be preserved unchanged or to be replaced as a whole by newly created *melt-ed*. In this theory, intermediate forms like †*melt-en* or †*molt-ed* are basically impossible and should not occur in any variety of English. The lack of clear attestations of such forms in the written records simply follows from the fundamental assumption that morphological analogy is not modifying but replacive.

In my view, the failure of intermediate forms †*melt-en* or †*molt-ed* to be attested on the path of the change *molt-en* > *melt-ed* and similar cases might constitute empirical evidence for the second position on morphological analogy, the assumption that—at least sometimes—inflectional forms are not modified but replaced.

But empirical arguments are strong enough only if they are based on many cases with a similar structure. In theory, the lack of †*melt-en* or †*molt-ed* in English might be basi-

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4 Kuhn and Reidy (1975 I,1:88–89, M,1:283–85) collected numerous attestations of both the inherited *molt-en* and the innovative *melt-ed* as early as Middle English, but the intermediate †*molt-ed* is not attested. The other conceivable intermediate form †*melt-en* might be assumed to occur twice, but both attestations are dubious. For *blowe vn to pat be inflammed & infused or melten & burbled* (1392, Chauliac), the possibility that *melten* is not the transitive past-tense participle but the intransitive 3pl. present-tense subjunctive cannot be excluded. As for *schal first be ymelte in a schelle in þe fuyre and þanne ydo in water* (1398, Bartholomaeus Anglicus), *ymelte* might be the infinitive wrongly put into the text due to the influence of *yd* (where the past-tense participle and the infinitive are homophonous). The *OED* (1961:324–25) attests no †*melt-en*, whereas *molt-ed* does occur in the sixteenth century (1565: *that may be molted*). However, its original locus is not the participle, which remains *molt-en* (1582: *how he molted and cast the false image, and bowed down to that which he had moltten*). Most probably, the innovative finite past-tense form *molt-ed* emerged beside the participle *molt-en* on the model of such verbs as *fold-ed* ~ *fold-en* (later *fold-ed*), *lad-ed* ~ *lad-en* (later *lad-ed*), and so forth (Jespersen 1956:71–75). This means that the participle *molt-ed* in the 1565 attestation is not an intermediate form on the way from the inherited *molt-en* to the innovative *melt-ed*, but rather the finite past-tense form secondarily employed as the participle.
cally accidental. To exclude this possibility, the following two subsections investigate two similar cases of inflectional change by morphological analogy, taken from two different groups of closely related languages or dialects of a single language.

The first case study deals with a change in the past-tense inflection of a verb class in North Germanic. The second addresses a change in the present tense of two verbs in dialects of Lithuanian. In both cases, as in the case of English *molt-en > melt-ed*, the theoretically conceivable intermediate forms with just one morpheme replaced fail to occur anywhere in the relevant languages or dialects. I argue that, due to the amount and the quality of the available data, this fact cannot be accidental.

3.2. The preterit tense of the verba pura in Old Norse and its descendants.

In thirteenth-century Old Norse, a member of the Germanic branch of Indo-European, most verbs formed their preterit tense according to one of the following two patterns (see Noreen 1923:325–50, Nedoma 2006:75–108). The so-called strong verbs used apophony in the root of the verb (11a), while the so-called weak verbs used a special preterit-tense marker (11b).

(11) Old Norse

a. strong verbs

<table>
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<tr>
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b. weak verbs

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<td>lif-ði</td>
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<tr>
<td>verma</td>
<td>verm-ða</td>
<td>verm-ði</td>
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This situation was basically inherited from Proto-Germanic. This is clearly shown, for instance, by the inflection of the Old Norse verbs’ etymological counterparts in closely related Gothic (given in 12; see Braune & Heidermanns 2004:141–67), whose written record starts as early as the fourth century.

(12) Gothic

a. strong verbs

<table>
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b. weak verbs

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</tr>
<tr>
<td>liban</td>
<td>libai-da</td>
</tr>
<tr>
<td>warmjan</td>
<td>warmi-da</td>
</tr>
</tbody>
</table>

Two originally strong Old Norse verbs preserved the Proto-Germanic pattern of preterit-tense formation by reduplication (13). The preterit tense of Old Norse *sá-a* ‘to sow’ and *ró-a* ‘to row’—originally members of a larger group of primary verbs called verba pura in Germanic linguistics (see on these Matzel 1987a,b)—reflects the Proto-Germanic reduplicated preterit-tense formation, which is also preserved in Gothic (see Noreen 1923:340, Nedoma 2006:91–92, Braune & Heidermanns 2004:155).
The inherited reduplicated preterit-tense forms seri, re-ri must have been reanalyzed in Old Norse as se-ri, re-ri, containing a root allomorph se-, re- (etymologically the reduplicant) and preterit-tense marker 3sg -ri (etymologically the preterit-tense allomorph of the root contracted with the inflectional marker). This reanalysis is demonstrated by verbs that only secondarily joined this pattern of preterit-tense formation, such as those in 14.

In dialects of Old Norse, sát-a ‘to sow’, rõ-a ‘to row’, and so forth secondarily joined the more widespread inflection pattern of the weak verbs. On the model of 15a, the inherited pattern given in 15b was transformed step by step into something like 15c.

In Icelandic, which is known to be the most conservative dialect of Old Norse, this latter development only involved sát-a ‘to sow’, whose new preterit tense 3sg sát-dí was already used alongside the inherited reanalyzed se-ri around 1200 (Cleasby & Vigfusson 1957:516, Egilsson 1966:484). In contemporary Icelandic, given in 16, the weak preterit-tense form of sát ‘to sow’ is the norm, whereas all other members of the group preserved their inherited inflection (Einarsson 1949:104 or Kress 1982:122–23, 135).

In Norwegian, the innovative weak preterit-tense forms such as sát-dé, rõ-dé of sát ‘to sow’, rõ ‘to row’ have frequently been attested in all members of the group since ca. 1300 (Seip 1971:359). The change must have been completed shortly after this time. The situation in contemporary Norwegian is laid out in 17 (as discussed in Beito 1970:301, 306–7).

As shown in 18, the change is also completed in the last descendant of Old Norse to be quoted here, Faroese (Lockwood 1964:77, 80).
Finally, the same development has to be assumed for Swedish and Danish, which do not descend from Old Norse but are closely related to it. According to Noreen 1904: 465–66, Wessén 1970: 148–49, and Brøndum-Nielsen 1971: 84–85, new preterit forms of the relevant verbs have been attested since the very beginning of the written record in the late thirteenth century (19).

To sum up, in the inflection of verba pura such as Old Norse sá-a ‘to sow’, ró-a ‘to row’, the inherited preterit-tense forms 3sg se-ri, re-ri were transformed into synchronically more regular weak preterit-tense forms like Faroese 3sg sá-ði, ró-ði in all descendants of Old Norse and also in closely related Swedish and Danish. Like the abandoned inherited preterit-tense forms, the new ones also consist of two morphemes. The first is the root morpheme in the form that is found in the corresponding infinitive, such as Faroese sá-, ró-. The second is the marker of the weak preterit tense, such as Faroese -ði.

The data show that in languages descending from Old Norse, and in its relatives Swedish and Danish, the relevant preterit-tense forms have been either completely retained in their original shape or completely replaced. See Icelandic 3sg re-ri of ró-a ‘to row’ (etc.), where both morphemes are retained, but Icelandic, Faroese 3sg sá-ði of sá-a ‘to sow’, where both morphemes have been replaced. Theoretically conceivable intermediate forms like †ró-ri, †sá-ri (with replaced root allomorph and retained inflectional marker) or †re-ði, †se-ði (with replaced root allomorph and retained inflectional marker) are nowhere attested.

The lack of such forms in Swedish or Danish is not surprising, because in these languages, only the final stage of the development is attested. In Icelandic and Norwegian, by contrast, where both the starting point and the end point of the development are abundantly documented, the failure of such intermediate forms to occur seems to be significant.

It is important to note that here, as in the case of English molt-en > melt-ed discussed in §3.1 above, there is no reason to assume that replacing one morpheme would automatically require an instantaneous replacement of the other. In Icelandic, each operation would create patterns similar to equally (slightly) irregular patterns given in 20, which have persisted in the language for centuries (see Noreen 1923: 351, 343, Kress 1982: 116–19, 136, Nedoma 2006: 106, 109). The same is true for Norwegian (see Beito 1970: 307–8).
If morphological analogy operates by replacement of inherited inflectional forms with forms created entirely anew, the lack of intermediate forms like †ró-ri, †sá-ri or †re-ði, †se-ði in Icelandic and Norwegian is in harmony with the theoretical expectation. See 21, for instance, in the case of ‘to sow’ in Icelandic.

(21) Icelandic

<table>
<thead>
<tr>
<th>INF</th>
<th>haf-a, verm-a</th>
<th>sá-a</th>
</tr>
</thead>
<tbody>
<tr>
<td>3SG.PRET</td>
<td>haf-ði, verm-ði</td>
<td>se-ði &gt; sá-ði</td>
</tr>
</tbody>
</table>

By contrast, if morphological analogy operates by modification of inflectional forms, replacing their parts, the lack of such forms as †ró-ri, †sá-ri or †re-ði, †se-ði in Icelandic, Norwegian, and Faroese texts from the thirteenth century up to now is unexpected and difficult to explain.

3.3. The present tense of ‘to put’ and ‘to give’ in Lithuanian. In sixteenth-century Old Lithuanian, a member of the Baltic branch of Indo-European, the semantically prominent and thus very frequent verbs dėti ‘to put’ and duoti ‘to give’ were inflected as shown in 22 (Senn 1966:291–93).

(22) Old Lithuanian

<table>
<thead>
<tr>
<th>INF</th>
<th>dė-ti</th>
<th>duo-ti</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRS.PTCP</td>
<td>ded-ąs</td>
<td>duod-ąs</td>
</tr>
<tr>
<td>1SG.PRS</td>
<td>de-mi</td>
<td>duo-mi</td>
</tr>
<tr>
<td>2SG.PRS</td>
<td>de-si</td>
<td>duo-si</td>
</tr>
<tr>
<td>3.PRS</td>
<td>des-ti</td>
<td>duos-ti</td>
</tr>
</tbody>
</table>

Each form in the above paradigms contained an appropriate inflectional marker, the same in both verbs, and one of four root allomorphs (23). The root allomorphs dė- and duo- were assigned to the infinitive, ded- and duod- to the present-tense participle, de- and duo- to the present tense 1sg and 2sg, and finally des- and duos- to the present-tense third person, which had one common form in all numbers.

(23) Old Lithuanian

<table>
<thead>
<tr>
<th>INF</th>
<th>ROOT</th>
<th>MARKER</th>
</tr>
</thead>
<tbody>
<tr>
<td>INF</td>
<td>dė-, duo-</td>
<td>-ti</td>
</tr>
<tr>
<td>PRS.PTCP</td>
<td>ded-, duod-</td>
<td>-ąs</td>
</tr>
<tr>
<td>1/2SG.PRS</td>
<td>de-, duo-</td>
<td>-mi/si</td>
</tr>
<tr>
<td>3.PRS</td>
<td>des-, duos-</td>
<td>-ti</td>
</tr>
</tbody>
</table>

In dialects of contemporary Lithuanian, dė-ti ‘to put’ and duo-ti ‘to give’ have either preserved their inherited present-tense inflection or secondarily joined a more widespread inflectional pattern, which can be illustrated by neš-ti ‘to carry’ and dirb-ti ‘to work’. Contemporary Standard Lithuanian is given in 24 (Senn 1966:291–93).

(24) Standard Lithuanian

<table>
<thead>
<tr>
<th>INF</th>
<th>neš-ti</th>
<th>dirb-ti</th>
<th>dė-ti</th>
<th>duo-ti</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRS.PTCP</td>
<td>neš-ąs</td>
<td>dirb-ąs</td>
<td>ded-ąs</td>
<td>duod-ąs</td>
</tr>
<tr>
<td>1SG.PRS</td>
<td>neš-u</td>
<td>dirb-u</td>
<td>~</td>
<td>ded-u</td>
</tr>
<tr>
<td>2SG.PRS</td>
<td>neš-i</td>
<td>dirb-i</td>
<td>ded-i</td>
<td>duod-i</td>
</tr>
<tr>
<td>3.PRS</td>
<td>neš-a</td>
<td>dirb-a</td>
<td>ded-a</td>
<td>duod-a</td>
</tr>
</tbody>
</table>

This means that, in the less conservative dialects of Lithuanian, the inherited present-tense forms of dė-ti ‘to put’ and duo-ti ‘to give’—such as 1SG.PRS de-mi, duo-mi and 3.PRS des-ti, duos-ti—were secondarily transformed into 1SG.PRS ded-u, duod-u and 3.PRS ded-a, duod-a. Following this transformation, both morphemes of the inherited present-tense forms were replaced. The roots, originally dė-, duo- in the 1SG.PRS and
des-, duos- in the 3. prs, now appear as ded-, duod-. Instead of the old inflectional markers -mi in the 1sg. prs and -ti in the 3. prs, -u and -a are used, respectively.

It is remarkable that, in all known dialects of Lithuanian, the inherited present-tense forms of dē-ti ‘to put’ and duo-ti ‘to give’ are either completely retained in their original form or were completely replaced. Compare 1sg. prs de-mi, duo-mi in the most conservative dialects, where both morphemes have been retained, with 1sg. prs ded-u, duod-u in contemporary Standard Lithuanian, where both morphemes have been replaced. Theoretically conceivable intermediate forms like 1sg. prs †ded-mi, †duod-mi (with replaced root allomorph and retained inflectional marker) or something like 3. prs †des-a, †duos-a (with retained root allomorph and replaced inflectional marker) are attested nowhere. Note that the development of Lithuanian dialects between the sixteenth century and now is abundantly documented in manuscripts and printed texts and, since the early seventeenth century, in grammatical descriptions (Zinkevičius 1996:227–311).

The failure of theoretically conceivable intermediate forms to appear in Lithuanian dialects is again to be expected if morphological analogy is conceived of as replacement of inherited inflectional forms as wholes by forms created entirely anew on a pre-existing model. In this particular case, a clear model is provided by the relation between the present-tense participle and the finite present-tense forms in the inflection of such verbs as neš-ti or dirb-ti (see, for instance, Bammesberger 2004:21). The innovative varieties of Lithuanian are given in 25.

(25) Lithuanian

<table>
<thead>
<tr>
<th></th>
<th>neš-ąs, dirb-ąs</th>
<th>ded-ąs, duod-ąs</th>
</tr>
</thead>
<tbody>
<tr>
<td>prs.ptcp</td>
<td>~</td>
<td>=&gt;</td>
</tr>
<tr>
<td>1sg. prs</td>
<td>neš-u, dirb-u</td>
<td>de-mi, duo-mi</td>
</tr>
<tr>
<td>2sg. prs</td>
<td>neš-i, dirb-i</td>
<td>de-si, duo-si</td>
</tr>
<tr>
<td>3. prs</td>
<td>neš-a, dirb-a</td>
<td>des-ti, duos-ti</td>
</tr>
</tbody>
</table>

By contrast, if morphological analogy operates by modification of inflectional forms, replacing their parts with parts of other inflectional forms, the complete absence of intermediate forms with just one phoneme replaced and the other preserved in recorded Lithuanian is unexpected and difficult to explain.

3.4. More arguments for morphological analogy as whole-word replacement. The two cases discussed in §§3.2 and 3.3 provide evidence suggesting that morphological analogy at least sometimes proceeds by replacing whole word forms rather than modifying them. Since mechanisms of inflectional change should not be multiplied beyond necessity, it is tempting to assume that morphological analogy always replaces whole word forms (until it is demonstrated that this is at least sometimes not the case). This position finds additional support in the following two observations. First, analysis of morphological analogy in terms of whole word forms is, at least for cases involving the root morpheme, demonstrably more economical than the morpheme-based approach. Second, there is evidence suggesting that the type of morphological analogy that is most often called (paradigmatic) leveling (see §2.1 above) depends on model patterns found outside of the paradigm in question. Both arguments are briefly spelled out in the remainder of this subsection.

Unlike the change in the inflection of Latvian duot discussed in §2.1 above, numerous similar changes in the shape of the root morpheme of a paradigm cannot be described as reduction in a set of preexisting allomorphs or a change in the selection properties of these allomorphs. Often, the root allomorph that appears in the relevant word form after the change is new to the language. Compare the changes in two West

(26) a. 12th c. English 13th c. English

<table>
<thead>
<tr>
<th></th>
<th>INFINITIVE</th>
<th>3SG.PRET</th>
<th>3PL.PRET</th>
<th>PRET.PTCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>chēsen</td>
<td>chēs</td>
<td>curen</td>
<td>i-cōren</td>
</tr>
</tbody>
</table>

In 26a, the root allomorph of the new thirteenth-century English preterit-tense participle {chōs-} is not found among the root allomorphs that already existed in twelfth-century English. Accordingly, the emergence of the new participle i-chōsen in thirteenth-century texts cannot be explained by substitution of one allomorph for another. To explain i-chōsen, one of the following two assumptions must be made. First, root allomorphs belonging to a particular word can somehow influence each other, becoming phonetically more similar. This would mean that the last allomorph cōr- in the twelfth-century set {chē-, chēs-, cur-, cōr-} somehow acquired the ch and s of the first and second allomorphs but kept its vowel unchanged. Second, it can be assumed that thirteenth-century English preterit-tense participle i-chōsen emerged beside the infinitive chēsen on the model of those verbs in the relevant inflectional class that never had similar consonant alternations, for instance, bēden ~ i-bōden ‘to command’.

The former of these logically possible assumptions would not help in 26b, where the last phoneme of twentieth-century Frisian jœch is new to this verb. Here the only possible explanation is a complete replacement of inherited jef in the inflection of jaan by the new form jœch created on the model of slaan ~ sloech ‘to strike’, where the alternation was inherited.

Indeed, the morpheme-based modification approach to morphological analogy traditionally makes use of three distinct mechanisms: (i) substitution of allomorphs (in Latvian duot discussed in §2.1 above), (ii) random modification of allomorphs by influence of other allomorphs of the same morpheme (as in thirteenth-century English chēsen and similar cases), and (iii) modification of allomorphs by influence from outside of the paradigm in question (as in Frisian jaan, etc.). Although it is perhaps possible to view mechanism (i) as a special case of mechanism (ii), the word-based approach to morphological analogy—which coherently explains all relevant changes in one and the same manner as whole-word replacement—remains more economical. In other words, since mechanism (iii) explains all kinds of analogical change in the root morpheme, there is no need to postulate mechanisms capable of explaining only parts of the evidence.

The second argument in favor of whole-word replacement as the only mechanism of morphological analogy runs as follows. The opposite view, the modifying or morpheme-based approach to morphological analogy, necessarily divides all cases of analogical change involving the root morpheme into two different categories. In the first category are those cases where the change is believed to take place entirely within the inflectional paradigm of the relevant word. This category comprises cases like the change in Latvian duot ‘to give’ (discussed in §2.1). In the second category are those instances of analogical change where influence from outside of the inflectional paradigm of the relevant word has to be assumed. This category includes cases like the change in Frisian jaan ‘to give’, which secondarily joined the inflectional pattern of slaan ‘to strike’ (see 26b). The difference be-
tween these two categories necessarily implies two different processes (see on terminology, for instance, Campbell 2004:106–9). The former is traditionally called ‘paradigmatic leveling’ or simply ‘leveling’ (the alternation is ‘leveled out’ and the paradigm becomes more uniform). The latter is often called ‘rule extension’ or simply ‘extension’ (the pattern is ‘extended’ beyond its original domain and imposed on new lexemes).

However, comprehensive investigations of analogical change in particular languages (such as English and Ancient Greek) suggest that this distinction between leveling and extension is epiphenomenal. While extension is possible without leveling, leveling depends on extension. This follows from two facts. First, leveling does not occur without a model and does not create patterns that previously did not exist in the language in question. See Garrett (2008:130), who states that in every case, a change in preterite stem formation involved the transfer of a verb into a pre-existing class—in other words, extension of an existing pattern. Usually the non-alternating pattern of regular weak verbs was extended to formerly irregular verbs, but in other cases an existing strong or irregular weak pattern was extended to a formerly regular verb. The point is that each change can be treated as extension. … in 900 years of Middle and Modern English linguistic history, there was never any case of pure leveling. The vast majority of preterite stem changes yielded paradigm uniformity, to be sure, but only given a pre-existing uniform paradigm of the same type.

Second, as shown by Sims-Williams (2016), while it creates more uniform patterns, leveling systematically reproduces morphomic (i.e. syntactically and semantically meaningless) features of other paradigms (such as the stem alliance between the aorist and the future tense in Ancient Greek).

If leveling does not exist as an independent process, extension remains the only mechanism responsible for analogical change involving root morphemes. Since extension necessarily involves relations between whole word forms, all such changes can be most economically described as replacement of inherited word forms by forms created entirely anew on a preexisting model.

This certainly does not logically imply that analogical change in the domain of inflectional markers also operates by whole-word replacement. However, as shown in §2.2 above, this position is possible and does not conflict with any known data.

3.5. Preliminary conclusions. The data discussed in this section indicate that the only securely established mechanism of analogical change in inflection is replacement of whole word forms by new forms created on the pattern of a preexisting model. Before this can be advocated, however, it is necessary to discuss the data that have been put forward in the relevant literature as evidence against morphological analogy as whole-word replacement.

4. Evidence against morphological analogy as whole-word replacement.

The concept of morphological analogy has well-known explanatory limitations (see, among others, Albright 2008:144–53, Andersen 2009, Fertig 2013:71–83). Morphological analogy is capable of describing inflectional change only a posteriori, and it explains neither why a particular inflectional form had to be replaced and/or modified at a particular time, nor why a particular strategy of replacement and/or modification was chosen (out of, most usually, several possibilities). However, pace Andersen 2009, these limitations pertain equally to analogy understood as whole-word replacement and to analogy seen as modification and therefore do not help to establish which of the two possible views on analogy is more realistic.

The only strong and clearly valid argument against morphological analogy as whole-word replacement that has been proposed in the relevant literature up to the present day
depends on the fact that this process requires a model in the form of a preexisting inflectional pattern in each particular case. It has been argued for several instances of morphological analogy that no such model pattern can be found in the relevant language. This argument was put forward in Jeffers & Lehiste 1979:55–56, 68, Andersen 2015:119, Fertig 2016:437–49, and Sims-Williams 2016:321. The Fertig 2016 paper is especially important because it contains the only carefully researched collection of relevant cases in the existing literature on inflectional change. However, a closer examination of their chronology and the dialectal variation within the relevant languages shows that these examples do not necessarily provide incontrovertible evidence against morphological analogy as whole-word replacement. This can be demonstrated by referring to the following case.


<table>
<thead>
<tr>
<th>(27)</th>
<th>Homeric Greek</th>
<th>Doric Greek</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ca. 12th c. BCE)</td>
<td>(since 7th c. BCE)</td>
<td></td>
</tr>
<tr>
<td>NOM.SG</td>
<td>póli-s</td>
<td>póli-s</td>
</tr>
<tr>
<td>GEN.SG</td>
<td>pólē-os</td>
<td>póli-os</td>
</tr>
<tr>
<td>NOM.PL</td>
<td>pólē-es</td>
<td>póli-es</td>
</tr>
</tbody>
</table>

In both works, it is claimed that this innovation in the Doric dialect of Ancient Greek cannot have followed a preexisting model because a suitable inflectional pattern did not exist in the language prior to the change. A more comprehensive investigation reveals, however, that as early as Homeric Greek the nouns belonging to the relevant stem class inflected according to one of the two patterns given in 28a; see Chantraine & Casevitz 2013:212–15. In all dialects of Greek attested at a later date, either the *pólis* pattern was secondarily generalized (as in the Attic dialect; see 28b) or the *mántis* pattern was (as apparently in all other dialects, including Doric; see 28c). See on this latter point most recently Hinge 2006:159–60. Since the two originally distinct patterns shared the nominative singular, both changes can be interpreted in terms of morphological analogy as whole-word replacement.5

<table>
<thead>
<tr>
<th>(28)</th>
<th>a. Homeric Greek (ca. 12th c. BCE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOM.SG</td>
<td>póli-s ‘town’</td>
</tr>
<tr>
<td>GEN.SG</td>
<td>pólē-os</td>
</tr>
<tr>
<td>NOM.PL</td>
<td>pólē-es</td>
</tr>
<tr>
<td>b. Attic Greek (since 7th c. BCE)</td>
<td></td>
</tr>
<tr>
<td>NOM.SG</td>
<td>póli-s</td>
</tr>
<tr>
<td>GEN.SG</td>
<td>póle-ōs6</td>
</tr>
<tr>
<td>c. Doric Greek (since 7th c. BCE)</td>
<td></td>
</tr>
<tr>
<td>NOM.SG</td>
<td>mánti-s</td>
</tr>
<tr>
<td>GEN.SG</td>
<td>mánti-os</td>
</tr>
</tbody>
</table>

5 The difference between the *pólis*-type and the *mántis*-type seems to have originated in the inherited DAT-LOC.SG *pólēi*. This case form, probably particularly frequent in *pólis* ‘town’, seems to have secondarily generated the GEN.SG *pólēos*, following the prominent pattern DAT-LOC.SG *éridi* ~ GEN.SG *éridos* ‘fight’ and so forth.

6 Attic *pôle-ōs* is a regular reflex of more ancient *pôle-os*; see on this development, for instance, Rix 1992:57.
Similar reasoning can probably be applied to the other cases of morphological analogy allegedly lacking a model that have been collected in the works mentioned above.

5. Implications.

5.1. Preliminaries. The data discussed in §§3 and 4 lead us to the following conclusion. The change in inflection traditionally called morphological analogy probably operates not by modifying inherited inflectional forms (i.e. replacing parts of these forms with parts of other inflectional forms) but rather by replacing these inherited forms as wholes with forms created entirely anew by the extension of a preexisting morphological pattern.

The present section briefly addresses the question of why this insight into the operating principles of morphological analogy is important for historical linguistics. In addition to the inherent value of every insight into the modus operandi of language change, the following two points, one concerning the diachrony of inflectional systems and one concerning their synchrony, should be stressed. First, the conclusion reached here helps us distinguish a possible analogical change in inflection from changes that are theoretically just as conceivable but not yet established as possible. Second, the conclusions about inflectional change reached in this paper may shed light on the structure of the mental lexicon and/or help establish how inflectional forms are synchronically processed by speakers. After briefly addressing these issues in §§5.2 and 5.3, the discussion leaves the domain of inflection and takes up the question of potential implications that the conclusions reached in §§3 and 4 may have for the other component of morphology, derivation.

5.2. The modus operandi of morphological analogy and linguistic reconstruction. It is clear that under the notion of morphological analogy as change by replacing whole word forms, the set of analogical changes possible in a particular situation is usually smaller than in the case of change as modification. Modifying an inflectional form by replacing its parts with parts of other inflectional forms does not require a model. By contrast, replacing an inherited word form with a form created anew needs a model that (i) must have existed in the language prior to the change, and (ii) must be a plausible source for the new form in terms of semantic prominence, frequency in discourse, and so forth.

Especially for purposes of linguistic reconstruction, the value of a more restrictive theory, telling the scholar which changes are clearly possible (and might therefore be assumed in each particular case) and which are not yet established as possible, can hardly be overestimated. Such important works in morphological reconstruction as *Hittite and the Indo-European verb* by Jay Jasanoff (2003) and *Origins of the Greek verb* by Andreas Willi (2018) make use of morphological analogy on virtually every page. Often more than just one solution is conceivable in a particular case. A more restrictive approach would help restrain the range of conceivable solutions by marking as more doubtful those alternatives that use morphological analogy as modification of inherited forms.

5.3. Morphological analogy and synchronic processing of inflection. As for the processing of inflectional forms by speakers in the synchrony of languages, two mutually exclusive positions seem to exist in contemporary linguistics (see Blevins 2003, 2006, similarly Stump & Finkel 2013:262–94, Stump 2016:258–59). According to the first position (most recently advocated in Bruening 2018), which might be called the morpheme-based approach, the mental lexicon of a speaker contains mainly morphemes and rules by which these morphemes can be combined into inflectional forms. The alternative position, often called the word-based approach, assumes that the mental
lexicon stores sets of whole word forms and that these sets are used by a speaker as models for creating inflectional forms that, for whatever reason, cannot be retrieved from memory (see most recently Blevins 2015, 2016, Ainsworth 2019). It seems clear that the conclusion that morphological analogy is a replacement of whole word forms by forms created entirely anew on a preexisting model is in better agreement with the latter position on the synchrony of inflection than with the former.

However, a growing body of predominantly psycholinguistic evidence indicates that speakers are capable of both processing morphologically complex word forms as wholes and decomposing inflectional forms into smaller units (cf. Sereno & Jongman 1997, Burrani & Thornton 2003, Hay & Baayen 2005, Zuraw 2009, among others). If analogical change in inflection operates solely on the basis of relations between whole word forms, the question arises of why the alternative strategy of processing inflection by smaller units appears to play no role in change. Answering this question remains a task for future research.

5.4. Inflectional change and derivational morphology. It is widely believed that processes responsible for the creation of new word forms may also be at work in what is traditionally called ‘derivation’, that is, creation of new lexemes. New lexemes can emerge in a variety of ways (such as univerbation, composition, conversion, etc.), most of which are not relevant to the present discussion. However, one particular mechanism of derivation is similar to the creation of new word forms by morphological analogy. See the development given in 29b, which is obviously akin to what happened in the case of inflectional change given in 29a and discussed in §2.2 above.

(29) a. 13th c. German 15th c. German
    1/3SG.PRS darf darf ‘need/needs’
    2SG.PRS darf-t ~ darf-st ‘you need’

b. 13th c. German 15th c. German
    tisch tisch ‘table’
    tisch-ære ~ tisch-eler ‘carpenter’

It is clear that both developments given in 29 can be analyzed in the same two ways, as in 30. It can be assumed that both darf-st and tisch-eler emerged in fifteenth-century German by recombination of morphemes, {-st} and {-eler} being taken from other lexemes and/or retrieved from speakers’ mental lexicons. Or it can be assumed that darf-st and tisch-eler emerged in fifteenth-century German as wholes created on the model of preexisting patterns.

(30) 15th c. German
    a. 1/3SG.PRS kan darf
        ~ ~
    b. 15th c. German hord tisch
        ~ ~
        hord-eler ‘treasure hunter’ tisch-er > tisch-eler

Since the latter assumption seems to be closer to reality in the case of change in inflection, it is tempting to assume the same for derivation. Establishing whether this position can be supported by additional observations and reconciled with what appears to be counterevidence (discussed, for instance, in Haspelmath 1995:7–8, 10, 12–13) remains a task for future research.
6. Constraints on morphological analogy as whole-word replacement.

6.1. Preliminaries. Sections 3 and 4 have demonstrated that, in the domain of inflection, morphological analogy is more likely to operate not on sub-word units such as morphemes but on whole words that are abandoned and created anew on preexisting model patterns. It is possible that this conclusion is subject to two important limitations, which are briefly discussed in the following subsections. Section 6.2 deals with a phenomenon that does not per se belong to change in inflection but nevertheless may affect inflectional properties of particular words. Section 6.3 addresses the relevance of the well-known typological distinction between languages with predominantly ‘fusional’ morphology and those with predominantly ‘agglutinative’ morphology.

6.2. Syntagmatic contamination. The conclusion reached on morphological analogy as operating by replacing whole word forms probably does not mean that inflectional properties of words are never changed in a different manner. In addition to the well-known morphological change in the course of changing phonology, we know of at least one mechanism of change that, though it does not actually target inflection, may affect the morphology of a word without completely replacing it.

As discussed in, for example, Campbell 2004:111–13, words and word forms that are located near each other in frequently repeated pieces of speech sometimes become more similar in almost deliberate ways. This is especially often observed in numerals immediately preceding and/or following each other in counting. See the case of the Ancient Greek words for ‘seven’ and ‘eight’ given in 31 (see Beekes 2010:1066).

(31) Homeric Greek Heraclean dialect Elean dialect

heptá ‘seven’, oktō ‘eight’ > heptá, hoktō heptá, optō

The changes displayed in 31, which can be tentatively called ‘syntagmatic contamination’, cannot count as morphological because they have nothing to do with the morphological properties of the involved lexemes. However, syntagmatic contamination does sometimes affect morphology. In the famous case given in 32 and also discussed in Campbell 2004:112–13, the inherited form of the genitive singular senātūs of Latin senātus ‘senate’ turned into senatī because of the following populī in the frequently used legal formula ‘(of) the Roman senate and people’. It is possible that similar cases can also lead to permanent changes in the inflection of an affected word that is outside of the formulaic expression.

(32) pre-Cicero Latin Cicero

GEN.SG senātūs populī=que Romānī > senatī populī=que Romānī

The conditions required for syntagmatic contamination are both very specific and well understood. The possible interference of this phenomenon with inflectional morphology can be easily taken into consideration in each relevant case. The existence of syntagmatic contamination does not, therefore, invalidate the conclusions on morphological analogy reached in the present paper.

6.3. Fusional versus agglutinative morphology. As is widely known, languages possessing inflectional morphology belong to one of two different types (see, for instance, Coates 2000:618–22). In languages with so-called ‘agglutinative’ morphology, the relation between a morpheme and a particular grammatical function is close to one-to-one. In languages using so-called ‘fusion’, a morpheme may encode a variety of grammatical functions. Accordingly, a language with predominantly agglutinative morphology is likely to encode, for instance, the number and the case form of a noun by two different and clearly separable affixes. A language with predominantly fu-
sional morphology is likely to use just one affix encoding the number and the case form at one and the same time.

All data used in the present discussion of morphological analogy have been taken from languages belonging to different branches of the same Indo-European language family. All of these languages are predominantly fusional. Whether conclusions on morphological analogy reached by investigating fusional languages are also valid for languages with agglutinative morphology is not a priori clear.

A thorough investigation of this question is beyond the scope of the present paper. However, one piece of evidence seems to indicate that in predominantly agglutinating languages, change by a simple recombination of morphemes may be possible. Seifart (2015) has shown that speakers fluent in two such languages can copy derivational affixes from one language into the other directly, without borrowing whole words. The same has been demonstrated for inflectional affixes encoding case in nouns and subject agreement in verbs (see Seifart 2017:395–411, 425–26, Pakendorf 2019). These latter findings are in sharp contrast with what is typically found in predominantly fusional languages (see e.g. Kossmann 2010, 2015:252–56).

However, in both cases of direct affix borrowing in agglutinative languages, it remains to be shown that affixes have indeed been copied and not, rather, structural patterns consisting of a word or a word form lacking the relevant affix and a word or word form containing it.

7. SUMMARY. The discussion has shown that, of the two theoretically possible approaches to morphological analogy in inflection—analogy as modification of inflectional forms by replacing their parts versus analogy as the replacement of inflectional forms as wholes—at present only the latter approach may be viewed as supported by empirical data. In those instances of morphological analogy where the inherited inflectional form and its successor are distinct in more than one morpheme, the former position implies intermediate forms that are not actually attested in the three cases investigated here. Precisely such intermediate forms are not possible under the latter approach. The view of morphological analogy as whole-word replacement seems additionally supported by the observation that leveling in inflectional paradigms depends on model patterns outside of the paradigms in question.

The conclusions reached here have important consequences for the methodology of linguistic reconstruction, for synchronic processing of inflection, and, finally, for derivational morphology. If morphological analogy as modification cannot be secured in the documented history of languages, it should not be assumed for their prehistory. Morphological analogy operating on whole word forms is in better agreement with those theories of inflection that assume whole word forms to be the basic processing unit. Finally, the concept of morphological analogy as replacement of whole words seems applicable to derivational morphology as well.

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