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On the relation between V-to-I and the structure of the inflectional paradigm¹

PETER ACKEMA

Abstract

In this paper an account is provided of the trigger for V-to-I movement. This account explains why relatively rich inflection involves a distinct inflectional node in the clausal structure whereas relatively poor inflection is base-generated on the verb (Rohrbacher 1999), without having to assume that there are two fundamentally different types of inflection. I will argue that there is not a direct causal connection between rich inflection and V-to-I but, rather, that the two are related because having V-to-I and not having rich inflection are alternative ways of avoiding a violation of the same constraint, namely a general constraint that disfavors complex structure below the word (X^0) level. This constraint is a ranked, violable constraint, as in the optimality-theoretic conception of grammar. Its interaction with two other relevant constraints, which concern economy of movement and realisation of the input in the output, will account for the fact that languages can vary in their tolerance level for the amount of inflection on unmoved verbs. The analysis thus explains why no single definition of richness can exactly divide the V-to-I languages from the non-V-to-I ones. It will also account for the English 'V-to-I for auxiliaries only' puzzle.

1. Introduction

Recent research in the realm of V-to-I movement (verb movement out of VP, across a VP-initial adverb, cf. Emonds 1978, Pollock 1989) has supplied some evidence for the idea that this movement is related to the presence of 'rich' verbal agreement inflection in the language in question (see for instance Platzack and Holmberg

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1989; Roberts 1993; Rohrbacher 1994, 1999; Vikner 1997a; Koenenman 2000). Vikner (1997a: 189) provides the data in (1)–(2), which show that in English, Danish and Faroese the verb does not undergo V-to-I, whereas in Icelandic, Yiddish and French it does.² When these data are compared to the paradigms of the regular present tense inflection for finite verbs in these languages (given in (3), from Vikner 1997a: 191), it seems clear that there is some relation between V-to-I and the structure of the inflectional paradigm. At least within this group of languages, paradigms in the V-to-I languages show more distinct forms than those in the non-V-to-I languages.

- (1) a. *That John often eats tomatoes (surprises most people).* (English)
 b. *At Johan ofte spiser tomater (overrasker de fleste).* (Danish)
 c. *At Jón ofta etur tomatir (kemur óvart á tey flestu).* (Faroese)
 d. **Að Jón oft borðar tómata (kemur flestum á óvart).* (Icelandic)
 e. **Az Jonas oft est pomidorn (is a xidesh far alemen).* (Yiddish)
 f. **Que Jean souvent mange des tomates (surprend tout le monde).* (French)
- (2) a. **That John eats often tomatoes (surprises most people).* (English)
 b. **At Johan spiser ofte tomater (overrasker de fleste).* (Danish)
 c. *(*)At Jón etur ofta tomatir (kemur óvart á tey flestu).* (Faroese)
 d. *Að Jón borðar oft tómata (kemur flestum á óvart).* (Icelandic)
 e. *Az Jonas est oft pomidorn (is a xidesh far alemen).* (Yiddish)
 f. *Que Jean mange souvent des tomates (surprend tout le monde).* (French)
- (3) Paradigms of the present tense of ‘hear’

Eng	Dan	Far	Ice	Yid	Fre
<i>hear</i>	<i>høre</i>	<i>hoyra</i>	<i>heyra</i>	<i>hern</i>	<i>écouter</i>
<i>I hear</i>	<i>jeg hører</i>	<i>eg hoyri</i>	<i>ég heyri</i>	<i>ikh her</i>	<i>j’écoute</i>
<i>you hear</i>	<i>du hører</i>	<i>tú hoyrir</i>	<i>pú heyrir</i>	<i>du herst</i>	<i>tu écoute(s)</i>
<i>he hears</i>	<i>han hører</i>	<i>hann hoyrir</i>	<i>hann heyrir</i>	<i>er hert</i>	<i>il écoute</i>
<i>we hear</i>	<i>vi hører</i>	<i>vit hoyra</i>	<i>við heyrum</i>	<i>mir hern</i>	<i>nous écoutons</i>
<i>you hear</i>	<i>I hører</i>	<i>tit hoyra</i>	<i>pið heyrir</i>	<i>ir hert</i>	<i>vous écoutez</i>
<i>they hear</i>	<i>de hører</i>	<i>tey hoyra</i>	<i>peir heyra</i>	<i>zey hern</i>	<i>ils écoute(nt)</i>

For this reason, the above mentioned authors have elaborated in different ways the idea that V-to-I movement is in some way the result of having a richer inflectional paradigm.

2. Since Icelandic and Yiddish also have embedded Verb Second (V-to-C), these data are not yet sufficient to show that these languages have V-to-I independently of this. Vikner shows, however, that the finite verb also occurs in front of VP-adverbials in those types of embedded clause in which embedded V2 is impossible.

Nevertheless, some problems with this idea keep recurring as well (for extensive discussion of such problems see Bobaljik 2000). First, it appears to be difficult to give a definition of ‘richness’ of inflectional paradigms, such that all languages with such a rich inflectional paradigm have V-to-I and all languages that do not have such a paradigm lack V-to-I. Various proposals have been made as to what the defining characteristic of a rich inflectional paradigm is (see the references quoted above). Although these definitions cover a lot of empirical ground, languages remain with paradigms that by these definitions should not trigger V-to-I but nevertheless have it; see, for example, Roberts 1993 on Middle Scots, Lightfoot 1995 on Middle English, and Platzack and Holmberg 1989 or Vikner 1995 on Kronoby Swedish. In general, Roberts (1999: 291) states that “there are certainly languages with V-movement that lack the relevant morphology”.³ Moreover, there are two languages, namely the two variants of Faroese as described in Jonas 1996, that have an identical verbal inflectional paradigm but differ with respect to whether or not they allow V-to-I (hence the bracketed asterisk in (2c)). Also, English poses a problem in this respect. Although this language is often taken as a model for non-V-to-I languages, it does have V-to-I for auxiliaries (cf. Pollock 1989; Roberts 1998):

- (4) a. *John has completely lost his mind.*
 b. *?*John completely has lost his mind.*

This is something of a puzzle, given that an auxiliary like *have* in (4) does not have a richer inflectional paradigm than main verbs.

The second problem that keeps recurring concerns the trigger for V-to-I. Several accounts have been given that establish a relation between rich inflection and an independent I-position in syntax to which the verb must move, but difficulties remain with respect to the explanation of why such a relation exists. Rohrbacher (1994, 1999), for example, argues that the distinction between rich and poor inflection is that the former is referential but the latter is not. He further argues that only referential inflectional affixes are listed as distinct entries in the lexicon and can be inserted separately from the verb in a distinct I-node. Nonreferential inflection is generated directly on the verb. However, it remains unclear why there should be such a link between referentiality and an independent I-position, or, in other words, why the lexical inflectional rules operating before syntax can add ‘poor’ but not ‘rich’ inflection to the verb (cf. Neeleman 1996).

3. The reverse of this problem, namely languages with rich inflection but without V-to-I movement, is potentially even more problematic, since most of the accounts of the phenomenon given so far imply that failure to move the verb when the inflection is rich must lead to ungrammaticality. Nevertheless, some Germanic OV-languages with relatively rich inflection (German, Frisian) might in fact be non-V-to-I. Several arguments have been given against V-to-I raising in embedded clauses in Germanic OV-languages (cf. Reuland 1990, Haider 1993, Koopman 1995), but the issue is difficult to decide (cf. Vikner 1995: 152 ff.). See also section 4 below.

In this paper I will give an account of the trigger for V-to-I which predicts that relatively rich inflection involves a distinct inflectional node whereas relatively poor inflection is base-generated on the verb, as in Rohrbacher's (1994) account, without having to assume that there are two fundamentally different types of inflection, one referential and the other nonreferential. (In fact, it will turn out that rich inflection partly involves base-generation too.) I will argue that there is not a direct causal connection between rich inflection and V-to-I but, rather, that the two are related because having V-to-I and *not* having rich inflection are alternative ways of avoiding a violation of the same constraint, namely a general constraint that disfavors complex structure below the word (X^0) level. This constraint is a ranked, violable constraint, as in the optimality-theoretic conception of grammar (Prince and Smolensky 1993). Its interaction with two other constraints, to do with economy of movement and realisation of the input in the output, will account for the fact that languages can vary in their tolerance level for the amount of inflection on unmoved verbs. In other words, the analysis will explain why no single definition of richness can exactly divide the V-to-I languages from the non-V-to-I ones. It will also provide an explanation for the English 'V-to-I for auxiliaries only' puzzle.

2. V-to-I as a means to avoid structure under X^0

2.1. Grimshaw's (1997) "No-Morphology"

Grimshaw (1997: 382) suggests that the difference between a V-to-I language like French and a non-V-to-I language like English results from a different ranking of the following two constraints:

- (5) No-Lex-Mvt
A lexical head cannot move
- (6) No-Morphology
All syntactic heads contain exactly one morpheme

In English, (5) outranks (6), with the result that the lexical verb remains in its base position. This means that the inflection must be generated directly on the verb in its basic V-position. Thus (6) is violated in order to make it possible for higher-ranked (5) to be satisfied.⁴ In French, by contrast, (6) outranks (5). In that case a violation of (6) is avoided by inserting the inflectional morpheme in a separate head. The lexical verb must move to this I-position to pick up its inflection, resulting in a

4. This presupposes I-to-V lowering to be impossible (pace Vikner 1997b), as I will assume throughout the paper. (Overt lowering is presumably ruled out altogether by independent principles of grammar, see Boškovic and Takahashi 1998 for recent discussion). Hence, in a simple affirmative declarative sentence in English no IP is generated at all (see also Ackema et al. 1993).

violation of lower-ranked (5). Grimshaw does not discuss what happens when there is more than one inflectional morpheme. Following the logic of her argument, it seems these must be generated in a separate head each in a language like French, with ranking (6) >> (5).

The core of the proposal to be made below is a development of this account, but there are some problems with Grimshaw's proposal as it stands.

First, given its formulation, the constraint in (6) appears to be based on the idea that overt morphemes, instead of just features, are inserted in syntax. However, there are a number of serious disadvantages to the insertion of overt affixes in syntax; a good case can be made for a model of grammar in which only the syntactically relevant (i.e., not phonological) features are present in syntax and in which spell-out rules consequently determine how these features are realized by overt morphemes (see Sproat 1984; Ackema and Don 1992; Halle and Marantz 1993; Beard 1995, Stump 1998: 37–38; Ackema and Neeleman 2000c; and Bobaljik 2000 for detailed discussion and various proposals). I will therefore adopt the view that there is a strict separation between morphosyntactic structure, which contains inflectional phi-features, and morphophonological structure, which contains the overt morphemes corresponding to these features. As noted, the link between the two levels of structure is established by realisation rules or (looking at it in a less unidirectional way) correspondence rules (see Jackendoff 1997 for general discussion).

A second problem with Grimshaw's proposal as it stands is that, in a language like French, after V-to-I movement has taken place (6) seems to be violated after all. One way to avoid this conclusion would be to say that (6) is valid at D-structure but not at S-structure. This is not an attractive state of affairs, however, given that the status of D-structure is unclear in the usual conception of optimality theoretic syntax, where constraints operate on surface representations. (See also Chomsky 1995, who argues that only levels of representation that interface with the articulatory-perceptual or the cognitive-interpretational systems impose constraints on linguistic structure; and compare Brody 1995 and Jackendoff 1997, who argue for a unirepresentational theory of syntax in general).

Thirdly, and most important for the present purpose, it is not clear why there is a relation between V-to-I, i.e. between ranking (6) above (5), and the structure of the inflectional paradigm in the language. Grimshaw remarks that "this should now be understood as reflecting a relationship between properties of inflection and existence as an independently projecting head" (p. 382), but it remains unclear why such a relationship should exist. I will argue that a reformulation of the constraint in (6), along with bringing the Parse family of constraints in the picture, can answer this question.

2.2. *No-Morphology and the morphosyntactic structure of inflected words*

Let us assume, then, that the constraint in (6) is to be reformulated as in (7). (The constraint in (7) is similar, though not identical, to Neeleman's (1994) "Complexity Constraint" and Roberts's (1997) *[_{Word} Word Word] constraint; see also Ackema and Neeleman (2000b) for discussion of the preference for syntactic realisation of certain inputs over morphological realisation of the same input).

- (7) No-Morphology (new formulation)
 *Dominate(X^0 , (Y,Z)), where Y and Z are sisters and are distinct from X^0

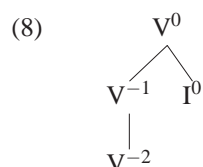
The constraint in (7) is violated by every triple in a tree structure of a zero-level node A and a pair of sister nodes B and C distinct from A when A dominates B and C.

The next question concerns the structure of an inflected verb in the morphosyntactic module of grammar. As assumed above, overt inflectional morphemes are not present in this module. For some authors, this has been reason to assume that inflected verbs are the spell-out of syntactically simplex verbal heads that are specified for particular person, number, etc., features (see, for instance, Anderson 1992 and Beard 1995). Others have argued, however, that this view leads to a rather unconstrained theory about possible morphological relationships between words. Such relationships are typically handled by redundancy rules over complete phonological forms in the affixless models just referred to. Now, whereas in an affix-based theory the phonological forms that affixation may take are subject to the general constraints on phonological operations in the language, these constraints cannot be said to apply to redundancy rules. Crucially, no phonological operation which adds an affix to a base is thought to take place in this conception of grammar. One consequence of this is that a phenomenon like the Mirror Principle (cf. Baker 1985; Grimshaw 1986) cannot be explained satisfactorily in these models. (For further discussion see Don 1993: 89 ff. and Ackema 1999: 216 ff.)

The idea that overt morphemes do not belong in syntax can be reconciled with the idea that inflected words have a syntactically nonsimplex structure by assuming that syntax contains positions hosting particular morphosyntactic features (so there are abstract morphemes) which do not necessarily correspond in a one-to-one fashion with morphemes in the morphophonological module (cf. Halle 1990; Ackema and Don 1992; Halle and Marantz 1993). The next question then is: what kind of position do these features occupy in the syntactic module? A rather common view is that they are generated as heads of their own functional projection. However, this view is not a necessary consequence of the idea that syntax contains abstract inflectional affix positions. The morphological realisation rules do not care how the verbal complexes whose spell-out they determine have been derived, in particular, whether they have been derived by head movement of the lexical head to a (number of) functional head(s) or whether the abstract inflectional heads have been base-generated on the lexical head. In principle, then, we might expect language

variation: an inflectional feature may be generated in a functional head position in one language but be base-generated on the lexical head in another. It may even be the case that within one language, one feature is generated in a distinct head and another one on the lexical head. This may not seem an attractive source of either cross-linguistic or language-internal variation at first sight. However, as I will show below, whether a feature is base-generated on the lexical head or in a distinct head position need not be stipulated as such, but can be made to follow from the grammar of the language (so from its constraint hierarchy in an OT perspective on grammar). For present purposes, the relevant features are those of the “I” domain. The question is why a distinct I-position is postulated in some languages but not in others (triggering V-movement in the former but not the latter) and why this is related to the structure of the inflectional paradigm of the language.

Consider in this respect the effect on the constraint in (7) of base-generation of inflectional features on the verb or generation of these features in a distinct head. Although not crucial,⁵ I assume that base-generated inflection in the languages under discussion occurs in a specifier position within a subzero verbal projection, as in (8).

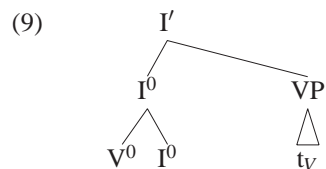


The general idea, motivated in detail in Ackema (1999), is that morphological structures resemble syntactic structures in all relevant respects, containing not only adjunct positions but also argument positions. When a morpheme occupies such an argument position, it functions as an argument with respect to the verbal head. (In other words, this is a structural instantiation of the idea that morphemes in complex words can fulfil the same grammatical function as independent syntactic constituents, an idea also defended in some LFG approaches to the issue, see, for instance, Mohanan 1995; Bresnan 2000; Toivonen 2000). Subject agreement functions as the subject argument of the verb, hence occupies a specifier position (whereas in languages with verbal object agreement, this occurs in subzero complement position, functioning as the internal argument). The syntactic subject DP functions as the antecedent of argumental agreement inflection, providing the reference of this argument. In languages in which the agreement inflection has

5. The precise structure of verbs with base-generated positions for inflectional features has no consequences for the analysis below as long as this structure violates (7). This is presumably the case in all structures one can imagine, even if base-generated inflection would simply be adjoined to V^0 . In base-generated adjunction structures, in contrast to adjunction structures derived by movement (see below), the lower and higher segments of the node adjoined to are arguably distinct categories (as is relevant for (7)), see Coopmans 1988 for evidence.

unambiguous feature make up, it does not need a pronominal syntactic subject as an antecedent, resulting in the possibility of pro drop. This can be compared to the more or less classical idea (expressed in Chomsky 1981; Jaeggli 1986; and Baker et al. 1989) that in passives the participial inflection functions as the verbal head's subject argument. The only difference with finite inflection then is that participial morphology cannot have a syntactic DP antecedent, as it lacks person/number features (hence the "dethematisation" of the syntactic subject position in this case). (For more motivation of these claims see Ackema 2001.)

Consider now how (8) fares on the constraint in (7). V^{-1} and I^0 are distinct from V^0 , which dominates these nodes. Hence, (7) is violated. As in Grimshaw's proposal, then, the trigger for generating the inflection in a distinct head position, and hence for V-to-I, must be that it avoids violation of (7). As noted above, it must be ensured that after verb movement the relevant condition is not violated after all. Indeed, in (9), the structure that results after V-to-I, (7) is not violated if the two I-segments that are created as a result of adjunction by movement are not distinct, as argued by May (1985), Chomsky (1986) and others (see also footnote 5).



In this way, V-to-I is a means to prevent violation of the No-Morphology constraint in (7). This constraint, which essentially penalises structure building by base-generation, or Merge in current terms, can be regarded as an "economy of merger" counterpart to economy of movement. Just like economy of movement, (7) in effect says merger should be minimised. The only other thing about (7) is that it specifically mentions merger below the X^0 -level. Of course, (7) may just be a special instance of a more general "do not merge" constraint (compare the general *STRUC ("no structure") constraint of Prince and Smolensky 1993: 25), but, as the implications of assuming such a general constraint go well beyond the scope of this paper, I will stick to the definition in (7).⁶

In the next section I turn to the main issue, namely the question why a relation appears to exist between V-to-I and the structure of the agreement paradigm.

6. Of course, in every language structure is built, so constraints on economy of merger must be counteracted by constraints that require realisation of the input, namely the family of Parse constraints. The interaction of (7) and other constraints with Parse constraints allows for the situation that in some instances partial or complete nonrealisation of the input is optimal. This accounts for some instances of "absolute ungrammaticality" (inputs for which no output at all exists in some language); see Legendre et al. (1998) and Ackema and Neeleman (2000a) for discussion of this issue within syntax. Of course, if a general "do not merge" constraint outranks every other constraint in the constraint hierarchy no input at all will be realised; for obvious functional reasons this hierarchy does not correspond to the grammar of an actual natural language.

3. The relation between V-to-I and 'rich' inflection

In the previous section I argued, basically following Grimshaw (1997), that having V-to-I avoids the violation of (7) caused by a verb with base-generated inflectional structure. However, there is an alternative way of avoiding such a violation: leaving out the inflection. If V^0 does not need to accommodate an inflectional node, (7) is satisfied as well. Although things cannot be as simple as this (languages without V-to-I do not necessarily show total absence of inflection), this is the basic idea to be pursued here: V-to-I and leaving out inflection are two alternative solutions to the same problem, hence languages without V-to-I usually have poorer inflection than languages with V-to-I (a similar idea is put forward by Vikner 1997b).

Before turning to the complication that non-V-to-I languages can have some inflection, another issue needs to be addressed first, namely why there is no universal preference for one of the options to avoid violation of (7) over the other. As discussed in the previous section, a V-to-I structure like (9) satisfies (7). However, it violates the No-Lex-Mvt constraint in (5). If the inflection is left out of syntax and the verb is not moved, both No-Morphology in (7) and No-Lex-Mvt in (5) are satisfied. So why is leaving out inflection not universally preferred over V-to-I?

Obviously, this must be because leaving out some element from the structure is penalised as well. If the input of a sentence consists of some representation of its semantics (only sentences with nondistinct meaning compete in the constraint evaluation, see for instance Grimshaw 1997), features like person, number and tense will be fully specified in the input. Not realising such features in the morphosyntactic structure then violates a member of the Parse family of constraints, namely (10).

- (10) Parse-Phi
Parse the phi-features in the input

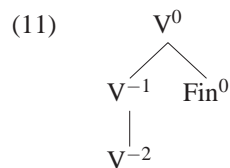
This constraint is violated once for each phi-feature in the input that is not present in the syntactic structure.

The basic account then is as follows. Languages in which Parse-Phi is ranked above No-Lex-Mvt have rich inflection and avoid a violation of (7) via V-to-I movement. Languages in which No-Lex-Mvt is ranked above Parse-Phi do not have V-to-I and avoid a violation of (7) by not parsing inflection.

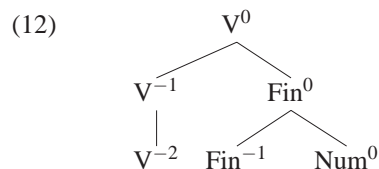
So, completely leaving out inflection is a means to satisfy No-Morphology. However, this cannot be the end of the story. In languages that do not have V-to-I, some inflection can appear on the verb. Yet any base-generated inflection under V^0 leads to a violation of No-Morphology, as discussed in section 2. Also, another problem, mentioned in section 1, is not answered by the basic proposal yet: not all V-to-I languages have the same number of distinctions in their inflectional paradigm. In fact, there is a language with the bare minimum of distinctions (just one finite form in the present tense, which differs from the infinitive) that shows this movement (Kronoby Swedish, see below).

Before these problems can be addressed, it must first be noted that No-Morphology is not a constraint that is violated or not but a constraint that can be violated to different degrees: it is violated once by every triple in a tree structure of a zero-level node A and a pair of sister nodes B and C distinct from A when A dominates B and C. Informally, more base-generated branching structure below the zero level leads to more violations of (7). I assume that for every feature that is expressed in the inflectional paradigm of a language, as indicated by the presence of distinct forms for opposing values of that feature, an inflectional node is present in the morphosyntactic structure. Furthermore, I assume that inflectional features express binary oppositions only (so there cannot be monolithic [1], [2] and [3] person features). For concreteness, I will adopt a feature system that includes the binary inflectional features [+/-ad(dressee)] and [+/-sp(eaker)] besides [+/-num(ber)] and [+/-fin(ite)] (see Kerstens 1993, Harley and Ritter 1998, and references cited there). Then 1st person is [+sp], 2nd person is [-sp, +ad] and 3rd person is [-sp, -ad]. Note that 1st person is not specified for [ad] since its specification as [+sp] already discriminates it from 2nd and 3d person.

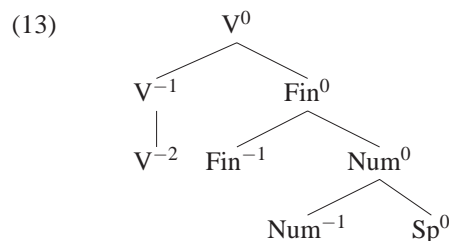
To illustrate, the tree in (11) occurs if in a paradigm the finite verb forms differ from the infinitive, in case inflection is base-generated on the verb (cf. (8)).



If, in addition to this, singular endings differ from plural ones the structure is as in (12).



If also, for example, first person differs from second and third person we get (13).



Every terminal inflectional node is specified for the + or – value of that particular feature. At PF, the string of terminal nodes in the tree corresponds to one (in case of fusion) or more (in case of agglutination) morphemes from the inflectional paradigm. Clearly, (13) is worse with respect to No-Morphology in (7) than (12), which in turn is worse than (11). To be precise, whereas (11) violates No-Morphology only once, (12) violates it three times (once for each of the triples (V^0, V^{-1}, Fin^0) , (V^0, Fin^{-1}, Num^0) and (Fin^0, Fin^{-1}, Num^0)) and (13) violates it six times (because of (V^0, V^{-1}, Fin^0) , (V^0, Fin^{-1}, Num^0) , (V^0, Num^{-1}, Sp^0) , (Fin^0, Fin^{-1}, Num^0) , (Fin^0, Num^{-1}, Sp^0) , and (Num^0, Num^{-1}, Sp^0)).

As yet, the gradable nature of violations of the No-Morphology constraint does not help explaining the possible presence of inflection in non-V-to-I languages. If No-Morphology is ranked higher than the other relevant constraints, as assumed in the account of V-to-I versus non-V-to-I above, then violating it at all must be avoided if possible, given the absolute priority of higher constraints over lower ones in optimality theory. Therefore (11), simple as it is, should already be banned in a language with No-Morphology on top of the constraint ranking. Instead, such a language should either have V-to-I, or no inflection at all. So, we are still stuck with the wrong prediction that V-to-I is absent only in languages without any inflection.

I will argue that, if the operation of local conjunction of constraints, as proposed by Smolensky (1995), is applied to the constraint in (7), the presence of inflection in some non-V-to-I languages and cross-linguistic differences in precisely how much inflection is tolerated on verbs in situ can both be accounted for.

Smolensky argues that, given two constraints C1 and C2, a new constraint is created by conjoining C1 and C2. By definition, the resulting constraint C1&C2 is violated in case both C1 and C2 are violated in some particular local domain, but not otherwise. Crucially (for our purposes), a constraint can also be conjoined with itself. The result is a new constraint, call it C^2 , which is violated whenever the structure induces two distinct violations of C within a particular domain. It is not violated when C is violated only once, or not at all. From C^2 and C the constraint C^3 can be derived by conjunction, which is violated whenever C is violated three times, but not when C is violated less than three times, in the relevant domain. And so on. Crucially, C^n can be in a different position in the constraint hierarchy than C is. Specifically, C^n can be in a higher position than C^{n-1} , with crucially interacting constraints in between the two.⁷ The possibility of apply-

7. A ranking in which C is ranked higher than C^2 , does not have different effects from a ranking with C only. This is because in all candidates that remain after evaluation of C, C is violated the same minimal number of times, so that lower-ranked C^2 cannot discriminate between these candidates. The reverse is not true: if C^2 is ranked above C, then if there are candidates in which C is violated either once or not at all, these equally survive C^2 ; obviously, C can discriminate between such candidates. In general, adding C^n to a ranking can only have an empirical effect if it is ranked higher than C^{n-1} and some constraint with which C interacts intervenes between the two.

ing self-conjunction like this to the No-Morphology constraint in (7) implies that the constraints No-Morphology² (violated whenever No-Morphology is violated twice), No-Morphology³ (violated when No-Morphology is violated three times), etc., can be part of the constraint hierarchy as well.⁸ The local domain for evaluation of these conjoined constraints is the morphosyntactic word, X^0 .

Now, as noted, the structure in (11), which can occur in non-V-to-I languages, violates No-Morphology only once. Hence, it does not violate No-Morphology¹⁺ⁿ ($n > 0$). The fact that V-to-I need not be triggered in this case can then be derived by the assumption that it need not be No-Morphology itself whose violation is to be avoided, but rather a higher order No-Morphology constraint.

Consider for instance the following constraint ranking:

- (14) No-Morphology³ \gg No-Lex-Mvt \gg Parse-Phi \gg No-Morphology

Because both No-Lex-Mvt and Parse-Phi outrank No-Morphology, a single inflectional Fin-node can be base-generated on the verb (so No-Morphology is violated but Parse-Fin is satisfied), without there being V-to-I (so No-Lex-Mvt is also satisfied). But if a second phi-feature is parsed, the resulting structure either violates No-Morphology³ or No-Lex-Mvt. If the second feature is base-generated on the verb as well, No-Morphology³ is violated (because No-Morphology is violated three times in that case, see for instance (12) and the discussion below it). If the second feature is generated in a distinct head and there is V-movement to this head No-Lex-Mvt is violated. Given that No-Morphology³ and No-Lex-Mvt outrank Parse-Phi in (14), the second feature will not be parsed at all under this ranking. Then only one feature is parsed, with the result that the verb can be specified as finite (distinct from the infinitive) but is underspecified with respect to person and number.

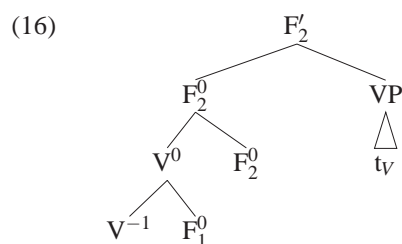
Compare this with the ranking in (15).

- (15) No-Morphology³ \gg Parse-Phi \gg No-Lex-Mvt \gg No-Morphology

As with the ranking in (14), one inflectional node can be base-generated on the verb, but again it is impossible to let this node branch into nodes for two distinct phi-features, because this would incur a fatal violation of No-Morphology³. However, since in (15) Parse-Phi outranks No-Lex-Mvt it is more important to parse a second phi-feature than not to have verb movement. Hence, the second feature is generated in a distinct head and there will be verb movement to this head. This results in a structure like (16) (where the particular nature of the phi-features is

8. Alderete (1997) and Itô and Mester (1998) argue that the fact that effects of the Obligatory Contour Principle concern the local co-occurrence of marked but not unmarked features follows naturally by treating these effects as the result of local self-conjunction of phonological markedness constraints. Legendre et al. (1998) invoke local self-conjunction of a syntactic barrier-type constraint in an account of island effects in wh-extraction in Chinese. So the mechanism as such is also motivated by phenomena entirely unrelated to those under discussion here.

left unspecified⁹), which satisfies No-Morphology³ (No-Morphology is violated twice, by the triplets (F_2^0, V^{-1}, F_1^0) and (V^0, V^{-1}, F_1^0) – recall that the two F_2^0 -nodes created by V-adjunction are nondistinct, so that the triple (F_2^0, V^0, F_2^0) does not violate (7)).



If, in contrast to (14)–(15), No-Morphology³ is ranked below Parse-Phi and No-Lex-Mvt, two distinct phi-features can be base-generated on the verb. Parsing a third feature, however, leads to six instead of three No-Morphology violations (see (13) and the discussion there), so that this will be impossible again if No-Morphology⁶ is ranked high, as in (17).

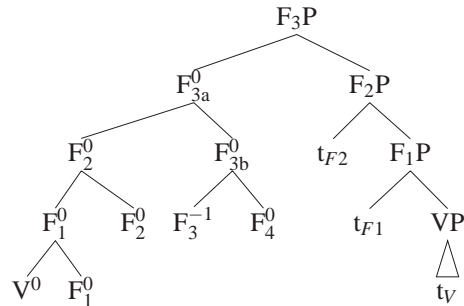
(17) No-Morphology⁶ >> Parse-Phi >> No-Lex-Mvt >> No-Morphology³

The ranking in (17) has an interesting consequence. As was just explained, given this ranking, two phi-features can be base-generated on the verb. A third feature can be generated in a distinct head, triggering V-to-I, without leading to violations of No-Morphology⁶ or Parse-Phi. However, (17) also allows for a derivation in which even a fourth phi-feature can be parsed without resulting in a violation of No-Morphology⁶. This is possible by generating the features in three distinct head positions, the third containing two features and the other two one each, and then having successive cyclic head movement to these nodes. The resulting representation is given in (18).¹⁰

9. The analyses here and below are based on the number of features that are parsed; they do not account for which features are parsed if, say, two but not more can be parsed. This relates to a general problem in the theory of L1 acquisition. If a child encounters a morphological distinction between two forms in a paradigm it will assume that this is the expression of a different specification for some feature of these forms – but which feature does it assume that the distinction expresses? Presumably there is a universal feature hierarchy in UG guiding acquisition in this respect, since some features are more likely to be expressed than others (cf. Greenberg 1966). At the same time, it does not appear to be possible to make an absolute implicational scale, such that a feature lower on the hierarchy is only expressed in a language if all features higher on the scale are as well. The issue is discussed in Pinker (1984: chapter 5). Pinker proposes a mechanism for the acquisition of inflection in which the “grammaticizability hierarchy” determines the probability of a certain feature being chosen in the child’s initial hypothesis about a morphological distinction it encounters.

10. Here and below I ignore possible internal structure of the functional projections, in particular possible specifier positions; for the present purposes, this extra structure would be irrelevant.

(18)



This representation violates No-Morphology five times ((F_{3a}^0, F_1^0, F_2^0) , (F_{3a}^0, V^0, F_1^0) , (F_2^0, V^0, F_1^0) , $(F_{3a}^0, F_3^{-1}, F_4^0)$ and $(F_{3b}^0, F_3^{-1}, F_4^0)$ – all other triplets involve nondistinct nodes), so No-Morphology⁶ is satisfied. Given that this derivation exists, the fourth phi-feature is in fact parsed obligatorily, preventing a fatal violation of Parse-Phi in (17). As a result, in languages in which V-to-I is already triggered by the impossibility of generating more than two inflectional features on verbs in situ, V-movement allows, and therefore forces, parsing *all* features. It is not surprising, then, that generalisations about the kind of paradigm that goes together with to V-to-I, concur on paradigms that show distinct marking in one or more cells for every relevant feature (cf. Rohrbacher 1999, Koeneman 2000).

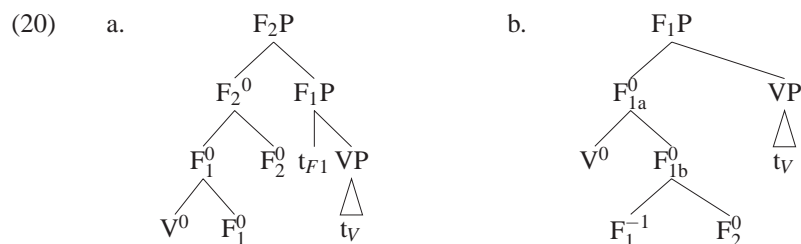
However, as mentioned in the introduction, there are exceptions to these generalisations as well. This can now be understood as follows: in the grammar of these ‘exceptional’ languages it is not No-Morphology⁶ but a lower order No-Morphology constraint that is ranked above No-Lex-Mvt and Parse-Phi. As a result, in case of poorer inflectional structure the grammar can trigger V-to-I (and actually does trigger V-to-I if also Parse-Phi \gg No-Lex-Mvt) as well; see the discussion around (14)-(15). If, for example, the No-Morphology constraint itself already outranks Parse-Phi and No-Lex-Mvt, then the single phi-feature that is parsed must be generated in a distinct head, as in (9). (See also the discussion on Kronoby Swedish in section 4 below.) So, a language with very poor inflectional structure can still have V-to-I, namely if it has the partial grammar in (19).

(19) No-Morphology \gg Parse-Phi \gg No-Lex-Mvt

At first sight, one might still expect rich inflection in a language with the constraint ranking in (19), by generating every feature to be parsed in a distinct head position or by letting the additional functional head or heads branch itself, as discussed in connection with the example in (18). This would rob us of our account of the

Nevertheless, it may be noted that there is indeed evidence for a connection between V-to-I and more specifier positions in the ‘Mittelfeld’ of the clause. V-to-I languages typically have more than one subject position available (as shown by the existence of transitive expletive constructions) and also typically allow object shift. See Bobaljik (2000) and Koeneman and Neeleman (2001) for recent discussion.

existence of V-to-I languages with poor inflection. In fact, however, it is impossible to parse a second feature in a language with the ranking in (19). Whether generated in a distinct head position, as in (20a), or in the same head position as the first feature, as in (20b), an additional parsed feature results in a structure that does violate No-Morphology.



In (20a) No-Morphology is violated once (because of (F_2^0, V^0, F_1^0)), in (20b) it is violated twice (because of $(F_{1a}^0, F_1^{-1}, F_2^0)$ and $(F_{1b}^0, F_1^{-1}, F_2^0)$). This means that, despite the partial Parse-Phi \gg No-Lex-Mvt ranking in (19), there is no other option to satisfy No-Morphology than by leaving further features unparsed. But since by having V-to-I one feature can be parsed without violating No-Morphology, V-to-I is triggered and this single feature is parsed.

Concluding, how much inflection on a verb in situ is tolerated by a language (before V-to-I is triggered or before inflection is left out) depends on the lowest No-Morphologyⁿ constraint that still dominates either Parse-Phi or No-Lex-Mvt (recall that universally $C^n \gg C^{n-1}$). If base-generating another phi-feature on the verb leads to a violation of this particular constraint, then either V-to-I is triggered (if Parse-Phi \gg No-Lex-Mvt) or the feature is left unparsed (if No-Lex-Mvt \gg Parse-Phi). This accounts for the observed fluid, rather than rigid, demarcation line between V-to-I and non-V-to-I languages in terms of the richness of their inflectional structure.

4. Typology

In this section I will show how the observed language typology with respect to V-to-I follows from variation in the constraint hierarchy, as discussed in the abstract in the previous section.

Consider the ranking in (17) again, repeated below in (21).

- (21) No-Morphology⁶ \gg Parse-Phi \gg No-Lex-Mvt \gg No-Morphology³

As discussed in section 3, it results in a language which has V-to-I and which parses all phi-features. This is indicated by at least one first person form that is distinct from the other persons (showing that [+/-sp] is parsed), at least one

second person form that is distinct from third person ([+/-ad]), at least one singular form that is distinct from the corresponding plural ([+/-num]) and by a distinct infinitive ending ([+/-fin]).¹¹ Languages conforming to this pattern are, for instance, Icelandic and French. Both have V-to-I and they have the following paradigms:

(22)

	Icelandic		French	
	inf. -a		inf. -er	
	sing	plur	sing	plur
1	-a	-um	-e	-ons
2	-ar	-id	-e(s)	-ez
3	-ar	-a	-e	-e(nt)

The correspondence rules (relating morphosyntactic features to morphophonological forms) that are minimally necessary to account for (22) are given in (23).

- (23) a. (Ice)
 [-num,+sp] → -a, [-num,-sp] → -ar, [+num,+sp] → -um, [+num,-sp,+ad] → -id, [+num,-sp,-ad] → -a, [-fin] → -a
- b. (Fr)
 [-num] → -e, [+num,+sp] → -ons, [+num,-sp,+ad] → -ez, [+num,-sp,-ad] → -e, [-fin] → -er

All phi-features are referred to in these rules, which implies that the complete feature make up of the input is parsed in syntax in these languages. This also means that the paradigms in (22) show some instances of accidental homophony (instead of syncretism that results from not parsing phi-features). For example, given that all phi-features are parsed, 2sg and 3sg in Icelandic must be [-num,-sp,-ad] and [-num,-sp,+ad], respectively, so that there are really two correspondence rules (instead of one that mentions just [-num,-sp] as in the minimally necessary (23)), which happen to relate these feature matrices to the same affix -ar at PF.

The following class of languages to be discussed also have V-to-I, but poorer inflection than French and Icelandic. As discussed in section 3, such languages are characterised by a ranking that is similar to that in (21), but with a lower order No-Morphology constraint on top. Examples are older stages of English, Scots and

11. Given that the trigger for V-to-I proposed here is related to the number of features that are parsed, and given that in infinitival clauses no distinct [sp], [ad] or [num] features are parsed (as also indicated by the lack of distinct inflectional endings for infinitives), it is to be expected that infinitives need not undergo V-to-I in languages which have this movement for finite forms. Infinitives do move in some languages under some circumstances, but this may involve V-to-C rather than V-to-I, see for instance Johnson and Vikner (1994) on Icelandic and Hoekstra (1997) on Frisian. I will disregard this matter here.

Danish, for which it has been observed that deflexion in the inflectional paradigm preceded the loss of V-to-I by some centuries (Lightfoot 1995: 45, Roberts 1999: 291–292). The most extreme case, however, appears to be instantiated by present day Kronoby Swedish. This language has V-to-I, but the inflectional endings for finite forms, although distinct from the infinitive, are all the same (Platzack and Holmberg 1989). Hence, the correspondence rules mention only one feature, [+/-fin]. Such a language has the partial grammar in (19), repeated here in (24).

(24) No-Morphology >> Parse-Phi >> No-Lex-Mvt

This grammar leads to one inflectional node (which can host the [+/-fin] feature) being generated in a distinct head, plus V-movement. The resulting structure satisfies No-Morphology, see (9) and the discussion there. Parsing more features would, however, result in a violation of No-Morphology, even if these features were also generated in distinct heads (as discussed in connection with (20)).

Note that, given this analysis, in V-to-I languages parsing at least one ([+/-fin]) feature is always possible, and therefore obligatory. On the other hand, in some non-V-to-I languages, namely those characterised by the ranking in (25), inflectional endings are banned altogether.

(25) No-Morphology >> No-Lex-Mvt >> Parse-Phi

This means there is, after all, a minimum requirement on the inflectional structure of V-to-I languages: they must have a distinction between their finite and infinitive forms. If a language has only one verbal form overall it should not have V-to-I. This prediction appears to be correct (Sten Vikner, personal communication). (The snag here is, of course, that the distinct finite ending might accidentally be homophonous to the infinitival one).

Let us now turn to non-V-to-I languages. Consider first a non-V-to-I language with poor inflection, like Danish (cf. Vikner 1995):

(26)

Danish		
inf. -e		
sing plur		
1	-er	-er
2	-er	-er
3	-er	-er

The following correspondence rules suffice to account for this paradigm:

(27) [+fin] → -er, [-fin] → -e

We see that, as in Kronoby Swedish, only the [+/-fin] feature is mentioned. Absence of V-to-I follows if the Danish grammar contains the partial ranking in (28):

(28) No-Morphology³ >> No-Lex-Mvt >> Parse-Phi >> No-Morphology

One feature can be base-generated on the verb, but further features are left unparsed in order to avoid violations of either No-Morphology³ or No-Lex-Mvt. If this hypothesis is correct, the single *-er* affix in the Danish paradigm represents just [+fin], not number, speaker or addressee features (so there are not six homophonous fully specified *-er* affixes).

English also lacks V-to-I, but allows for one more inflectional feature to be base-generated on the verb. Compared to (28), the grammar of this language also has a partial ranking No-Lex-Mvt >> Parse-Phi, but this partial ranking is 'higher up' with respect to the universal hierarchy of No-Morphology constraints. To be precise, English has the ranking in (29).

(29) No-Morphology⁶ >> No-Lex-Mvt >> Parse-Phi >> No-Morphology³

The English paradigm is shown in (30), the correspondence rules necessary to account for it are given in (31).

(30)

	English	
	inf. 0	
	sing	plur
1	0	0
2	0	0
3	-s	0

(31) [-num, -ad] → -s¹²

The one correspondence rule in (31) suffices; note that no rule mentioning [+/-fin] is needed since the infinitive has no distinct ending.¹³

English does provide some complications. The first is V-to-I for auxiliaries, which will be discussed in the next section. The second concerns *do*-support.

As with V-to-I, there is an extra verbal head position in the structure of the clause when there is *do*-support. However, the reason for generating this extra head position is not the same as the reason for generating an extra head position in cases of V-to-I. The precise reason for this is discussed by Grimshaw (1997) and others,

12. Since this rule explicitly mentions [-ad] in its specification, first person is excluded from it. First person is not specified for the ad feature at all, see section 3. Its specification as [+sp] implies that it must be -addressee, but [-ad] is not in its feature make up.

13. Despite the distinct *-ed* ending of past tense forms the rule in (31) need not mention [-past] either, under the plausible assumption that present tense is the default so that a morpheme need not be specified as such (cf. Jensen 1990: 141, Lieber 1992: 101, Noyer 1993: 6). Note that for the past tense a correspondence rule referring only to [+past] suffices, so No-Morphology⁶ is in no danger of being violated there either.

which I will follow without further discussion here. The potential problem for the account of V-to-I proposed above concerns the reason why, when such an extra head position is necessary in English, it is filled by *do* instead of triggering verb movement. Grimshaw argues that this is a consequence of the interaction between No-Lex-Mvt and the constraint Full-Int(erpretation). Insertion of dummy *do* violates Full-Int, but renders movement of the main verb unnecessary. Therefore, if No-Lex-Mvt \gg Full-Int *do*-support is preferred in case a higher head position must be filled.

The question then is why, if the higher head position is generated in order to avoid a violation of a No-Morphology constraint (in a V-to-I language, in contrast to English), *do*-insertion is never preferred to moving the main verb. If *do*-support would be a viable alternative to V-to-I, it is predicted there should be languages in which main verbs cannot appear in a finite form and in which every finite clause contains a form of *do*. As far as I know, such a language is unattested.¹⁴ The answer to this problem is that, if avoidance of a No-Morphology violation is the trigger for generating the extra head, base-generating inflected *do* in that head position does not help, because it does not eliminate the violation of the relevant No-Morphology constraint. As argued in section 3, we can only derive fewer violations of No-Morphology by moving a less inflected verb in V to a distinct inflectional node. In combination with the standard assumption that nonlexical dummy *do* cannot be generated as the head of the VP, this explains why there are no languages that have obligatory *do*-support in all finite clauses.

After discussing the clear V-to-I and clear non-V-to-I languages, let us turn to Faroese. There are two dialects of this language, which have the same verbal inflectional paradigm but differ with respect to allowing V-to-I or not, see Jonas (1996) and Bobaljik and Thraínsson (1998) and references cited there.¹⁵ For obvious reasons, such a situation is hard to account for within theories in which a given inflectional paradigm obligatorily leads to either V-to-I or its absence. Bobaljik and Thraínsson (1998) argue that an alternative is necessary in which “it is not the “richness” of agreement morphology that is important, but rather the more general structure of the verbal morphology. In particular it is the (im)possibility of multiple

14. In some Dutch and German dialects a periphrastic construction with *do* can occur instead of a simple finite main verb, but this does not appear to be obligatory in any of these dialects; moreover, it is very uncertain that this has anything to do with V-to-I rather than V2 (V-to-C). For data and discussion see Tieken-Boon van Ostade (1990) (Dutch dialects, and acquisitional and historical data) and Erb (1995) (German dialects).

15. Monolingual speakers of the older V-to-I dialect seem to have disappeared, leaving only monolingual speakers of the non-V-to-I dialect and bilingual speakers of both dialects.

inflectional morphemes on the finite verb which is important, and not the features which these morphemes express". The analysis proposed here is, of course, of this type, and the distinction between the two dialects of Faroese can indeed be made to follow.

The paradigm for the present tense in Faroese is given in (32). The necessary correspondence rules that account for this paradigm are given in (33).

(32)

Faroese		
inf. -a		
	sing	plur
1	-i	-a
2	-ir	-a
3	-ir	-a

(33) $[+sp, -num] \rightarrow -i, [-sp, -num] \rightarrow -ir, [+num] \rightarrow -a, [-fin] \rightarrow -a$

Faroese I has a grammar in which both Parse-Phi and No-Morphology⁶ outrank No-Lex-Mvt, as in (34). This ranking forces V-to-I and the parsing of four features, as in (18) above. Faroese II, which lacks V-to-I, differs only in that here No-Lex-Mvt outranks No-Morphology⁶, as in (35), which forces base-generating the three inflectional features mentioned in (33) on the verb, rather than applying verb movement.

(34) Parse-Phi \gg No-Morphology⁶ \gg No-Lex-Mvt (Faroese I)

(35) Parse-Phi \gg No-Lex-Mvt \gg No-Morphology⁶ (Faroese II)

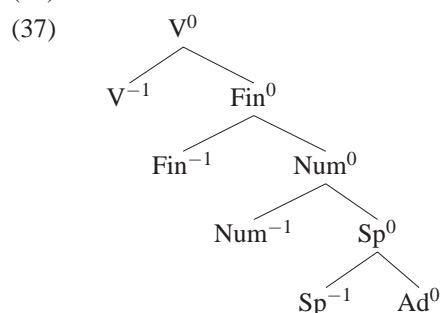
Note the subtle difference between what the paradigm in (32) represents in Faroese I versus II. As noted, in Faroese I, with grammar (34), four features are parsed. This means that the forms in (32) are also specified for the [ad] feature in this variant, although this feature is nowhere distinctly marked in the paradigm (as can be seen from the minimally necessary correspondence rules for this paradigm in (33)). This has ultimately led to Faroese II: new L1 learners do not like to adopt a feature for which there is no overt evidence. Instead, they assume that only the three features mentioned in (33) are morphosyntactically present (so for these speakers there is real syncretism in the paradigm). However, the grammar in (34) cannot account for this situation, since it obligatorily leads to four features being parsed. This leads to a minimal change in the ranking: the L1 learner adopts (35) instead of (34). The result is the loss of V-to-I in the language. Of course, a prerequisite for this change is not only that the morphological evidence for (34) is lost, but also that the syntactic evidence, to wit V-to-I itself, does not force the child to adopt (34) at the cost of introducing redundant features in its morphology (this is, after all, what the Faroese I speakers do). In other words, loss of inflection is a prerequisite for loss of V-to-I but it is not sufficient: the earlier unambiguous

evidence for V-to-I must either be lost by external factors (like a significant influx of adult L2 learners that do not learn this rule correctly) or become ambiguous because of other independent changes in the language (like the rise of *do* support in English for example, see Roberts 1993, 1999; Lightfoot 1995; as noted, *do*-support does not supply evidence for the existence of independent V-to-I movement in the language).

To conclude this section, I will discuss a problem that potentially undermines the account of the typological variation given here. I have argued that there is a correlation between richer inflectional structure and V-to-I because V-to-I and not parsing inflection are alternative ways of avoiding violation of a constraint that bans complex base-generated morphological structure. Since violations of this constraint are not absolute but gradable, languages differ in what counts as the critical limit of “complex morphology”. As a result, in some grammars a very limited amount of morphology on verbs in situ is already too much. This accounts for V-to-I languages with relatively poor inflection.

So far, so good. However, the gradable nature of the No-Morphology constraint, in combination with the use of constraint conjunction, also appears to lead to a more problematic prediction. Not only does it predict languages that are very sensitive to complex morphology on verbs in situ, but we also seem to predict the reverse: languages that are very insensitive concerning complex morphology on verbs, and prefer it to both V-to-I and underparsing. The correlation between rich inflection and V-to-I should break down in languages or language families that are characterised by a grammar in which Parse-Phi and No-Lex-Mvt both outrank a very high order No-Morphology constraint. In particular, in a grammar in which (36) holds, a structure as in (37) is possible, with all phi-features base-generated on the verb.

(36) Parse-Phi & No-Lex-Mvt \gg No-Morphology¹⁰



Now, although there is a non-V-to-I language which parses three features, namely Faroese II (see (33)–(35)), a non-V-to-I language which parses all four features appears to be unattested. Given that, so far, V-to-I has mainly been studied in a limited group of languages, it is unclear whether this means this situation is impossible in principle. For example, the Bantu language Kirundi (a VO language) has

a rich agreement system, but the object must be adjacent to the verb when unfocused (Ndayiragije 1996: 273–274), adverbs do not intervene. Similarly, Bresnan and Mchombo (1987) note that in Chichewa, another Bantu language with rich subject-verb agreement, “the object immediately follows the verb” when the object is not an incorporated pronoun. This might indicate absence of V-to-I, but of course only if the syntax of adverbs in these languages is such that some adverbs can be taken to be in a VP-initial position and there are indeed no V-Adv-Obj orders with these adverbs.

Still, let us suppose at this stage that languages allowing (37) are either very rare or nonexistent. How could that be accounted for? There is in fact a very simple way to exclude this type of language altogether, namely by adopting the idea that some rankings are universal. Explaining language variation in terms of variation in the constraint hierarchy does not by necessity entail that every possible permutation of the constraints must correspond to a possible grammar. It is quite possible that UG determines that certain subparts of the constraint hierarchy are not subject to variation. Then if No-Morphology¹⁰ universally outranks Parse-Phi and No-Lex-Mvt, in contrast to (36), (37) never occurs.

The disadvantage of this approach is of course clear: it simply states that the impossible is impossible, without providing any insight why. Universal constraint rankings that have been proposed in phonology usually concern constraints that govern markedness relations along a single dimension such as place of articulation (see for instance Kager 1999 and references cited there) and so probably have their roots in universal phonetic principles. It is quite unclear whether an analogous motivation for a universal hierarchy could be found in the present instance.

There is a more plausible way of dealing with the problem, however. This does not exclude grammars producing (37) altogether, but it gives some content to the idea that they are more marked than grammars that do not produce it. In other words, whether this account is successful or not will ultimately depend on whether richly inflected but unmoved verbs really cannot be found in any language at all. The idea is based on the consequences for L1 acquisition of the possibility of constraint conjunction.

In very general terms, L1 acquisition in OT consists of a process of constraint demotion (Tesar and Smolensky 1998, 2000). Roughly, the constraints can be split into two classes, those that require faithfulness to the input and those that penalise certain marked structures. Children start out with a hierarchy in which the markedness constraints outrank the faithfulness constraints (see Smolensky 1996 and references cited there); the data from the target language then trigger demotion of particular markedness constraints under particular faithfulness constraints. It seems not unlikely that the more such demotions are necessary the more marked the resulting grammar is, in the double sense that it takes more acquisitional steps to arrive at and allows more marked structures to surface.

In the case at hand, there is an opposition between markedness constraints, namely No-Morphology and its higher order derivatives, and faithfulness con-

straints, namely Parse-Phi and No-Lex-Mvt.¹⁶ So, suppose the child starts out with the group of No-Morphology constraints ranked above Parse-Phi and No-Lex-Mvt and then has to deduce, on the basis of the encountered data, which constraints are to be demoted.

Now, as noted at the end of section 3, the amount of inflection a language tolerates on a verb *in situ* depends on the lowest No-Morphologyⁿ constraint that still dominates either Parse-Phi or No-Lex-Mvt. The highest lowest No-Morphology constraint that still dominates either Parse-Phi or No-Lex-Mvt in the grammars discussed in this section is No-Morphology⁶ (namely in the English grammar, see (29)). This means that in these grammars all higher order No-Morphology constraints can remain in one block above the faithfulness constraints (recall again that No-Morphologyⁿ \gg No-Morphologyⁿ⁻¹) and need not be considered further by the L1 learning child. However, in order to account for (37) the constraints up to No-Morphology¹⁰ must be demoted as well, since (37) only arises if (36) holds. So more demotions are necessary to arrive at a grammar that produces (37) than are necessary to arrive at any of the grammars discussed in this section. As noted, this provides a rather plausible account for why the grammar producing (37) is indeed the most marked (though it should not be impossible in principle).

Although this is a speculative idea, some support for it comes from considering what should be the most unmarked grammars if it is correct. The most unmarked grammars should be those in which No-Morphology itself already outranks one of the other constraints, so that the child does not have to demote any No-Morphologyⁿ constraints. As discussed above, such languages have very poor inflection or no inflection at all: they either only have a distinction between finite and infinite verbs plus V-to-I, or just one verb form and no V-to-I (see the discussion around (24)–(25)). If the contention that creole languages show the hallmarks of unmarked grammars makes some sense (cf. Bickerton 1984), and given that an outstanding property of creole languages is the scarcity, often absence, of inflection, then the conclusion must be that the prediction that a poor inflectional system is unmarked is correct.¹⁷

5. Further evidence for the No-Morphology constraint: V-to-I and auxiliaries

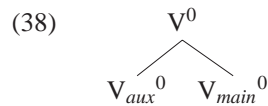
In this section I will supply some additional evidence for the No-Morphology constraint, which I argued to be the trigger of V-to-I. I will argue that adopting this

16. No-Lex-Mvt is a faithfulness constraint in the sense that it requires the output to reflect underlying word order.

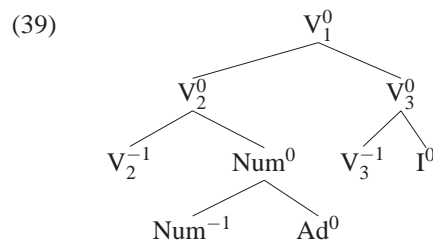
17. The same conclusion is reached by Roberts (1999), who works with a Minimalist conception of unmarked versus marked parameter values. For a potential counterexample to the claim that creoles have poor inflection see Kegl et al. (1999).

constraint makes it possible to explain why, in a language like English, V-to-I applies to auxiliaries but not to main verbs (cf. Pollock 1989; Roberts 1998). This in contrast to the mainland Scandinavian languages, which are non-V-to-I for main verbs and auxiliaries alike (cf. Vikner 1995). Such data are of course unexpected for accounts that regard V-to-I as a necessary consequence of a particular inflectional paradigm, since the inflectional paradigm of auxiliary *have* is the same as that of main verbs.

In Ackema (1999) I argued that auxiliaries and the main verbs they select are base-generated as a complex predicate (in order to explain the thematic properties of such structures), as in (38), from which the auxiliary can excorporate. However, no trigger for such excorporation in English is provided there.



Given the proposal made above, a trigger now presents itself in the form of the No-Morphology constraint. If their respective inflectional features were base-generated on both verbs in a verbal complex like (38), as they are base-generated on single main verbs in English, then a structure as in (39) results. (In (39), I^0 stands for the inflectional features of the main verb, for instance a [+perfect] feature if the auxiliary is perfect *have*; the subscripts on the V-nodes serve to distinguish these nodes and have no theoretical significance.)



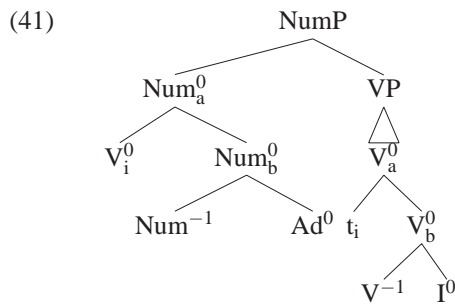
This structure induces eight violations of No-Morphology: (V_1^0, V_2^0, V_3^0) , (V_1^0, V_2^{-1}, Num^0) , (V_1^0, Num^{-1}, Ad^0) , (V_2^0, V_2^{-1}, Num^0) , (V_2^0, Num^{-1}, Ad^0) , (Num^0, Num^{-1}, Ad^0) , (V_1^0, V_3^{-1}, I^0) and (V_3^0, V_3^{-1}, I^0) . The constraint ranking that was established for English in section 4 ((29)) is repeated below in (40).

(40) No-Morphology⁶ \gg No-Lex-Mvt \gg Parse-Phi \gg No-Morphology³

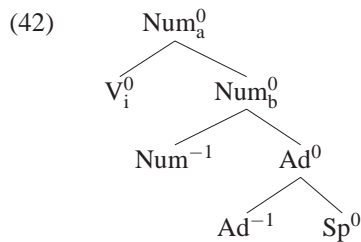
Given the eight violations of No-Morphology just mentioned, the structure in (39) violates the highest constraint in (40), so, if a better alternative exists in this respect, this alternative should be chosen. Since No-Lex-Mvt outranks Parse-Phi, the option that must normally be chosen to avoid violation of No-Morphology⁶ is underparsing of phi-features (hence the relatively poor inflection of English). That

seems to predict that even less inflectional features are parsed when an auxiliary is present than with finite main verbs. However, in this case there is an alternative way of avoiding a fatal violation of No-Morphology⁶, which is better because it does not invoke these extra violations of Parse-Phi and does not violate No-Lex-Mvt either. This alternative consists of having the auxiliary undergo V-to-I. No-Lex-Mvt specifically penalises movement of lexical heads, so auxiliaries are not affected by it (see Grimshaw 1997 for discussion; from a different, parametric, perspective see also Pollock 1989; Roberts 1999).

V-to-I of the auxiliary results in the structure in (41). In this structure No-Morphology is violated only twice in the domain of the Num⁰ node (because of (Num_a⁰, Num⁻¹, Ad⁰) and (Num_b⁰, Num⁻¹, Ad⁰)) and only three times in the domain of the V⁰ node (by (V_a⁰, t_i, V_b⁰)¹⁸, (V_a⁰, V⁻¹, I⁰) and (V_b⁰, V⁻¹, I⁰)). As a result, No-Morphology⁶ is satisfied, in contrast to what was the case in (39).



Interestingly, it may even be possible to parse an additional phi-feature in this case. If three features are generated in the independent functional head position instead of two (as in (41)), this would give rise to three extra violations of No-Morphology; compare the structure in (42) with the corresponding part of the structure in (41) (Sp in (42) is the 'bonus feature' compared to (41)). The extra violations are induced by (Num_a⁰, Ad⁻¹, Sp⁰), (Num_b⁰, Ad⁻¹, Sp⁰) and (Ad⁰, Ad⁻¹, Sp⁰).



18. Given the copy theory of movement (cf. Chomsky 1995), the trace in (41) is in fact a full copy of the moved V⁰ and should count as such for calculating No-Morphology violations. (Note that it is a noninflected and therefore nonbranching, V⁰ that is moved - as argued, the whole point of having V-to-I is to avoid base-generated complex structure. So this trace indeed induces just one violation.)

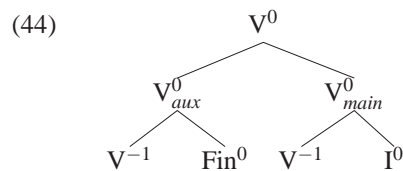
This brings the total number of No-Morphology violations in this domain to five, still good enough to satisfy No-Morphology⁶. Whether or not this actually occurs therefore depends on the relative rankings of No-Morphology⁵ (which has so far been irrelevant in the discussion of English) and Parse-Phi. If No-Morphology⁵ is ranked lower, the result will be (42) instead of (41). Given that there is an auxiliary that indeed has more forms in its paradigm than main verbs, namely *be*, this would appear to indicate that (42) is correct (with the consequence that the paradigms of the other auxiliaries contain accidentally homophonous forms).

In short, the additional violations of No-Morphology induced by the complex predicate structure of main verb and auxiliary in periphrastic constructions can lead to V-to-I specifically for auxiliaries. The extra violations can cause the structure to surpass the tolerance level for No-Morphology violations in the language in question (indicated by the lowest No-Morphology constraint above No-Lex-Mvt and Parse-Phi) and hence can trigger V-to-I in case of periphrasis only.

This leaves unexplained as yet why the mainland Scandinavian languages do not have V-to-I for auxiliaries.¹⁹ Recall the ranking that was established for Danish in section 4 ((28)), repeated here in (43).

(43) No-Morphology³ >> No-Lex-Mvt >> Parse-Phi >> No-Morphology

A base-generated complex of main verb plus auxiliary, with the single inflectional node corresponding to *-er* on the finite auxiliary and a single inflectional (participial or infinitival) node on the main verb has the structure in (44).



This structure induces four violations of No-Morphology, so that it violates the highest constraint in (43). This can be avoided again by generating the inflection in a distinct node and V-to-I of the auxiliary to this node, as in English.

Note, however, that although V-to-I for auxiliaries does not violate No-Lex-Mvt, it is not entirely free either: it does violate the overall ban on movement, expressed by the constraint in (45).

(45) Stay (Grimshaw 1997: 374)
Trace is not allowed

19. Roberts (1998) relates the difference between English and mainland Scandinavian to the V2 property of the latter, which in his account makes V-to-I of auxiliaries superfluous and hence impossible. In fact, from Roberts's account it seems to follow that V2 always precludes independent V-to-I, for any verb. That prediction probably is too restrictive, however, since there is a V2 language, Icelandic, that independently has V-to-I (Vikner 1995).

Mainland Scandinavian and English differ, then, with respect to the relative position of (45) in the rankings established so far:

- (46) No-Morphology⁶ >> No-Lex-Mvt >> Parse-Phi >> No-Morphology³
>> Stay (Eng)
(47) Stay >> No-Morphology³ >> No-Lex-Mvt >> Parse-Phi
>> No-Morphology (Sca)

The high ranking of Stay in (47) makes the four No-Morphology violations in (44) more acceptable than auxiliary movement.

6. Conclusions

Constraints about faithfulness to the input (Parse) and about economy of representation (No-Morphology) and economy of movement (No-Lex-Mvt, Stay) arguably play a role in various parts of grammar. Here, I hope to have shown that the interplay of these three general types of constraints can account for the observed correlation between a richer inflectional structure and verb movement. Rather than recapitulating the analysis by way of conclusion, I will point out some of its general consequences.

6.1. Modularity

The account of V-to-I presented above is based on the idea that phi-features are fully specified in the input for the syntactic generator, but can be left unparsed in the optimal syntactic structure. Between the syntactic module and the phonological module a similar mismatch can occur: even when some phi-feature *is* represented in the syntactic structure, this does not mean that a distinct affix that corresponds exactly to this feature must occur in the morphophonological structure (cf. Anderson 1992; Halle and Marantz 1993; Beard 1995). This picture fits best into a theory of grammar which assumes that the semantic/conceptual, syntactic and phonological modules are radically autonomous, each generating their own structures subject to their own wellformedness principles and doing this independently of one another. Correspondences between the various structures must be established via linking rules or principles, establishing regular or idiosyncratic correspondences between semantics, syntax and phonology. Various models of grammar have been proposed that are partly or completely compatible with this; see Jackendoff 1997 for a recent example.

6.2. Syncretism versus homophony

Related to the previous point is the issue of syncretism versus homophony of affixes. In some languages the use of the same ending for various persons and

numbers results from not parsing all person (sp and ad) and number features in syntax, so that the actual phonological affix simply corresponds to a poorer (underspecified) feature bundle. These might be called cases of “real” syncretism in the paradigm (cf. Plank 1991; Blevins 1995). However, given the model of grammar assumed here, it is also possible that distinct feature bundles happen to be spelled out by the same affix, a case of accidental homophony. An example from the present paper is formed by the 2nd and 3rd person singular in Icelandic, see the discussion below (23). These two different situations can be distinguished on the basis of the following two criteria. First, “real” syncretism must concern a natural class: the distinction that is ‘lost’ (not parsed) must concern a particular feature num, ad or sp or some combination of these. Accidental homophony can concern affixes whose features do not constitute a natural class (as with the 1sg, 2sg and all plural forms in English, which happen to be the same despite the fact that addressee and number features are parsed in this language, see section 4). Second, in case some feature is left unparsed in syntax, no syntactic principle can refer to that particular feature in the relevant language. In case two different feature bundles happen to be spelled out by an identical affix, syntactic principles can refer to those features. For an example of this difference between underparsing in syntax and “under-spelling-out” at PF, involving case features, see Ackema (1999: 123 ff.).

6.3. Flexible structure

The analysis above is based on the idea that there is no fixed functional clause structure in a language. A functional head position and its projection are only generated if this results in a structure that outperforms the competitors without the functional head with respect to the grammar of the relevant language. If no V-to-I is necessary no IP is present. For various proposals on how to implement and constrain such flexibility of clausal architecture see Haider (1989); Ackema et al. (1993); Grimshaw (1997); and Bobaljik and Thráinsson (1998), among others. This, of course, also implies that phenomena like adverb positioning, which have been analyzed in terms of a universal fixed hierarchy of functional projections in the clause (cf. Alexiadou 1997, Cinque 1999), must receive an alternative analysis – an issue well beyond the scope of this paper.

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