

Rich agreement and verb movement

Summary

In this paper we provide an overview of the alleged correlation between the finite verb and the properties of the inflection on the verb. Specifically, it has been attested that in languages in which the verb exhibits little (or no) inflectional morphology, no elements can intervene between the verb and the direct object (in discourse-neutral contexts). In contrast, such intervention effects have been abundantly attested in languages in which the verb exhibits sufficiently ‘rich’ morphology. This led to a hypothesis that verb movement is triggered by rich inflectional morphology. Thus far, this relation between the syntax and morphology of the finite verb has been addressed in great detail primarily in Germanic and related languages but, more recently, also beyond. We will review the empirical claims that led to the hypothesis, as well as their theoretical implications. In addition, we will evaluate the empirical facts in a number of non-Germanic, non-Indo-European languages and address the issues that arise in those languages. We will see that the hypothesis has not been fully confirmed or rejected yet, partially because even though the hypothesis is superficially far-reaching in many languages, often there are particular language-specific properties and confounding effects that make a straightforward evaluation of the hypothesis impossible.

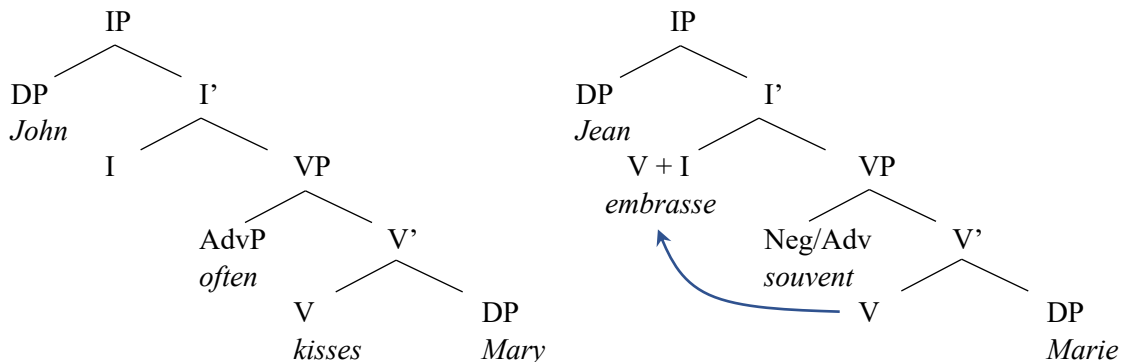
1. Introduction

Ever since the invention and development of functional projections dominating the verb phrase, a prominent theme has been to relate the content of these functional projections to verbal morphology. This was the case in Chomsky’s classic do-support analysis (Chomsky 1957) and continued to be a guiding idea during the era, starting at the end of the 1980s, that saw a proliferation of functional projections (Pollock 1989). An auxiliary aim has been to try and relate the existence of functional projections to syntactic verb positioning, and cross-linguistic differences that can be observed with respect to that. Emonds (1976) already shows that English and French display significant word order differences. In French, but not in English, the lexical verb can precede negation and certain sentential adverbs, whereas in English the lexical verb and a nominal object respect adjacency.

- (1) Jean *embrasse* **souvent** Marie [French]
 Jean kisses often Marie
 ‘John often kisses Mary.’
- (2) *John *kisses* **often** Marie [English]

Emonds proposes that the difference is a consequence of the verb moving to the inflectional domain of the clause in French but not in English. A way to represent the difference is as follows:

- (3) a. English: no verb movement b. French: verb movement



It is for this reason that the movement operation under consideration is often referred to as V-to-I movement, although the exact nature of the landing site is up for discussion. The next question is then how to account for the fact that some languages move the verb out of the VP but other languages do not.¹ In other words, what properties of the inflectional domain trigger verb movement, and why? This is a tricky issue because the inflectional domain (dominated by CP, see footnote 1) can encode many different properties, including tense, mood, aspect and agreement. Research in this area has created one poster boy, the so-called Rich Agreement Hypothesis (RAH), which states that verb movement to the inflectional domain takes place if (and only if) ϕ -agreement on the verb is rich (in some sense to be made precise). Since ϕ -agreement-related verb movement is probably the best studied instance of verb movement, and the one that has led to the most precise generalizations and theorizing, we will focus on that in this chapter. After a careful evaluation of the state of the art, we can see to what extent we can extrapolate the conclusions to other inflectional properties of clausal syntax.

The chapter is set up as follows. In section 2 we outline the observations and the basics of the theory behind the RAH. In section 3 we provide a discussion of an expanded set of languages (mostly outside Indo-European) that at least on the first encounter seem to challenge the RAH. Section 4 provides an overview of the theoretical approaches that offer explanations for the alleged correlation and delves into theoretical consequences of the empirical challenges. Section 5 concludes.

2. The Rich Agreement Hypothesis

The idea that verb movement may correlate with richness of inflection came to fruition after a careful look at cross-linguistic variation within the Germanic languages (Kosmeijer 1986; Pollock 1989; Platzack & Holmberg 1989; Roberts 1993; Rohrbacher 1994, among others). There are three comparisons that point in the direction of rich agreement being a trigger for verb movement: (i) cross-linguistic comparison, (ii) language-internal comparison and (iii) diachronic comparison. Let us look at each in turn.

As for (i), it can be observed that Icelandic allows the finite verb to precede sentential adverbs in clauses that disallow V2, namely embedded questions and relative clauses (though one has to look carefully at these clauses, to cancel the possibility that the verb movement we observe is actually targeting the C-position, see Wiklund et al 2009 for further details). In contrast, Mainland Scandinavian languages (Norwegian, Swedish and Danish) disallow this ordering. This contrast can be observed in (4):

- | | | |
|--------|--|-------------|
| (4) a. | Ég veit af hverju Hedda <kaupir> oft <* kaupir> skó. | [Icelandic] |
| | I know why Hedda buys often buys shoes | |
| b. | Jeg vet hvorfor Hedda <* kjøper> ofte <kjøpe> sko. | [Norwegian] |
| | I know why Hedda buys often buys shoes | |

¹ Verb movement has become a standard way to capture cross-linguistic differences in verb placement more generally. In verb second languages, the finite verb can precede the subject in canonical declarative clauses, which is impossible in a non-V2 language. V2 is standardly analysed as involving a movement to a C-position (Den Besten, 1989). It is not obvious that V-to-C movement should be related to verbal inflection. Since in V2 languages finite verbs in C look similar to finite verbs in other sentential positions, being finite seems to be a prerequisite for movement to C but not its trigger. The effect could be a consequence of the Head Movement Constraint (Travis 1984): if the highest verbal head in a clause is finite, it will be the finite verb, and only the finite verb, that can move to the C-position. Given the absence of a clear link with verbal morphology, we will ignore V-to-C movement in this chapter.

Crucially, Icelandic shows five agreement distinctions in its present tense agreement paradigm, whereas the Mainland Scandinavian languages show none. Hence, the differences between Icelandic are indeed along the lines of the RAH.

(5) Icelandic agreement paradigm

Inf. <i>Seg-ja</i> 'to say'		
	Singular	Plural
1	seg-i	seg-jum
2	seg-ir	seg-ið
3	seg-ir	seg-ja

As for (ii), although Standard Swedish does not display V-to-I movement, there are dialects of Swedish that still do, such as Älvdalen Swedish (data from Garbacz 2010):

- (6) Eð ir biln so an will it åvå. [Älvdalen Swedish]
 It is car.DEF that he want.to not have

It is precisely these dialects that still have a rich agreement paradigm, thereby again confirming the RAH. This particular dialect displays four distinctions:

(7) Älvdalen Swedish agreement paradigm

Älvdalen Swedish		
	Present tense	Past tense
1SG	spil-är	spil-äð
2SG	spil-är	spil-äð
3SG	spil-är	spil-äð
1PL	spil-um	spil-äð-um
2PL	spil-ið	spil-äð-ið
3PL	spil-å	spil-äð

As for (iii), it can be observed that languages that nowadays do not display V-to-I movement used to do so in the past. Old Swedish (example from Platzack 1988) and Old English (example from Roberts 1993) are two cases in points:

- (8) a. æn han sivngær ægh thigianda messu [Old Swedish]
 if he sings not silent mass
 b. By thy thanks I set not a straw

Given the RAH, these languages are expected to have rich agreement at these older stages and that is indeed the case, as illustrated in (9).

(9) Old Swedish / Middle English agreement paradigms

	Old Swedish	Middle English
1SG	spil-är	sing-e
2SG	spil-är	sing-est
3SG	spil-är	sing-eð

1PL	spil-um	sing-en
2PL	spil-ið	sing-en
3PL	spil-á	sing-en

These data, then, suggest a diachronic consequence of loss of inflection: the loss of V-to-I movement.

Establishing a correlation between rich agreement inflection and verb movement can only be evaluated properly in the light of a concrete, precise definition of richness, and the observations above are not more than impressionistic. Quite some attention has been devoted to this aspect of the correlation. Note first that richness cannot be equated with presence of agreement, which would mean that only languages without any agreement are expected to lack V-to-I movement. English is a clear counterexample: despite the fact that it has some agreement, the language lacks V-to-I movement. If presence or absence of agreement does not distinguish rich from poor languages, then what does? There are basically two types of definitions.

The first type capitalizes on distinctions within the (present tense) agreement paradigm. An empirically successful one is offered by Rohrbacher (1994), who proposes that an agreement paradigm qualifies as rich if in either the singular or plural the first and second person are uniquely marked.

- (10) The paradigm verb raising correlate
A language has V to I raising if and only if in at least one number of at least one tense of the regular verbs, the person features 1st and 2nd are both distinctively marked.

As can be observed in the data above, Icelandic, Älvdalen Swedish, Old Swedish and Middle English have three-way person marking and are therefore expected to show V-to-I movement, whereas Modern English, Modern Swedish, Norwegian and Danish are underspecified for person marking and also lack V-to-I movement. More recently, Koenen & Zeijlstra (2014) have drawn a parallel between rich agreement paradigms and the most minimal pronominal systems in the world's languages, claiming that both minimally distinguish between three persons (much like Rohrbacher) and have a number contrast in at least one person.²

- (11) The Rich Agreement Hypothesis
A language exhibits V-to-I movement if and only if the regular paradigm manifests featural distinctions that are at least as rich as those featural distinctions manifested in the smallest pronoun inventories universally possible.

On the basis of the Germanic varieties discussed in these works, it is hard to decide between (10) and (11) empirically: all Germanic varieties that uniquely mark a 1st and 2nd person also happen to have a singular/plural distinction somewhere in their paradigm. However, other languages may empirically disentangle the two. Of course, these definitions also have repercussions for the theoretical explanation for the RAH if it is indeed confirmed.

The second type of definition holds that a language has rich agreement if tense and agreement morphology can co-occur on the verb (Bobaljik 1995; Vikner 1997; Bobaljik & Thráinsson 1998). Since the languages under discussion do not express present tense by an overt morpheme, we should look at the past tense to establish this. We can observe that for instance Icelandic still displays agreement in the

² The notion that pronominal paradigms minimally reflect a three-way distinction in person and a two-way distinction in number has been challenged by Harbour (2016) on empirical grounds who correctly points out that there are languages that exhibit as few as two personal pronouns (e.g. Winnebago). However, in such seemingly problematic cases the pronominal distinctions are indeed present in the agreement morphology, and though such languages do not morphologically realize a complex set of personal pronouns, they do encode sufficiently rich pronominal features (cf. Tvica 2017).

past tense, whereas the only overt agreement marker in English, the 3rd person singular *-s* disappears in the past tense:

(12) Modern English / Icelandic agreement paradigms

	Modern English		Icelandic	
	Present tense	Past tense	Present tense	Past tense
1SG	walk	walk-ed	heyr-i	heyr-ð-i
2SG	walk-s	walk-ed	heyr-ir	heyr-ð-ir
3SG	walk	walk-ed	heyr-ir	heyr-ð-i
1PL	walk	walk-ed	heyr-jum	heyr-ð-um
2PL	walk	walk-ed	heyr-ið	heyr-ð-uð
3PL	walk	walk-ed	heyr-a	heyr-ð-u

With this definition of richness, it is also correctly predicted that Icelandic has V-to-I movement but not English. Again, it is hard to empirically distinguish between this definition and the ones that are based on distinctions within the agreement paradigm: varieties with relatively many distinctions in the present tense tend to maintain at least some agreement marking in the past tense. There is one language, however, which at first view seems to be decisive, namely Faroese. It has the paradigms in (13):

(13) Faroese agreement in present and past tense

	Faroese	
	Present tense	Past tense
1SG	døm-i	døm-d-i
2SG	døm-ir	døm-d-i
3SG	døm-ir	døm-d-i
1PL	døm-a	døm-d-u
2PL	døm-a	døm-d-u
3PL	døm-a	døm-d-u

As can be observed, Faroese makes no distinction between 2nd and 3rd person anywhere in the paradigm, so that (10) and (11) predict that the language should lack V-to-I movement. The definition based on co-occurrence of tense and agreement morphology, however, predicts that Faroese should have V-to-I movement, as it displays number marking in the past tense. There is in fact discussion about Faroese on whether it has V-to-I movement or not. For instance, Bobaljik & Jonas (1996) argue that there is a dialect split, with one variety displaying V-to-I movement and one that does not.³ Heycock et al 2010 argues that what looks like V-to-I movement is actually V-to-C movement. Hence, the choice between two (types) of richness may depend on particular language-specific analyses.

What we therefore see is that variation in verb positioning within Germanic languages can be accounted for by postulating a correlation between V-to-I movement and richness of agreement inflection, an idea that has come to be known as the RAH.

At the same time, there are roughly two main challenges to it, and both are of a typological nature. The first one has to do with possible language types. On the basis of the description above one might expect that there are only two language types to be distinguished on the relevant issue: rich languages with V-to-I movement and poor languages without it. This would give the typological picture in (14):

(14) RAH: Strong version

	Rich agreement	Poor agreement
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³ See Bobaljik (2003) for the argument that the Faroese paradigm can be analyzed in different ways, with one analysis predicting V-to-I movement and another predicting the opposite.

V-to-I movement	✓	×
No V-to-I movement	×	✓

As a matter of fact, however, this bi-directional correlation between verb movement and richness has been challenged, even within the group of Germanic languages. Scholars have brought in data that suggest the existence of language varieties that are poor but nevertheless display V-to-I movement (Bobaljik & Thráinsson 1998). If so, this would suggest a uni-directional formulation of the RAH: if agreement is rich, V-to-I movement is triggered, but if agreement is poor both V-to-I movement or the absence of it are possible. This would give the typological picture in (15):

(15) RAH: Weak version

	Rich agreement	Poor agreement
V-to-I movement	✓	✓
No V-to-I movement	×	✓

Other scholars, however, have brought in data suggesting the existence of language varieties that are rich but nevertheless lack V-to-I movement (Bentzen et al. 2007). This would give the typological picture in (16):

(16) NO RAH

	Rich agreement	Poor agreement
V-to-I movement	✓	✓
No V-to-I movement	✓	✓

If (16) holds true, then there is no correlation to be had and the RAH must be abandoned. It is important, therefore, to look at these challenges to (14) and (15) and at the factors that underlie this discussion.

The second challenge is to see if the RAH holds up if the typological sample is enlarged. After all, the pool of Germanic languages is way too small for making any legitimate typological claims. Although the bulk of the RAH discussion has successfully extended the scope to include Romance languages (they are generally rich, irrespective of the definition, and allow the finite verb to precede sentential adverbs), one would like to see it tested on a serious typological scale. Tvica (2017) has started to undertake this task, concluding after an in-depth analysis of a typological sample of 24 languages that he finds no clear counterexamples to (14). At the same time, it is clear that this conclusion is reached after making some analytical choices for individual languages that (potentially) impacted on this conclusion. Whether a particular language has V-to-I movement cannot always be read off from the surface syntax but requires an understanding of how this surface syntax is put together first.

The factors that complicate the issue for Tvica are partly reminiscent of the factors that caused the discussion to arise over the Germanic languages, and partly new. In section 3, we will look at the challenges to (14) and (15) and pinpoint on what assumptions analyses and discussions are based.

3. Empirical challenges

The RAH is typically evaluated by (i) determining whether agreement is rich or poor (given the definitions discussed above), and (ii) establishing whether there is V-to-I movement. Regarding (ii), V-to-I is standardly detected based on the position of the verb in relation to adverbs that appear at the left edge of the verbal domain. Empirically, this means that the presence of $V_{\text{fin}}\text{-Adv-O}$ orders indicates that the finite verb must have undergone movement (potentially V-to-I) to a position in front of the adverb (with verb second effects being controlled for). Crucial to the hypothesis is the fact that the $V_{\text{fin}}\text{-Adv-O}$ orders have been empirically associated with the presence of rich agreement morphology that reflects person and number features of the fin subject; whereas the unavailability of $V_{\text{fin}}\text{-Adv-O}$ (and thus the

presumed absence of V-to-I) has been associated with the lack of (rich) agreement. However, we will show that the evaluation of the RAH merely in these terms is not always straightforwardly possible, and that a superficial assessment of the surface facts may even lead to a premature rejection of the hypothesis.

In the first section (3.1), we describe the facts in languages that seem to exhibit rich agreement morphology and yet in some (or all) contexts prohibit V_{fin} -Adv-O orders. In the same vein, section 3.2 features empirical description with the opposite set of facts, involving languages that lack (rich) agreement morphology, and yet permit some instances of V_{fin} -Adv-O orders that may arise due V-to-I movement. We divide the languages into rich and poor agreement languages in the sense of Koenenman and Zeijlstra (2014), as defined in (9), though the division for this sample turns out to be the same under Rohrbacher's (1999) definition (cf. 8).

3.1 Rich agreement in the absence of V_{fin} -Adv-O orders

In this section we provide the data from languages that at least in some contexts prohibit V_{fin} -Adv-O orders and yet exhibit rich verbal morphology. We describe rich agreement languages that (i) completely lack either adverbial diagnostics or contexts in which the hypothesis can be evaluated (section 3.1.1), (ii) appear to contradict the RAH in some contexts (section 3.1.2), and (iii) appear to contradict it in most (if not all) contexts (section 3.1.3).

3.1.1 Lack of proper diagnostics/context

In the introduction we have illustrated data that seem to support a bidirectional correlation between V_{fin} -Adv-O orders and rich agreement. In the context of a few languages discussed above, this appears to hold rigidly both on a cross-linguistic level with languages such as English and Icelandic, and on a language-internal level, as shown with Standard and Älvdalen Swedish. In a broader crosslinguistic picture the matters become more complex as there are languages that lack diagnostics altogether. For example, the Chapacuran language Wari' exhibits rigid VOS orders with arguments that can be left out (17), but it lacks adverbs as a category. Wari' does have elements that semantically modify events having an adverb-like function. However, Everett & Kern (1997) point out that such 'verbal modifiers' always form compounds with verbs, such that they must appear immediately adjacent to the verb, no matter where the verb appears in the clause, as shown in (18). This makes the RAH untestable in this language, as the structural position of the finite verb cannot be determined.

(17) jami na-on (pije') (narima') [Wari']
 turn:over 3.SG:RP/P-3-S.M child woman
 'The woman turned the child over.' (adapted from Everett & Kern 1997:307)

(18) a. **maqui'** **hwap** na tarama'
 come fast 3.SG:RP/P man
 'The man came in a hurry.'
 b. %**hwap** **maqui'** na tarama'
 fast come 3.sg:rp/p man
 c. ***maqui'** na **hwap** tarama'
 come 3.SG:RP/P fast man
 d. 'om ca **maqui'** **hwap** ca tarama'
 neg RP/P come fast 3.SG man
 'The man did not come in a hurry.' (Joshua Birchall, p.c.)

Another potential issue for the evaluation of the RAH in Wari' is that agreement morphology appears together with the tense morpheme, but it is not clear to which extent it phonologically integrates with

the verb. According to Everett & Kern (1997), tense and agreement form a prosodic clitic group, and the clitic group forms a ‘breath-group’ together with the verb, which may suggest phonological dependency on the verb. This is perhaps supported further by cases in which the tense morpheme and the agreement morpheme appear separate from each other (as in negated sentences (19) and questions (20), where the second position clitic that follows negation and the wh-phrase, respectively, is the (finite) tense clitic, while the non-finite verb appears after the tense clitic preceding the agreement clitic).

- (19) 'om ca **cao'** ca-in carawa [Wari']
 not:exist INFL.N:RP/P eat 3.SG.M-3.N animal
 ‘He did not eat meat’ (Everett & Kern 1997:168)
- (20) 'ma carawa ca **pa'caca** mon tarama'
 that:PROX:hearer animal INFL.N:RP/P kill 3.PL.M COLL man
 ‘What thing/animal did the men kill?’ (Everett & Kern 1997:17)

Given (19) and (20), there are thus (at least) two problems for evaluating the hypothesis if we are to rely purely on superficial facts. First, the standard diagnostic, namely, clausal adverbs, comparable to what we find in many other languages, does not apply in Wari'. Therefore, an analysis of Wari' clause structure would have to establish in some other way whether or not V-to-I movement takes place. Second, we have seen above that it is not clear how Wari' agreement clitics are phonologically integrated with the verb; what is clear though, is that they always immediately follow the lexical verb. The phonological integration with the verb is relevant for the correlation, such that V-to-I may not be triggered. In particular, we demonstrate this to be the case in Tiwi and Hausa (cf. section 3.1.3).

The issue regarding the lack of diagnostics that allows for a straightforward assessment of the RAH also extends to the Nilo-Saharan language Lango. Like Wari', Lango exhibits a rich set of distinctions in its verbal agreement paradigm (cf. 21), suggesting that it is a rich agreement language under both Koenenman & Zeijlstra's (2014) and Rohrbacher's (1994,1999) definitions of richness. However, all adverbs in Lango must appear clause-finally, as shown in (22), (23), and (24).

- (21) Lango agreement affixes (Noonan 1992:91)

	Perfective (subjunctive, habitual)			Progressive		
	Singular	Plural	Dual	Singular	Plural	Dual
1	ǎ-	ǒ-	ǒ-	â-	ô-	—
2	ĩ-	ĩ- -wùnú		î-	î- -wùnú	
3	ò-/ø-/ǒ-/ǔ-	ǒ-/ ĩ-		à-/ê-	ô-/î-	

- (22) éń <*nî mwák-mwák> *jámô* <*nî mwák-mwák> céń <nî mwák-mwák> [Lango]
 he PART noisily 3.SG.chew.HAB PART noisily food PART noisily
 ‘He chews food noisily.’ (Noonan 1992:181)
- (23) John <*oyot oyot> *kwano* <*oyot oyot> buke <oyot oyot>
 John quickly 3.SG.read.HAB quickly> books quickly
 ‘John reads books quickly.’
- (24) án <*tùtwàl> *á-márô* <*tùtwàl> èntébbè <tùtwàl>
 I very.much 1.SG-like.HAB very.much Entebbe very.much
 ‘I like Entebbe very much.’ (Noonan 1992:183)

The facts in (22), (23), and (24) suggest that no correlation between rich agreement and verb movement can be attested in Lango, since V-Adv-O orders, the diagnostic of V-to-I movement, are unavailable. However, this observation alone is not sufficient, as we would also require the presence of Adv-V-O orders to establish the absence of V-to-I, though they too are ungrammatical. This suggests that evaluation of the RAH is not possible in Lango as there appears to be a restriction on adverbs such that they must appear clause-finally, even though it is not clear what would underlie such a restriction. As such, there is no way to detect whether there is V-to-I movement.

The presence of morphology on the verb other than agreement may indicate that V-to-I movement could be masked by other triggers of verb raising. This is particularly problematic in languages in which there is no way to leave out verbal morphology that may lead to such effects. For example, in the Kordofanian language of Moro, which has rich agreement morphology (cf. 25), and does exhibit $V_{\text{fin}}\text{-Adv-O}$ orders (cf. 26 and 27), verbs must, in addition to agreement, also be inflected with several other morphemes, such as aspect morphemes.

(25) Moro agreement paradigm (Rose 2013, adapted)

	Singular	Dual	Plural
1	é-	ál(ə)-	ɲa- ^{EX} , ál(ə)-...-r ^{IN}
2	á-	—	ɲa-
3	∅-	—	l-

- (26) a. *égan^wanaqó* úri tərəbésa káre **ɲómón ɲígítɲín** [Thotegovela Moro]
 1.SG-CLG-RTC-see-LA-PF mouse table under time two
 ‘I saw the mouse under the table two times.’
- b. *égan^wanaqó* úri **ɲómón ɲígítɲín** tərəbésa káre
 1.SG-CLG-RTC-see-LA-PF mouse time two table under
 ‘I saw the mouse under the table two times.’
- c. *égan^wanaqó* **ɲómón ɲígítɲín** úri tərəbésa káre
 1.SG-CLG-RTC-see-LA-PF time two mouse table under
 ‘I saw the mouse under the table two times.’ (Peter Jenks, p.c., tag: 20090725)

- (27) a. *égan^wanaqó* úri tərəbésa káre **rámram** [Thotegovela Moro]
 1.SG-CLG-RTC-see-LA-PF mouse table under suddenly
 ‘I saw the mouse under the table two times.’
- b. *égan^wanaqó* úri **rámram** tərəbésa káre
 1.SG-CLG-RTC-see-LA-PF mouse suddenly table under
 ‘I saw the mouse under the table two times.’
- c. *égan^wanaqó* **rámram** úri tərəbésa káre
 1.SG-CLG-RTC-see-LA-PF suddenly mouse table under
 ‘I saw the mouse under the table two times.’ (Peter Jenks, p.c., tag: 20090725)

The data in (26) and (27) are not inconsistent with theories that advocate the RAH since the orders in (26c) and (27c) show that there is an instance of verb raising that could in fact be V-to-I movement. However, (26) and (27) are also consistent with theories that reject the RAH, as the verb movement we see could also be triggered by aspectual morphology, though relying exclusively on the data in (26) and (27) to argue against the RAH at least raises the question why rich ϕ -agreement cannot trigger V-to-I movement, in contrast to aspectual morphology.

Thus far we have reviewed the data from three rich agreement languages in which adverbs as a category appear to be either absent, or positioned clause-finally. In either case we have shown that it is not possible to detect the presence (or absence) of V-to-I movement.

3.1.2. Limited $V_{\text{fin}}\text{-Adv-O}$ orders

In contrast to languages that lack adverbs as diagnostics, there are languages in which we find that only a particular class of adverbs can be used to detect V-to-I. That is, certain adverbs can appear in both $V_{\text{fin}}\text{-Adv-O}$ and $\text{Adv-}V_{\text{fin}}\text{-O}$ orders, whereas for other adverbs $V_{\text{fin}}\text{-Adv-O}$ orders are ungrammatical. One such language is Egyptian Arabic, in which adverbs such as *sa’at* ‘sometimes’ and *dayman* ‘always’ can either precede the finite verb or follow it, as seen in (29) and (30), respectively. The paradigm of verbal inflection (in both perfective and imperfective) is given in (28).

(28) Egyptian Arabic agreement paradigm (Abdel-Massih, Abdel Malek, and Badawi 1981:262)

Perfective		Imperfective	
Singular	Plural	Singular	Plural
-t	-na	a-...-∅	ni-...-∅
-t ^M / _{-ti} ^F	-tu	ti-...-∅ ^M / _{-i} ^F	ti-...-u
-∅ ^M / _{-it} ^F	-u	yi-...-∅	yi-...-u

(29) Layla <sa'-āt> *bi-ti-ktib* <sa'-āt> gawab-āt <sa'-āt> [Egyptian Arabic]
 Layla sometimes PRES-IMP.3.SG.F-write sometimes letters sometimes
 'Layla sometimes writes letters.'

(30) Layla <dayman> *bi-ti-ktib* <dayman> gawab-āt <dayman>
 Layla always PRES-IMP.3.SG.F-write always letters always
 'Layla always writes letters.' (Liesbeth Zack, p.c.)

Both (29) and (30) show the absence of the correlation, as Egyptian Arabic has rich agreement and yet allows both V_{fin}-Adv-O and Adv-V_{fin}-O orders. However, in contrast to *sa'at* 'sometimes' and *dayman* 'always' in (29) and (30), adverbs such as '*ulayyel* 'rarely' and *bi-sur'a* 'quickly' cannot precede the verb as shown in (31) and (32).

(31) Layla <*'ulayyel> *katab-it* <'ulayyel> gawab-āt <'ulayyel>
 Layla rarely wrote-3.SG.F rarely letters rarely
 'Layla rarely wrote letters.' (Mona Hegazy, p.c.)

(32) Layla <*'bi-sur'a> *katab-it* <bi-sur'a> gawāb <bi-sur'a>
 Layla with.speed wrote-3.SG.F with.speed letter with.speed
 'Layla quickly wrote a letter.' (Mona Hegazy, p.c.)

The two groups of adverbs appear to be semantically different, since *sa'at* 'sometimes' and *dayman* 'always' can *prima facie* be grouped as time adverbials, while '*ulayyel* 'rarely' and *bi-sur'a* 'quickly' modify events. Crucially, what this shows is that the bidirectional correlation between the rich agreement and V_{fin}-Adv-O orders holds only in those cases in which adverbs modify events, but not when adverbs modify time intervals. The relevant questions then are: what is the underlying syntax of the two types of adverbs? And, which of the two types (if any) can be relied on as diagnostics for V-to-I movement? Under a theory that espouses either a bidirectional or unidirectional RAH, (31c) and (32c) are straightforwardly accounted for as the structures for these cases must involve V-to-I movement. Such theories would then require a different status for time adverbs, such that they would not be constrained to the left edge of the verbal domain, but could also appear in a structurally higher position. This is not all that surprising given that semantically different adverbials have been observed to appear at different heights in the clausal structure, which led to the idea that there is a fixed universal (hierarchical) order of adverbs (cf. Cinque 1999). In Cinque's hierarchy temporal adverbs are higher than manner adverb, for instance. This would then open the way to account for all orders in (29) and (30).

The word order patterns that we see in Egyptian Arabic also occur in Wolof, a member of the Niger-Kordofanian family. Temporal adverbs such as *leegi* 'now' can either precede the verb or intervene between the verb and the direct object, as illustrated in (34). In contrast, the manner adverb *ndank* 'slowly' in (35) cannot appear preverbally, but rather intervenes between the verb and the object. Like in Egyptian Arabic, finite verbs in Wolof are also inflected with rich agreement morphology, as the paradigm in (33) shows. This means that the correlation holds only in contexts with manner adverbs and the like.

(33) Wolof agreement paradigm (Torrence 2013:39, adapted)

	Singular	Plural
1	-naa	-nanu
2	-nga	-ngeen
3	-na	-nañu

- (34) <léegi> Awa <?léegi> *lekk-naa* <léegi> jën wa <léegi> [Wolof]
 now Awa now eat-3.SG now fish the now
 ‘Now Awa ate the fish.’ (Cheikh Bamba Dione, p.c.)
- (35) <*ndànk> *lekk-naa* <ndànk> jën wa <ndànk>
 slowly eat-1.SG slowly fish the slowly
 ‘I slowly ate the fish.’ (Cheikh Bamba Dione, p.c.)

The consequences for any theoretical accounts of the Wolof data are the same as for Egyptian Arabic. A theory that advocates the RAH straightforwardly rules out the preverbal placement of adverbs as in (35), whereas a theory that rejects the RAH would have to come up with an alternative account to rule out such cases.

The occurrence of Adv- V_{fin} -O orders has also been observed in Icelandic, a language that is standardly taken to adhere to the RAH. As we have already shown in (12), Icelandic has rich agreement morphology. Despite the fact that there are V_{fin} -Adv-O orders (cf. 4a), Icelandic also exhibits some Adv- V_{fin} -O orders, such as the one in (36). This order was offered as counterevidence to the bidirectional RAH (cf. Bentzen et al. 2007). However, as reported by Angantýsson (2007), (36) is heavily marked and severely restricted, requiring the adverb to be stressed and the subject to be an unstressed pronoun. If this is correct, then (36) is not a discourse neutral order, and, as such, could potentially involve additional movement operations. Another reason that (36) may not be a proper context in which the correlation should be evaluated has to do with the fact that the sentence can be expanded with negation following the direct object (cf. 37). Since negation in Icelandic is also an adverb, the question arises as to how both finite verb and the direct object end up preceding it if not by the movement predicted by the RAH.

- (36) Mér fannst skrítið þegar hann **oft** *lék* hróknum [Icelandic]
 me found strange when he often moved rook.the
 ‘I thought it was strange when he often moved the rook.’
- (37) Mér fannst skrítið þegar hann **oft** *lék* hróknum **ekki** í tímahraki
 me found strange when he often moved rook.the not in lack.of.time
 ‘I thought it was strange when he often didn’t move the rook through lack of time.’

For proponents of either the bidirectional or unidirectional RAH, (36) can be disregarded for the following reason. If negation in (37) is located at the left edge of the verbal domain, then it follows that the verb must have moved to a position in front of it. The adverb *oft* ‘often’, then, must be located in a higher position, both in (36) and (37). Consequently, it cannot serve as a proper diagnostic for V-to-I movement. The RAH can then be evaluated in cases such as (4a), repeated in (38), in which obligatory verb raising (presumably V-to-I movement) is correctly predicted.

- (38) Ég veit af hverju Hedda <kaupir> **oft** <*kaupir> skó. [Icelandic]
 I know why Hedda buys often buy shoes

In this subsection, we have discussed Egyptian Arabic and Wolof, in which only specific classes of adverbs fall in line with the RAH predictions. As for the misbehaving adverbs, it may be the case that they are higher up in the clausal structure, where they cannot serve as V-to-I movement diagnostics. In addition, we have pointed out that problematic adverbs have also been observed in Icelandic, however, there is convincing evidence that they are not a proper diagnostic for V-to-I movement either.

3.1.3. Complete absence of V_{fin} -Adv-O orders

In contrast to Egyptian Arabic and Wolof, in which only specific types of adverbs do not appear in V_{fin} -Adv-O orders, there are rich agreement languages in which V_{fin} -Adv-O orders are uniformly ruled out. In Russian, for example, adverbs that are expected to follow finite verbs under accounts that espouse the RAH in fact precede finite verbs, as shown in (40). The paradigm of verbal inflection showing that Russian is a rich agreement language is given in (39).

(39) Russian agreement paradigm

	Singular	Plural
1	-ju	-jem
2	-ješ	-jete
3	-jet	-jut

(40) Ty **často** *pročytal-a* pravila [Russian]
 you often read-SG.F rules
 ‘You often read rules.’

A particularly interesting fact is that the preverbal placement of adverbs persists even in negated clauses, which in Russian are marked by a negative morpheme that appears as a clitic on the verb, as shown in (41). For negation to end up as a clitic on the verb, the verb must have moved from its base position, minimally to a position that allows the negation to cliticize onto the verb. If so, we must conclude that the preverbal adverb *často* cannot be positioned at the left edge of the verbal domain, but must appear higher. From that higher position, the adverb cannot function as a diagnostic for V-to-I movement.

(41) Ty <**často**> *ne-pročytal-a* <??***často**> pravila [Russian]
 you often NEG-read-SG.F often rules
 ‘You often did not read rules.’

Thus, for a theoretical account that advocates the RAH, negated clauses like (40) can be taken as evidence that adverbs in Russian are not proper diagnostics for V-to-I movement, since they also precede verbs that have moved out of the verbal domain. Another potential confounder is that Russian verbs are also marked with aspectual morphology that could be triggering verb movement, similar to what we have seen in Moro.⁴ In contrast, a theory that rejects the RAH can take **Fehler! Verweisquelle konnte nicht gefunden werden.** as corroborating evidence, but it would have to assume that negation (and possibly aspect) in Russian are both generated within the verbal domain, and as such do not trigger verb movement. This will be especially hard to maintain for negation, as sentential negation must outscope the projection of the verb (cf. Acquaviva 1997, Penka 2010, a.o.).

In addition to Russian, the complete absence of V_{fin} -Adv-O orders is also attested in two related Papuan languages, Bilua and Hatam, both of which exhibit rich agreement inflection, as shown in (42), and yet both seem to restrict adverbs to preverbal positions, as shown in (43) and (44).

(42) a. Bilua agreement paradigm

	Singular	Dual	Plural
1	a-	qe-	nge- ^{EX} ; me- ^{IN}
2	ngo-	qe-	me-
3	o- ^M /ko- ^F	qo-	ke-

b. Hatam agreement paradigm

⁴ Later in the discussion of Igbo we will demonstrate that aspectual morphology also correlates with V-Adv-O orders (cf. section 3.2).

	Singular	Plural
1	di-	ni ^{-EX} ; i(g) ^{-IN} ; si ^{-DL}
2	a-	ji-
3	ø-	i(g)-

- (43) a. ...ko **uri-a** *v-e-a* [Bilua]
 ...3.SG.F good-LIG 3.SG.M-see-PRES
 ‘...she saw him well.’
- b. ...o-be **maba** *vouvae-v-a* **inio**
 ...3.SG.M.CONT truly kill-3-SG-M-OBJ-PRES FOC
 ‘...he truly killed him.’
- c. ...o-ta **matu** *kora-korai-va*
 ...3.SG.M-SIT very REDUP-BE.angry.PRES
 ‘...he became very angry.’
- d. ...pui a-ba **tova** *kail-ou*
 ...NEG 1.SG.M.PROS behind go.up-FUT
 ‘...I am not going to go up behind [you]’ (Obata 2003:143)
- e. erisanga ta enge ta nge **ukaka** *iruruput-a*
 today TOP1.PL.EX TOP1.PL.EX careless work-PRES
 ‘Today, we work carelessly.’ (Obata 2003:254)
- f. ...pui **kapiavole** *ko-kati-v-a* ko-a bakisa
 ...NEG quickly 3.SG.F-give-3.SG.M.OBJ-PRES 3.SG.F-LIG custom.money
 ‘...she didn’t give the custom money to him quickly.’ (Obata 2003:31)
- (44) Noni <**haniyai**> *ø-ku* <***haniyai**> mun di-no ø-nggimang <**haniyai**> [Hatam]
 he quickly 3.SG-hide quickly thing REL-3.SG 3.SG-steal quickly
 ‘He quickly hid what he had stolen.’ (Ger Reesink, p.c.)

In the case of Bilua, we find, in addition to the fact that the features of subjects are doubled in the agreement morphology, that overt subjects are obligatorily followed by topic markers, as shown with the marker *ta* in (45). Similarly, topic markers also appear after overt subjects in Hatam, as shown in (46), though Hatam topic markers can be left out.

- (45) a. bazu **ta** ko-baro-a vo kasi
 story TOP 3.SG.F-arrive-PRES 3.SG.M at
 ‘The story arrived at him.’ (Obata 2003:26)
- b. ...meqora-ka-la **ta** o o-la veutu tona...
 ...child-LIG-3.SG.M TOP 3.SG.M go.PRES entrance beside
 ‘...the son, he went to beside the entrance...’ (Obata 2003:38)
- c. ...kake **ta** lasive-a-mu ni mata kake **ta** parani poso
 ...INDEF.PL TOP male-LIG-PL and other INDEF.PL TOP warrior PL.M
 ‘...some were men, and some others were warriors.’ (Obata 2003:50)
- d. Sito **ta** kala maba, vo ta o-pazo-kini-e matu kubo-a koi
 Sito TOP INDEF.SG.M person 3.SG.M TOP 3.SG.M-hit-RECP-RMP very many-LIG place
 ‘Sito is a man, he fought at lots of places.’ (Obata 2003:63)
- e. ...kiada-mu **ta** ke-pado-padoi-va
 ...all-3.PL TOP 3.PL-REDUP-gather-PRES
 ‘...everyone [without exception, without leaving anyone] they gathered...’ (Obata 2003:73)
- f. kurou ni kobaka **ta** uri-a-ma baere-baere kidi
 pigeon and snail TOP good-LIG-3.SG.F REDUP-friend COLL.DL
 ‘Pigeon and Snail were good friends,’ (Obata 2003:75)

- (46) Dani ne di-kwei leu Branda
 I TOP 1.SG-come from Holland
 ‘As for me, I come from Holland.’ (Reesink 1999:68)

At a quick glance, (45) and (46) suggest that the RAH does not hold in Bilua and Hatam. However, the facts about topic markers raise a more fundamental question, namely, how subject arguments are syntactically realized? That is, can (subject) nominals that appear with topic markers be understood as syntactic arguments of the verb, or are they topics in an A-bar position. In the latter case, these data can be analyzed as displaying topic doubling, with the preverbal agreement markers functioning as the actual subjects. These questions are particularly relevant for Bilua given the obligatoriness of the topic markers, but they also may extend to Hatam, since Bilua and Hatam are genetically related languages. Whether the RAH holds or not depends here on a proper analysis of the grammatical status of subject morphology.

Preliminary evidence for the subject status of what looks like an agreement marker comes from their morphophonological dependency requirements. Both Bilua and Hatam exhibit cases where what looks like a prefixal agreement morpheme is not strictly phonologically dependent on the verb, but can appear independently from the verb or appear on other elements, as shown in (47) and (48) respectively. This suggests that the alleged agreement markers are actually subject pronouns themselves.

- (47) a. 'ke 'uri-a 'bori-k-a [Bilua]
 3.PL good-LIG carry-3.SG.F.OBJ-PRES
 ‘They carried it well (carefully)...’
 b. 'o 'odie-k-a
 3.SG.M call-3.SG.F.OBJ-PRES
 ‘...he called her...’ (Obata 2003:15)

- (48) a. Dani di-dem mem wim biei ni-ndig di-mo [Hatam]
 I 3.SG-enough for fell tree 3.SG-big REL-there
 ‘I can cut that big tree.’ (Reesink 1999:86)
 b. Dem mem ni-plei hab can kan big
 enough for 1.EX-shoot bird two know not
 ‘We were not at all able to shoot two birds.’ (Reesink 1999:87)
 (lit. enough/adequate we shoot two bird know not)

The issue of phonological dependency is quite relevant, even if the subject doubling morpheme turns out to be agreement, which we now address in two other languages.

For one, this is quite conspicuous in the Chadic language Hausa, where agreement morphemes are always phonologically independent from the verb. As shown in (50a-c), agreement can either appear in combination with a Tense, Aspect, or Mood morpheme as a phonologically independent word, referred to by Newman (2000) as the Person-Aspect-Complex (PAC), or it can appear phonologically independent when it co-occurs with the future tense morpheme (cf. 50d). The person and number distinctions in the paradigm (cf. 49) suggest that it is a rich agreement language.

- (49) Hausa agreement paradigm (Jaggar 2001:155, adapted)

	Singular	Plural
1	nā	mun
2	kā	kun
3	yā	sun ^M /and

- (50) a. (*ni) nā tayà Tankò baƙin ciki [Hausa]
 I 1.SG.PF help Tanko unhappiness
 ‘I consoled Tanko.’ (Jaggar 2001:423)

- b. yārōnā yā sakā rīgā cikin àkwàtì
boy.of.1.SG 3.SG.M.PF put gown inside box
'My boy put the gown inside the box.' (Jaggar 2001:419)
- c. mālāmīnā yanà kōyà miní Hausa
teacher.of.1.SG 3.SG.M.IMP teach to.1.SG Hausa
'My teacher is teaching Hausa.' (Jaggar 2001:415)
- d. (*sū) zā sù gyārà mōtārsà
they FUT 3.PL fix car.of.3.M
'They wil fix his car.' (Jaggar 2001:425)

Comparable to Bilua and Hatam, V_{fin} -Adv-O orders are also absent in Hausa, as most adverbs appear either clause-initially or clause-finally, as shown in (51). However, adverbs *ko* 'even', *ɗan* 'a little' and *tabà* 'ever' can precede verbs as shown in (52).

- (51) a. yā rasà ùbā nandānan [Hausa]
3.SG.M.PF lost father quickly
'He lost his father quickly.' (Abdoulaye 1992:195)
- b. inà sōntà ainùn
1.SG.IMP love very.much
'I love her very much.' (Newman 2000:34, adapted)
- c. sun ɗaurè shi tam
3.SG.PF tie it tightly
'They tied it up tightly.' (Newman 2000:39, adapted)
- d. yā iyà Hausa kwañai
3.SG.M know Hausa really.well
'He knows Hausa really well!' (Jaggar 2001:661, adapted)
- e. nakàn zō òfis gālibī/yawanci/gālibàn dà karfè tañà
3.SG.HAB come office usually at nine o'clock
'I come to the office usually at nine o'clock.'
- f. gālibī/yawanci/gālibàn nakàn zō òfis dà karfè tañà
usually 3.SG.HAB come office at nine o'clock
'Usually, I come to the office at nine o'clock.' (Jaggar 2001:662, adapted)
- (52) a. bā sà kō sōn buñōdì dà ruwā
NEG 3.PL.IMP even want bread and water
'They do not even want bread and water.'
- b. Kānde tā ɗan tàimàkē nì
Kānde 3.SG.F.PF a.little help me
'Kānde helped me a little.' (Newman 2000:72, adapted)
- c. bàì tabà zuwà makañanta ba
3.SG.M:NEG.PF ever go school NEG
'He has never been to school.' (Green 2007:11)

The only optional elements that can intervene between the verb and the direct object are so-called modal particles. Six of such particles have been identified: *fa*, *dai*, *kuwa*, *kuma*, *ma*, and *kam* (cf. Jaggar 2001:60). Concerning the semantics of modal particles, Newman (2000:326) reports that they are "often essentially untranslatable" and their contribution in English "is typically expressed by stress, intonation or non-verbal gestures." They have a pragmatic or discourse function expressing personal attitude, state of mind, emphasis, contrast etc.. "Except in cases where they function as conjuncts, the modal particles appear after the word, phrase, or clause to which they apply" (Newman 2000:326).

Aside from modal particles, other optional elements cannot intervene between the verb and the direct object. Given this, it appears that the RAH does not hold for Hausa. At the same time, the agreement morpheme is not hosted by the verb but appears combined with another TAM morpheme that

occurs independently from the verb. This stands in contrast with what is typically the case in many other languages where the agreement tends to be realized as phonologically dependent on the verb. From this, we can infer that a theory advocating the RAH must stipulate as part of its generalization that V-to-I movement can be triggered only by a rich agreement morpheme that phonologically depends on the verb. Given that agreement morpheme in Hausa does not depend on the verb, the data is compatible with the RAH.⁵

The kind of phonological properties of agreement morphemes that we see in Hausa also comes into play in the Australian language of Tiwi. In this language, rich agreement morphemes (see (53)) do not necessarily depend on the verb but can attach to a variety of functional morphemes that precede the verb. We see this in (54) where adverbial-like prefixes *atə-* ‘morning’ and *əmənəŋi-* ‘before-getting-up’ as well as aspectual (durative) prefix *uṭiŋə-* appear between the subject morphology and the verbal stem.

(53) Tiwi agreement morphology (Osborne 1974:38, adapted)

	Non-past		Past	
	Singular	Plural	Singular	Plural
1 ^{IN}	mu-	ŋa-	mu-	ŋa-
1 ^{EX}	ŋə-	nə-pə-	ŋə-	ŋə-tə-
2	ŋə-pə-	nə-pə-	ṭi-	ŋə-tə-
3	a-/a-pə-	wu-	ji-/ṭi-	pu-

- (54) a. *ŋə-ra-tu-apa*
ŋə- rə- atə- apa
 1.SG- PT- morning- eat
 ‘I ate in the morning.’ (Osborne 1974:26)
- b. *ŋə-rə-pumənaə-apa*
ŋə- rə- əmənəŋi- apa
 1.SG- PT- get up eat
 ‘I ate before getting up.’ (Osborne 1974:32)
- c. *ŋu-uṭiŋ-apa*
ŋə- uṭiŋə- apa
 1.SG- DUR- eat
 ‘I’m eating.’ (Osborne 1974:28)

Osborne (1974) lists a plethora of similar functional prefixes that can appear between the agreement prefix and the verb. Crucially, the language realizes these prefixes in a specific order where the leftmost morpheme is the subject agreement that can be followed by as many as ten different kinds of functional morphemes before the verbal stem appears. This suggests that here the agreement morphology is not strictly dependent on the verb for phonological support, but can attach to other morphemes, as already illustrated in (54). Consequently, if the RAH has to do with the locus of agreement in addition to its richness, the relation between the verb and its agreement morphology may be more indirect. This underscores the relevance of evaluating the hypothesis on a broader typological scale as such facts have to our knowledge not been encountered in the European branches of Indo-European languages.

Like in Hausa, the agreement morpheme is not strictly dependent on the verb. Thus, Tiwi and Hausa can be grouped together in the sense that they stand apart from many other rich agreement languages in which the agreement morpheme is strictly hosted by the verb. Therefore, just as for Hausa, a theory maintaining the RAH would require to loosen the strict phonological dependency between the

⁵ One question that comes to mind with respect to the data from Hausa is whether or not the PAC morpheme could potentially be understood as a finite verb rather than the main verb since PAC carries agreement and other features that cross-linguistically finite auxiliaries tend to realize. If PAC is indeed a finite auxiliary verb, then the data is not even inconsistent with the RAH, since PAC precedes adverbs, as shown in (51).

rich agreement morpheme and the finite verb as a prerequisite for V-to-I movement. This then correctly predicts the ungrammaticality of V_{fin} -Adv-O orders.

We have reviewed the facts from a number of languages that either restrict V_{fin} -Adv-O orders or prohibit them completely. Now we turn our attention to another verb-initial, rich agreement language, Kaqchikel (see (55)), where a restriction on V_{fin} -Adv-O orders has also been attested. Kaqchikel exhibits VSO, VOS, and SVO orders (cf. 56), but only allows adverbial intervention in SVO orders (cf. 57). In both VSO or VOS orders adverbial intervention is ruled out, as illustrated in (58). Importantly, verb-initial orders with arguments with equal degree of definiteness, as in (56a-b), can be interpreted as either VSO or VOS.

(55) Kaqchikel agreement paradigm (Brown, Maxwell, & Little 2006:29, 49, adapted)

	Intransitive		Transitive	
	Singular	Plural	Singular	Plural
1	yi-	yoj-	nin-	nqa-
2	ya-	yix-	na-	ni-
3	n-	ye-	nu-	nki-

- (56) a. x-u-b'a ri tz'i ri me's [Kaqchikel]
 COMPL-3.SG.ERG-bite the dog the cat
 'The dog bit the cat.'
- b. x-u-b'a ri me's ri tz'i
 COMPL-3.SG.ERG-bite the cat the dog
 'The dog bit the cat.'
- c. ri tz'i x-u-b'a ri me's
 the dog COMPL-3.SG.ERG-bite the cat
 'The dog bit the cat.' (Broadwell 2000)
- (57) a. **iwir** ri tz'i' x-r-oqotaj ri me's Adv S V O
 yesterday the dog COMPL-3.SG.ERG-chase the cat
- b. ri tz'i' **iwir** x-r-oqotaj ri me's S Adv V O
 the dog yesterday COMPL-3.SG.ERG-chase the cat
- c. ri tz'i' x-r-oqotaj **iwir** ri me's S V Adv O
 the dog COMPL-3.SG.ERG-chase yesterday the cat
- d. ri tz'i' x-r-oqotaj ri me's **iwir** ?S Adv V O
 the dog COMPL-3.SG.ERG-chase the cat yesterday
- (58) a. **iwir** x-r-oqotaj ri tz'i' ri me's Adv V S O
 yesterday COMPL-3.SG.ERG-chase the dog the cat
- b. x-r-oqotaj **iwir** ri tz'i' ri me's *V Adv S O
 COMPL-3.SG.ERG-chase yesterday the dog the cat
- c. x-r-oqotaj ri tz'i' **iwir** ri me's *V S Adv O
 COMPL-3.SG.ERG-chase the dog yesterday the cat
- d. x-r-oqotaj ri tz'i' ri me's **iwir** ?V S O Adv
 COMPL-3.SG.ERG-chase the dog the cat yesterday

The data raise the question whether all three orders in (56) derive from one basic order or whether they are independently derived. If the latter, then the correlation between agreement and V-Adv-O should be expected in all three of them. If, however, there is one basic order, then the correlation should be expected only in that order, since the other two may involve operations that mask V-to-I movement. One relevant difference between SVO and verb-initial orders is that only the latter allow both arguments to be indefinite. SVO, on the other hand, must always have definite objects, suggesting that if there is

one basic word order, it cannot be SVO. If this is correct, the adverbial intervention in SVO orders (see (58)), which superficially shows that the fact that verbal agreement does not correlate with adverbial intervention between the verb and the object, is in fact of no consequence for the RAH. This leaves us with verb-initial orders in which we cannot use adverbs as diagnostics for verb movement, though the placement of subjects in VSO orders suggests that the verb could have moved to a clause-initial position for independent reasons. Hence, the RAH-compatibility of the Kaqchikel facts depends on which order is the basic one and whether V-to-I takes place in that order.

3.1.4 *Summing up*

Thus far we have described empirical facts in a number of rich agreement languages in which V-Adv-O orders are ruled out, either completely or in certain contexts, and this is contrary to what the RAH would predict under the assumption that adverbs can mark the left edge of the verb phrase. The discussion suggests that elements that potentially could serve as diagnostics for V-to-I are in fact problematic for evaluating the correlation. We have seen that these languages raise further questions, the outcome of which will determine the extent of the problem. Importantly, there is no *a priori* reason to assume that an element that can be used as a diagnostic in language A will also work in language B. Four general issues can be raised from the discussion above that have hitherto been largely ignored in the V-to-I literature:

- i. Subject doubling morphemes that on the first encounter look like agreement morphology may in fact be arguments of the verb.
- ii. Agreement morphemes can be phonologically independent from the verb, and as such, may not be triggers of verb movement.
- iii. The presence of non-agreement verbal morphology may trigger verb movement that masks V-to-I movement.
- iv. The standard assumption with respect to vP-adjoined adverbs may not hold universally. In some languages semantically equivalent adverbs may adjoin elsewhere in the structure, as an option or as a rule.

How we deal with the issues in (i)-(iv) has direct consequences for the evaluation of the RAH. The status of the subject doubling morpheme, whether it is agreement morphology or an argument of the verb, will lead to opposite predictions: V-to-I is only expected to correlate with (rich) agreement morphology, not with subject doubling. If agreement morphemes do not phonologically depend on the verb, then verb movement might not be triggered. Other functional morphemes that inflect on the verb may also trigger verb movement; if so, then it may be impossible to what the role is of agreement morphology. And if an adverbial is not adjoined to vP, then it cannot be used as a diagnostic for V-to-I movement. This shows that the evaluation of the RAH requires more language-specific in-depth analyses; the apparent counter examples count as real counter examples only if they cannot be analyzed along the lines of (i)-(iv).

Note that the difficulties in establishing whether a language falls in line with the RAH not only arise for rich agreement languages, but also for languages that lack (sufficient) subject-related morphology on the verb, to which we turn to next.

3.2. *V_{fin}-Adv-O orders in the absence of rich agreement*

In this section, we turn to languages that are categorized as poor agreement languages and yet exhibit facts that pose a challenge to the RAH. In section 3.2.1 we describe poor agreement languages in which, despite the absence of V_{fin}-Adv-O, the overall distribution of adverbs suggests that the RAH either cannot be evaluated at all, or it can be evaluated only in particular contexts. Section 3.2.2 delves into

poor agreement languages that exhibit limited V_{fin} -Adv-O orders, while section 3.2.3 addresses poor agreement languages with pervasive V-Adv-O orders.

3.2.1 Lack of proper diagnostics/contexts

Comparable to what we have seen with some rich agreement languages in section 3.1, there are also cases of poor agreement languages in which there appear to be no adequate diagnostics for V-to-I movement, as adverbs must surface in the clause-final position. For example, Thai, the Sino-Tibetan language Pwo Karen, the Miao-Yao language Hmong Njua, and the Niger-Congo language Igbo, all of which exhibit poor agreement morphology (cf. 59), disallow both Adv- V_{fin} -O and V_{fin} -Adv-O orders, as shown in (60) through (63).

- (59) a. phǒm/dichǎn / khun / khǎw àan náŋsǔu [Thai]
 I.M/I.F / you.HON / he/she/they read book
 ‘I/you/(he/she/they) read a book.’
- b. jǎwe. / nəwe. / ʔəwe. / ʔəθi:we. khlàin chəkhlàin xèxè [Pwo Karen]
 1.SG / 2.SG / 3.SG / 1.PL speak language slowly
 ‘I.M/I.F/you.HON/he/we speak slowly.’
- c. kǔ / káo / nǎw / pé mong qéng qéng [Hmong Njua]
 1.SG / 2.SG / 3.SG / 1.PL speak slow slow
 ‘I/you.SG/he/we walk quite slowly.’
- d. ní / í / ó / ányì ma -ra yá [Igbo]
 I / you / he/she/it / we know -RV 3.SG
- (60) a. mǎe-báan càt dǒokmáay yáaŋ-šayŋaam [Thai]
 maid arrange flower PFX-beautiful
 ‘The amid arranged the flowers beautifully.’
- b. *mǎe-báan càt yáaŋ-šayŋaam dǒokmáay
 maid arrange PFX-beautiful flower
- c. *mǎe-báan yáaŋ-šayŋaam càt dǒokmáay
 maid PFX-beautiful arrange flower (Nuttanart Muansuwan, p.c.)
- (61) a. θàʔwà khlàin chəkhlàin xèxè [Pwo Karen]
 Thawa speak language slowly
 ‘Thawa speaks slowly.’
- b. *θàʔwà khlàin xèxè chəkhlàin
 Thawa speak slowly language
- c. *θàʔwà xèxè khlàin chəkhlàin
 Thawa slowly speak language (Atsuhiko Kato, p.c.)
- (62) a. kǔ hlai mblê qéng [Hmong Njua]
 I harvest rice slowly
 ‘I harvest rice slowly.’
- b. *kǔ hlai qéng mblê
 I harvest slowly rice
- c. *kǔ qéng hlai mblê
 I slowly harvest rice (Taweesak Kunyot, p.c.)
- (63) a. Ike ri-ri ji ɔsiĩsɔ [Igbo]
 Ike eat-RV yam quickly
 ‘Ike quickly ate yam.’
- b. *Ike ri-ri ɔsiĩsɔ ji
 Ike eat-RV quickly yam

- c. *Ike ɔsiiso ri-ri ji
Ike quickly eat-RV yam (Chukwuma Okeke, p.c.)

The data patterns in (60) through (63) are the same as the ones in Lango (cf. section 3.1.1), and therefore the conclusion is the same as well: the RAH cannot be evaluated since neither the b. and c. examples are grammatical.

However, unlike Thai, Pwo Karen, and Hmong Njua, Igbo, as will be demonstrated shortly, does have contexts which allow adverbs to appear in other positions. In addition, the language exhibits a fair amount of aspectual morphology, some of which appears suffixed on the verb. This is, for instance, the case with so-called ‘factatives’, as shown in (63). Other types of aspect are realized as free-standing morphemes that precede the verb, such as ‘habituals’. In such cases, the verb appears together with a semantically vacuous harmonizing prefix *a-*, and adverbs can appear both preverbally and clause-finally, as shown in (64).

- (64) a. ahàn ji a-nụ mmịi nkwú ɔsiiso [Mbàisén Ìgbo]
3.PL HAB *a*-drink wine palm.GEN quickly
‘They customarily quickly drink palmwine.’
b. *ahàn ji ɔsiiso a-nụ mmịi nkwú
3.PL HAB quickly *a*-drink wine palm.GEN
c. *ahàn ɔsiiso ji a-nụ mmịi nkwú
3.PL HAB quickly *a*-drink wine palm.GEN (Chukwuma Okeke, p.c.)

Igbo also has other types of phonologically free aspectual morphemes, as shown in (65), illustrating the aspectual morphology in three different dialects of Igbo (adopted from Déchaine 1993). Importantly, the highlighted morphemes in (65) appear as suffixes on the verb, whereas the non-highlighted morphemes precede the verb and are phonologically independent.

- (65) Igbo aspectual morphology (adapted from Déchaine 1993)

	Òweré	Nnééwi	Ìgboúzò
anticipated	gà	yà	gà
habitual	ji	nà	nà
progressive	-ga	nà	nà
prior	-na-a-na	-bu	té
perfective	-é-la	ná	-gé-a
negative	-hụn	-họ	-shọ

The distinct patterns in (63) and (64) correlate exactly with the phonological properties of aspectual morphemes, such that in contexts with inflected morphemes, the adverb must appear in clause-final position as in (64), whereas with non-inflected morphemes adverbs can appear both preverbally or clause-finally.

This highlights that in addition to agreement, other types of morphology, such as aspectual morphology, (can) correlate with different word order outcomes. If this is correct, then the RAH cannot be evaluated in (63) much like it could not be evaluated in Germanic V2 contexts. Even though (64) shows the predicted correlation, a theory that advocates the RAH would still have to explain why Adv-V-O orders are ruled out in (63c). Any theory that rejects the RAH, on the other hand, would have to have an alternative account that also rules out (64c), in addition to (63c).

Although we can control for the phonological dependency of aspectual morphology in Igbo, this is not the case for every language. As we have already seen in Moro (section 3.1), aspectual morphology always appears on the verb together with its rich agreement, which makes it impossible to evaluate the RAH. The same holds for certain poor agreement languages, such as the Otomanguean language

Quiegolani Zapotec. Quiegolani Zapotec lacks agreement morphology (see (66)), but exhibits rigid VSO orders in which aspectual morphemes are invariably inflected on the verb (see (67)). Black (2000:47) reports that all adverbs must appear either clause-initially or clause-finally, as shown in (68), but cannot intervene anywhere between the verb and its arguments.

- (66) a. r-a noo / be / de / men skwel [Quiegolani Zapotec]
 HAB-go 1.EX / 1.IN / 2 / 3 school
 ‘I/I.IN/you/they go to school.’ (Black 2000:26, 34, adapted)
- (67) a. w-eeey Benit mël [Quiegolani Zapotec]
 COMPL-take Benito fish
 ‘Benito took a fish.’ (Black 2000:45)
- b. r-u mëëz ngyed
 HAB-eat fox chicken
 ‘The fox is eating the chicken.’ (Black 2000:46)
- (68) <yzhe> ts-a <*yzhe> noo <*yzhe> Mejiko <yzhe> [Quiegolani Zapotec]
 tomorrow POT-go tomorrow 1.EX tomorrow Mexico tomorrow
 ‘Tomorrow I will go to Mexico.’

The example in (68) indicates that the language lacks V-Adv-O orders, patterning with the data from Kaqchikel (cf. section 3.1.3). This superficially suggests that the RAH holds for Quiegolani Zapotec. However, given the default VSO orders, it is very well possible that these involve displacements, as the verb and the object are not adjacent. If this is correct, then any theory that espouses the bidirectional RAH faces a potential problem given that the language lacks agreement morphology. However, if aspectual morphology in Quiegolani Zapotec correlates with the word order outcomes, as we have shown for Igbo, then it is plausible that verb movement might not reflect V-to-I movement. The lack of V-to-I would then be masked, and the RAH could not be evaluated.

Thus far, we have discussed cases in which adverbs cannot be used to detect V-to-I as they must appear clause-finally, like in Thai, Pwo Karen, and Hmong Njua. Igbo shares the same adverbial properties with these three languages, but only in contexts where the verb is inflected for aspect. In the absence of these verbal aspectual inflections, Igbo has preverbal adverbs that can function as diagnostics for verb movement. We have also considered Quiegolani Zapotec, which restricts adverbs to either clause-initial and clause-final position, making it impossible to determine the position of the verb. Importantly, none of these languages exhibits V_{fin} -Adv-O orders, but that fact alone is not sufficient to evaluate the RAH.

3.2.2 Limited V_{fin} -Adv-O orders

V_{fin} -Adv-O orders do occur in some languages with poor agreement morphology, though. One example concerns Regional Northern Norwegian (ReNN), which exhibits no agreement morphology on the verb (cf. Bentzen et al 2007). Certain adverbs such as *ofte* ‘often’ can appear either preverbally or postverbally in contexts that lack V2, as shown in (69), whereas other adverbs, such as the negation *ikke* must appear preverbally (cf. 70). When used together in the same sentence, the two adverbs appear in the order *ofte-ikke* (cf. 71).

- (69) Æ vet koffer ho Hedda <kjøpe> ofte <kjøpe> sko [ReNN]
 I know why she Hedde buys often buys shoes
 ‘I know why Hedda often buys shoes.’
- (70) ...ettersom nån studenta <ikke> leverte <*ikke> oppgaven
 ...as some students not handed.in not assignment.DEF
 ‘...as some students {not handed in /didn’t hand in} the assignment.’

- (71) Jeg vet hvorfor John ofte ikke vet svaret
 I know why John often not know answer.DEF
 'I know why John often does not know the answer.'

In terms of surface positions, what we see in (69) and (70) is reminiscent of the way different types of adverbs behave in Egyptian Arabic and Wolof, where temporal adverbs appear to be more flexible than event modifying adverbs. In ReNN, we see that *ikke* 'not' cannot appear in V_{fin}-Adv-O orders, correlating with the fact that ReNN is a poor agreement language, whereas *ofte* 'often' appears in both V_{fin}-Adv-O and Adv-V_{fin}-O orders. This suggests that the two adverbs are not only semantically but also syntactically different. The question arises then which of the two adverbs (if not both) appears at the left edge of the verbal domain and is therefore a proper diagnostic for V-to-I movement. For any theoretical account that defends the bidirectional RAH, it would have to be assumed that the negative adverbial *ikke* appears at the left edge; this seems to be supported by (71) where *ikke* appears to the left of the verb. The flexibility of *ofte* should then be explained by assuming that it has multiple adjunction sites, one of which could also be the left edge of the verbal domain. This then would further explain the data in (69)-(71). A theory that does not adhere to the RAH can take (69) as counter evidence to the bidirectional version of the hypothesis, but the fact that the verb cannot precede negation whereas the adverb *ofte* has to is hard to reconcile with the fact that the verb can precede *ofte*. The analysis runs into an ordering paradox.

Limited cases of V_{fin}-Adv-O orders can also be found in Vietnamese, despite the fact that Vietnamese lacks subject agreement morphology, as illustrated in (72). However, such orders are restricted to contexts in which the direct objects are definite, as shown in (73), whereas in contexts with indefinite objects the interventions are ruled out (cf. 74).

- (72) tô / ahn / cô ấy đi [Vietnamese]
 I / you.SG / she went
 'I you she went.' (Trang Phan, p.c.)

- (73) a. Tôi sẽ **cẩn thận/nhanh chóng/thường xuyên/luôn luôn/chắc hẳn** đọc cuốn sách này
 I will careful/quick/often/always/probably read CLS book this
 'I wil carefully/quickly/often/always/probably read this book.'
 b. Tôi sẽ đọc cuốn sách này **cẩn thận/nhanh chóng/thường xuyên/luôn luôn/chắc hẳn**
 I will read CLS book this careful/quick/often/always/probably
 c. Tôi sẽ đọc **cẩn thận/nhanh chóng/thường xuyên/*luôn luôn/*chắc hẳn** cuốn sách này
 I will read careful/quick/often/always/probably CLS bookthis
 (Trang Phan, p.c.)

- (74) a. Tôi sẽ **cẩn thận/nhanh chóng/thường xuyên/luôn luôn/chắc hẳn** đọc sách
 I will careful/quick/often/always/probably read book
 'I wil carefully/quickly/often/always/probably read books.'
 b. Tôi sẽ đọc sách **cẩn thận/nhanh chóng/thường xuyên/luôn luôn/chắc hẳn**
 I will read book careful/quick/often/always/probably
 c. *Tôi sẽ đọc **cẩn thận/nhanh chóng/thường xuyên/luôn luôn/chắc hẳn** sách
 I will read careful/quick/often/always/probably book
 (Trang Phan, p.c.)

The (un)grammaticality of all orders in (74) is consistent with the RAH. In a theory that advocates the bidirectional RAH, the problematic facts in (73c) would have to follow from any dislocation of the direct object to the right, similar to the typical cases of heavy-NP shifts.

Word orders also correlate with object definiteness in Hawaiian, which has two clausal orders: VSO and VOS. Interestingly, objects in VSO orders must be definite, whereas the objects in VOS orders

must be indefinite. And just like Vietnamese, Hawaiian is a poor agreement language (cf. 75) in which V-Adv-O strings are ruled in in VSO orders, but ruled out in VOS orders, as shown in (76) and (77).

(75) ke hana nei au / oe / ia / mau, kaula / makou, kakou [Hawaiian]
 PRES do PRES I / you / he / we.DL / we.PL
 ‘I/you/he/we two/ we do.’ (Judd 1977:8)

(76) a. *holohjolo mau* ‘o Kehau ma ke kaona
 cruise always SBJ Kehau in the town
 ‘Kehau always cruises in town.’
 b. ‘*ai ho’onu’u* iho la lakou i ka malolo
 eat relish DIR DIR they OBJ the malolo(fish)
 ‘They relishingly ate the malolo.’ (Medeiros 2013:79)

(77) a. *inu kop mau* ‘o Noelani
 drink coffee always SBJ Noelani
 ‘Noelani always drinks coffee.’
 b. ‘*olelo* Hawai’i *mau* ‘o Noelani
 speak Hawaiian always SBJ Noelani
 ‘Noelani always speaks Hawaiian.’
 c. **inu mau kop* ‘o Noelani
 drink always coffee SBJ Noelani
 ‘Noelani always drinks coffee.’
 d. *‘*olelo* Hawai’i *mau* ‘o Noelani
 speak Hawaiian always SBJ Noelani
 ‘Noelani always speaks Hawaiian.’ (Medeiros 2013:79)

The question arises whether the two-word orders are independently derived or whether one is derived from the other, similar to what we have discussed for different word orders in Kaqchikel (cf. section 3.1.3). If one order derives from the other, it might be reasonable to assume that VSO is derived from VOS rather than the other way around, given that the verb and object do not form a constituent in the VSO surface order. Since Hawaiian VSO must have definite objects, the idea that VSO derives from VOS by rightward movement of the definite object is also supported by the Vietnamese facts, where definiteness is also associated with additional displacements masking the prohibition of adverbial intervention. Therefore, if correct, the proponents of the RAH could suppose that VSO involves additional displacements, yielding V-Adv-O orders. Such displacements would then be absent in VOS, correctly predicting the ungrammaticality of the V-Adv-O orders.

However, if VSO and VOS are derived independently from each other, then this may pose a challenge to the bidirectional RAH, as VSO may involve V-to-I, despite the fact that Hawaiian lacks agreement morphology, though arguably the verb ends up in a higher position.

3.2.3 No absence of V-Adv-O orderings

Finally, there are languages where, despite the absence of rich verb agreement, V-Adv-O orderings are still widely attested. This is especially the case when languages start to lose rich agreement. As already discussed in the introduction, the RAH, if correct, must not only hold synchronically but also diachronically. There are examples that indeed point in this direction. For instance, the loss of agreement inflection in Old English correlated with the shift from V_{fin} -Adv-O to Adv- V_{fin} -O orders (cf. Roberts 1985).

However, it has been noticed that the loss of rich inflection does not always neatly coincide with the loss of V-to-I movement. Recently, a similar claim has been made for Early Modern Danish (see

Heycock and Sundquist 2017, and references therein).⁶ By 1350, Danish exhibited only a singular-plural distinction in its verbal paradigm but continued to exhibit robust V-to-I movement for the next two centuries (cf. Sundquist 2002, 2003). According to Heycock & Sundquist (2017), 16th Century texts show that V-to-I movement occurred at the rate of 42%, and by later 17th Century the rate was 10%. Although these diachronic developments appear to run counter to the expectations of the bi-directional RAH, there are some complicating issues.

First, if there were no relation between rich verbal agreement and V-to-I movement, it is coincidental that all languages without rich inflection at least end up without V-to-I movement, albeit at a later stage. In other words, the observed time gap raises a question for any approach to these data. Theories endorsing the RAH must explain the gap; theories rejecting the RAH need to account for the fact that it is a temporary gap.

Second, as is well known, English developed a new category of functional heads with a distinct distribution dissimilar to that of lexical verbs, and it developed these exactly in the period in which the language is predicted to lose V-to-I movement. Since members of this new class (auxiliary and modal verbs) precede negation and diagnostic adverbs, like in Modern English, the ensuing word order mimics the one that is created by verb movement. In order to establish if the RAH encounters a problem, one must look at the development of V-Negation and V-Adv orders with lexical verbs only. Similar remarks apply to the history of Danish. It is noteworthy that the examples Sundquist (2002) provides as illustrations of V-to-I movement in Early Modern Danish almost exclusively involve cases in which a modal or auxiliary verb precedes, and the non-finite lexical verb follows the *vP* boundaries. The question is whether this is a coincidence (and more convincing data against the bidirectional RAH can be provided) or indicative of a transitional phase in the history of Danish in which modal/auxiliary verbs and lexical verbs are treated as categorially distinct from verbs, on a par with English.

Colloquial French is another language that can be characterized as poor. The 1PL forms *nous V-ons* have been almost completely replaced by *on V-e* (originally a 3SG impersonal form), so that the only context without a schwa ending is the 2PL (*vous V-ez*), making Colloquial French as poor as Modern English.

(78) French agreement paradigm

	Inf. <i>parl-er</i> 'speak'	
	Singular	Plural
1	(je) parl-[ə]	(on) parl-[ə]
2	(tu) parl-[ə]	(vous) parl-[e:]
3	(il) parl-[ə]	(jils) parl-[ə]

Nevertheless, finite verbs must precede negation and diagnostic adverbs. As already observed by Rohrbacher (1994), there is convincing evidence (see references in this work and references in Koeneman & Zeijlstra 2014) to suggest that subject clitics in this language function as agreement morphemes, and that the real subject argument can optionally surface as a tonic pronoun.

- (79) a. (Moi,) je viens [French]
 I I come
 'I'm coming.'
- b. (Toi,) tu viens
 you you come
 'You're coming.'
- c. Hier, Jean (/) il est parti.
 Yesterday jean he is left

⁶ Similar development had already been observed in Early Modern English, see Koeneman (2000).

‘Yesterday, Jean/he left.’

If so, Colloquial French is as rich as Italian, because every slot in the paradigm is uniquely marked, and that it is in fact a null subject language. The fact that Colloquial French displays V-to-I movement is exactly what the RAH would predict. It is tempting to suggest that the loss of affixal inflection in fact triggered or speeded up the reanalysis of subject clitics into agreement markers, as it provides a language learner a way to reconcile the agreement status of Colloquial French with the word order facts. In any case, the idea that French subject doubling clitics function as agreement morphology is crucial to any theory that espouses the bidirectional RAH, as otherwise the bidirectional RAH is disconfirmed.

3.2.4 *Summing up*

In this section we have reviewed a number of poor agreement languages that are problematic for accounts that espouse the bidirectional version of the RAH; under the unidirectional RAH accounts, V-to-I movement is not excluded in poor agreement languages. Importantly, we face a similar set of issues that we spelled out for the rich agreement languages at the end of subsection 3.1, repeated below. The issues (i) and (ii) pertain only to Colloquial French as this is the only language that has subject doubling morphemes. Other languages that have word orders that are problematic for the RAH either exhibit non-agreement verbal morphology that is also suspect for a trigger of verb movement, as in Igbo and Quiévolani Zapotec, or lack proper adverbial diagnostics, either fully as in Thai, Pwo Karen, Hmong Njua, or only in examples with particular types of adverbs, as we have seen in Regional Northern Norwegian.

- i. Subject doubling morphemes that on the first encounter look like agreement morphology may in fact be arguments of the verb.
- ii. Agreement morphemes can be phonologically independent from the verb, and as such, may not be triggers of verb movement.
- iii. The presence of non-agreement verbal morphology may trigger verb movement that masks V-to-I movement.
- iv. The standard assumption with respect to vP-adjoined adverbs may not hold universally. In some languages semantically equivalent adverbs may adjoin elsewhere in the structure as an option or as a rule.

In addition to issues (i)-(iv) we have seen that there may be other confounders such as object definiteness in Vietnamese and Hawaiian, which seems to correlate with word order outcomes that appear challenging for the RAH. Challenges also come from diachronic data showing a time-frame discrepancy between the loss of rich agreement and the cessation of the V-to-I movement, as we have seen in the development of English and Danish.

4. Theoretical consequences of the empirical studies

4.1 *The connection between syntax and morphology*

The RAH is the most prototypical hypothesis that links the presence of inflectional morphology to the triggering of syntactic operations. From a historical perspective, such a tight connection between syntax and morphology was taken to be straightforward. Earlier versions of minimalism (Chomsky 1995) were lexicalist in nature, and under lexicalist approaches morphology drives syntax: the verb enters the derivation fully inflected and it moves up to higher positions to check the relevant features (cf. Rohrbacher 1994, Vikner 1995, Koenenman 2000). The richer the inflectional morphology, the more functional head positions are to be targeted. This way, the existence of the RAH was theoretically fairly straightforward. At the same time, it should be noted that feature checking in such a model could also

take place at a distance (see, for instance, Chomsky's distinction between so-called strong vs. weak features), so the question remains open why the verb could not stay in situ and have its features checked after spell out.

In more current generative models of grammar, morphological insertion is assumed to take place after the syntactic computation on the branch to PF (cf. Bonet 1991, Marantz 1991, Noyer 1992, Bobaljik 2008). If syntactic structure is the input for morphological vocabulary insertion, morphology itself should not be able to alter the syntactic structure anymore. Hence, it should not be possible to propose a tight connection between richness of morphology and syntactic structure. In this light, it is not strange that scholars started to question the validity of the RAH, or any other conjecture relating morphology and syntactic movement. Bentzen et al.'s 2007 attempt to abandon the RAH by arguing that both types of counterexamples to the RAH, rich agreement without V-to-I movement, and V-to-I movement without rich agreement, can be attested, is a crystal-clear example of that.

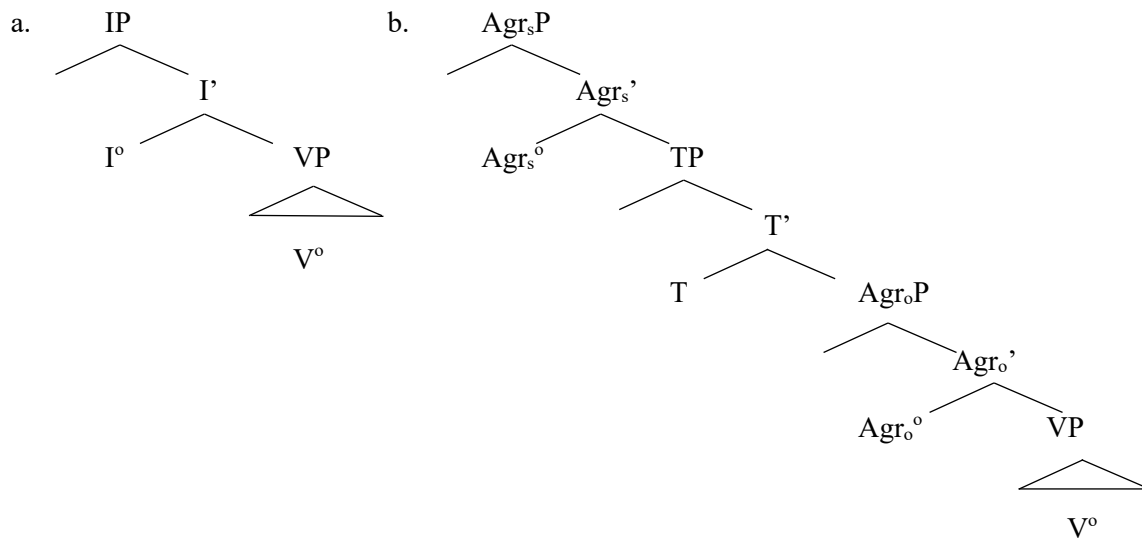
At the same time, both empirical and theoretical considerations may call against such an attempt. Empirically, it is not clear whether the claims made by Bentzen et al. really hold (see section 3). Also, the claim that there is no connection between morphology and syntactic movement would predict that there should not even be a tendency for languages with rich agreement morphology to display V-to-I movement or for languages with poor agreement morphology not to display it. It seems pretty clear, however, that the empirical landscape is such that the four different types of predicted languages are not distributed evenly.

4.2 *Postsyntactic morphology and the weak RAH*

The idea that morphological insertion takes place after syntax does not entail that any correlation between morphology and syntax becomes unstatable, as Bobaljik (1995), Thráinsson (1996) and Bobaljik & Thráinsson (1998) have already pointed out in the late nineties. For them, rich inflection may reflect the presence of more functional projections and it is this extra structure that triggers verb movement. They take this to mean that one can maintain at least a weak version of the RAH: if a language has rich agreement, it must have V-to-I movement but no prediction is made for languages without rich agreement, as has also been proposed by Rohrbacher 1994; Vikner 1995; Koenenman 2000, a.o. Empirically, this amounts to proposing that V-to-I movement may take place in the absence of rich agreement but not that languages with rich agreement lack V-to-I movement.

Concretely, Bobaljik and Thráinsson (1998) argue that cross-linguistic variation with regard to verb movement relates to the amount of functional structure above the VP that spells out as inflectional morphology. They propose a so-called 'Split-IP parameter', which means that they take languages to differ with respect to whether tense and agreement morphology is hosted in separate functional heads (T° , AgrS° , AgrO°), or whether it jointly occupies one functional head (I°). The underlying structures of the two types of languages are as follows:

(80) The Split-IP parameter



This way, the weak version of the RAH can directly be accounted for once three assumptions are adopted. Syntactically, Bobaljik & Thráinsson first assume that each feature on a functional head in the inflectional domain needs to be checked by a finite verb that is not more than one head away from it. That means that in (80a), the finite verb can check the features present on I° without having to move, but in (80b), the verb cannot check any feature above AgrOP. In order to check the features of AgrS°, the locus of subject agreement, the verb will need to raise at least to T°, the locus of tense agreement. Second, they assume that verbal movement only takes place when necessary, i.e., only when it takes place for feature checking requirements. Bobaljik & Thráinsson further assume that (inflectional) morphology reflects syntactic structure. Since, in (80a), there is only one functional head above vP, it can only be realized by a single agreement marker; in (80b), there are two separate morphemes, which can either be realized separately or jointly.

Together, this derives the weak version of the RAH. Only languages with a split IP can realize rich agreement morphology, and in all Split IP languages the finite verb must raise to at least T°. In languages with no split IP, verbs stay in situ (unless verbal movement applies for independent reasons), and agreement morphology must always be poor.

It should be noted, that Bobaljik & Thráinsson's account for the weak RAH comes along with a particular notion of when agreement counts as rich. For them, it cannot be a number of contrasts within the verbal agreement paradigm that triggers V-to-I movement, but rather whether the verb comes inflected with multiple segmentable morphemes (e.g. agreement + tense). This is indeed the kind of 'richness' that distinguishes English from Icelandic under this approach, as shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**, repeated below. The crucial difference between these languages is not the number of contrasts, but the fact that Icelandic, unlike English, exhibits a dedicated past tense morpheme (though see Koenen & Zeijlstra 2021 for a different assessment of the morphological structure of Icelandic agreement markers).

(81) Modern English and Icelandic agreement paradigms

	Modern English		Icelandic	
	Present tense	Past tense	Present tense	Past tense
1SG	walk	walk-ed	heyr-i	heyr-ð-i
2SG	walk-s	walk-ed	heyr-ir	heyr-ð-ir
3SG	walk	walk-ed	heyr-ir	heyr-ð-i
1PL	walk	walk-ed	heyr-jum	heyr-ð-um
2PL	walk	walk-ed	heyr-ið	heyr-ð-uð
3PL	walk	walk-ed	heyr-a	heyr-ð-u

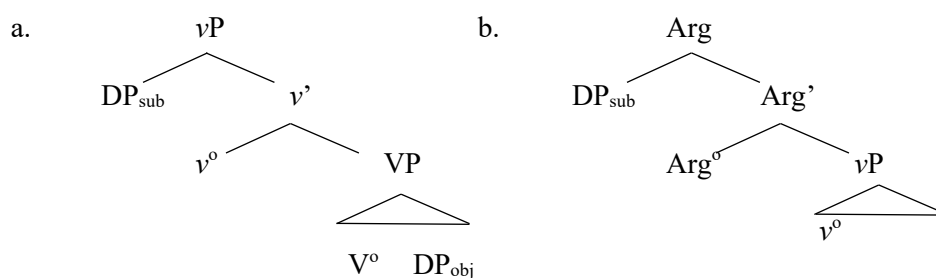
In order to evaluate this weak version of the RAH, which is indeed compatible with a postsyntactic view on (inflectional) morphology, it is thus important to not only evaluate the correlation between richness of agreement and verbal movement, but also whether the relevant languages are indeed rich in the above-described sense.

4.3 Postsyntactic morphology and the strong RAH

More recently, Koenenman & Zeijlstra (2014) and Tvica (2017) have argued that even if morphology precedes syntax, richness of morphology and syntactic structure building still go hand in hand, albeit indirectly. For them, rich morphology forms the only possible cue for language learners to postulate those formal features that can project functional structure. In this way, even though morphology does not drive syntax directly in the linguistic model, morphology does determine syntax through acquisition, causing a tight connection between the two. In fact, they argue that a bidirectional relation between V-to-I movement and rich inflectional agreement morphology is predicted this way.

In a nutshell, Koenenman & Zeijlstra (2014), followed by Tvica (2017), propose that the lower bound of what counts as rich agreement is identical to the lower bound of what may constitute argumenthood, which they take to be similar to with what features the poorest pronominal system in the world's known languages display. In terms of a featural system, all languages in the world show at least featural distinctions with respect to [speaker], [participant] and (arguably) [number] in their pronominal systems (cf. Greenberg 1963. Universal 42; Harley & Ritter 2002; Cysouw 2003; Tvica 2017, though see Harbour 2016). Koenenman & Zeijlstra take this to mean that if a verbal paradigm contains affixes with similar featural distinctions, this can be taken as evidence for the language learner that these affixes are *argumental* in nature and base-generated as a separate Arg(ument) head above the vP. By contrast, if in a verbal paradigm these featural distinctions are not represented, there is no evidence for the learner that argumental features must be hosted in a separate functional projection. In fact, such features cannot even be acquired as part of the formal feature inventory of that language. Therefore, the structural difference between languages with rich and poor agreement is that only the former has a functional position, which is standardly referred to as I° but for them is a projection of the feature [ARGUMENT]. Movement to this position can then simply be taken to result from application of the Stray-Affix Filter (Lasnik 1981, 1995, Baker 1988). The relevant structures are then as in (82):

(82) Absence vs. presence of ArgP



Note that the prediction for Koenenman & Zeijlstra differs from that of Bobaljik & Thráinsson in two ways. First, whereas the latter need to take richness of agreement to lie in its internal morphological structure (being minimally bimorphemic instead of monomorphemic), the former have to define richness in terms of featural contrasts: only if there are contrasts in all dimensions constituting argumenthood does a paradigm count as rich. Empirically, these notions often coincide, but do not have to. Second, whereas Bobaljik & Thráinsson only predict that rich agreement languages must exhibit V-to-I movement (V-to-Arg movement in their terms), Koenenman & Zeijlstra also predict that poor agreement languages must lack it. Even if in such languages certain instances of head movement can be detected, these cannot be instances of V-to-I/Arg movement, for the very simple reason that I/Arg is non-existent in such languages.

5. Conclusions and open questions

Despite superficial counterexamples, we have empirically shown that it seems likely that some version of the RAH might go a long way. Nonetheless, as we expand the empirical domain, additional problems for the evaluation of the RAH arise, which we briefly recapitulate here.

First, the status of the subject inflection on the verb as agreement has been taken for granted in much of the literature on the RAH. Although this assumption might have made sense for languages such as Icelandic and Spanish, it is much less straightforward when we are faced with the clausal properties in languages such as Bilua and Hatam. It may be the case that such agreement-like morphemes are in fact arguments themselves, as proposed by Jelinek (1984), which inevitably leads to an opposite prediction for the RAH.

Second, in addition to the richness of agreement, another dimension that seems to be relevant for the RAH concerns its phonological properties. It is typically observed in most (if not all) of the well-studied languages of the Indo-European family that subject agreement appears phonologically (obligatorily) attached to the finite verb. This observation, however, does not fully carry over to the larger typological picture; depending on a language, agreement can be independent of the verb in either specific or general contexts. If agreement is a functional head in the extended projection, as standardly assumed, the question arises whether V-to-I movement needs to happen when agreement is expressed by an unbound morpheme.

Third, non-agreement functional inflections on the verb may be involved in additional displacements. If inflectional morphology, such as aspectual or temporal morphology, is hosted by specific heads in the extended projection, then there is reason to think that they, like (rich) agreement morphology, can also trigger verb raising. Thus, it may become impossible to tease apart which type of inflection (or whether both) may be triggers of movement. In such cases, we can refute the RAH if there is no evidence of verb raising, but we cannot evaluate the status of the RAH.

Fourth, the standard verb movement diagnostics do not fully carry over to the larger typological picture. As we have demonstrated, adverbs do not behave uniformly either intra-linguistically (as a category) nor cross-linguistically. For example, only specific types of (low) adverbs, such as manner adverbs, appear to be reliable diagnostics, though there are languages in which other types, e.g. time adverbs, can also be used to detect verb raising. That said, across languages we have seen that even manner adverbs behave differently (at least superficially) and sometimes cannot be used to detect V-to-I movement. Naturally, the problems with diagnostics also extend to languages that express adverb-like modification in different ways, e.g. through aspectual morphology, but lack adverbs as category altogether.

The phenomenon of V-to-I movement is not the only one in which there is a hypothesis linking morphology, or even rich morphology, to some syntactic phenomenon. Two other examples that spring to mind are the hypothesized correlation between rich agreement and pro drop (i.e. the ability to license null subjects), and the one between rich case endings and freedom of word order. To some extent, the issues encountered there mimic the ones discussed in this paper, most prominently the issue of whether the hypothesized correlation holds at all.

It is well known, for instance, that there are languages without rich agreement that nevertheless license null subjects. For this reason, some literature distinguishes agreement-based pro drop from radical pro drop (cf. Neeleman & Szendrői 2008 for discussion). But even if only agreement-based pro drop is taken into consideration, many issues arise. How rich should agreement be in a language for it to license null subjects. Is there a lower bound? Should we look at the whole paradigm to determine whether agreement in a language counts as rich? If so, how do we explain the existence of partial pro drop in languages like Standard Finnish and Hebrew? What happens if we direct our attention away from the centrally studied Indo-European languages and look at other language families (cf. Cole 2009)? See Koenen & Zeijlstra (2019) for a recent overview of some of these issues. Similar to the discussion about V-to-I movement, it is relatively easy to falsify a coarse correlation between rich agreement and the appearance of null subjects but this might entail different things. It might entail that the generalization is wrong, it may turn out that the generalization is not precise enough, and it may turn out that a more in-depth analysis of recalcitrant languages reveals why they are recalcitrant, or in fact perfectly behaved.

The correlation between rich morphological case systems and freedom of word order goes back at least to Sapir (1921) and Jakobson (1936), and that there is something essentially correct is “not really

a matter of debate”, according to McFadden (2004:150). Neeleman & Weerman (1999), however, note that morphological case may be a necessary more than sufficient prerequisite. Although both Icelandic and German have rich morphological case systems, word order in these languages is more restricted than one would expect on an innocent understanding of the correlation. Instead of taking German and Icelandic as falsifying the correlation, they set out to account for the relatively free but still restricted word orders in these languages.

In both these areas, the question is whether the correlation holds uni- or bi-directionally and whether the property it mentions (rich case or agreement) counts as a sufficient prerequisite for the particular phenomenon (pro drop or free word order) to arise or is merely a necessary ingredient. Like in the case of V-to-I movement, the research informing us about the correctness of the hypotheses involved should be fine-grained and the study of individual languages should be in depth so as to prevent premature falsification. We hope that the discussion on the RAH above counts as an example for that.

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Glossary

1	first person	CLG	class g noun	COMPL	completive aspect
2	second person	CLS	classifier	CONT	continuity marker
3	third person	COLL	collective	DIR	directional

DL	dual	LA	locative applicative	PT	past tense
DUR	durative	LIG	ligature	RECP	reciprocal marker
ERG	ergative	M	masculine	REDUP	reduplication
EX	exclusive	N	neuter	REL	relative marker
F	feminine	NEG	negation	RMP	remote past tense
FOC	focus marker	OBJ	object	RV	factative
FUT	future tense	PART	particle	RP/P	realis past/present
GEN	genitive	PF	perfective	RTC	root clause
HAB	habitual	PFX	prefix	SBJ	subject
IMP	imperfective	PL	plural	SG	singular
IN	inclusive	POT	potential	SIT	situation-change
INDEF	indefinite	PRES	present tense	marker	
INFL	inflection	PROS	prospective marker	TOP	topic marker