A typology of clause structure

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1 Introduction[1]

This article collects a number of ideas and comments on word order typology from the perspective of the *principles-and-parameters* framework. It will show that current generative grammar predicts a larger set of transitive structures than the six types normally mentioned in the typological handbooks (SVO, SOV, VSO, etc). The main cause of this discrepancy is that, whereas generative grammar investigates the hierarchical positions of the verb and its arguments, most typological research is concerned with their relative surface order. In order to bring together these two lines of research, we have to translate the predictions of generative grammar into a more sophisticated typology in linear terms that can be taken as the point of departure for future typological research.

This article will exemplify how the typological predictions of generative grammar can be made explicit in linear terms by investigating the strong generative capacity of a specific version of the computational system of human language C_{HL}, and spell out these predictions in more detail. It will further suggest a number of ways in which these structures can be recognized, and, by doing so, it also sets a new research program for language typology. The paper concludes with a number of potentially complicating factors that should be taken into account during the execution of this program.

I want to stress that the specific version of C_{HL} to be discussed below is certainly not the one adopted by all generative scholars: it is simply the one I believe to be correct (for reasons extensively discussed in Broekhuis 2008). In order to provide the typological community with sufficient information, the typological predictions of the alternative versions should be made explicit as well. This is certainly not possible within the confines of this article and should, in my view, preferably be done by the proponents of these alternative versions in order to avoid unwanted bias. This therefore constitutes a research task for the generative community as a whole.

What I propose is thus a project which crucially involves both generative syntacticians and typologists in the hope that the former may help the latter to find certain so far unknown typological differences between languages, and that the latter may help the former by providing the relevant typological data that are needed to evaluate the competing theoretical proposals and to improve the most successful ones.

2 Two problems

A language like English has a so-called SVO order. This means that in an unmarked declarative sentence the subject (S) is followed by the verb (V), which is in turn followed by the object (O). It is the order we find in an English sentence such as in (1).

(1)   <u>John</u> <u>ate</u> <u>an apple</u>.
         S   V   O

Greenberg (1963) noticed that the fast majority of the world's languages has an SO-order. The OS-order was deemed to be "excessively rare", and on the basis of this observation, he formulated his famous language universal 1:

(2)   *Universal 1*: In declarative sentences with nominal subject and object, the
             dominant order is almost always one in which the subject precedes the object.

The correctness of universal 1 has been confirmed over and over again (cf. Table 1 in Siewiersky 1999), and Dryer (2008) provides the following figures for the sample of 1228 languages collected for *The World Atlas of Language Structures*.

(3)   a.   SVO: 436   d.   VOS: 26   g.   No dominant order: 171
       b.   SOV: 497   e.   OVS: 9
       c.   VSO: 85   f.   OSV: 4

Greenberg's view on clause structure and word order was simple in the sense that he just investigated the relative surface orders of S, V and O (which also causes a difficulty for classifying languages that exhibit an asymmetry between embedded and main clauses with respect to the relative order of the verb and the object, like Dutch and German). This simple view has changed considerably over the last 50 years and the various formal approaches now assume that relatively simple sentences like (1) must be assigned rather intricate hierarchically organized structures, with the result that, e.g., the SVO order can in principle be derived in more than one way; even the highly simplified structures in (4) show that there are at least three ways to derive the SVO order, so that we may conclude that the basic word order typology is much more complex than the traditional six-way distinction suggests.[2]

(4)   a. $[_{IP} ... I [_{VP} S [V O]]]$
       b. $[_{IP} S I [_{VP} t_S [V O]]]$
       c. $[_{IP} S I{+}V [_{VP} t_S [t_V O]]]$

This raises the question of how many clause types can be derived by the grammar, and this paper aims at providing an answer to this question. Given that A′-movements normally correlate with special meaning effects (like the derivation of interrogative clauses), we have to focus on the set of available A- and verb movement operations in the IP-domain. The basic

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[2] This paper will adopt without much discussion the so-called VP-internal subject hypothesis (see Koopman & Sportiche, 1991, and much later work), according to which the subject is generated within the lexical projection of the verb and moved into the regular subject position (SpecIP) at a later stage of the derivation. Languages like Dutch, with optional subject raising to specIP, provide conclusive evidence in favor of this hypothesis. First consider the Dutch example in (ia); the fact that the subject may follow the indirect object clearly shows that the internal argument need not raise to SpecIP in Dutch. Under the assumption that sentence adverbs like *waarschijnlijk* 'probably' are external to the lexical projection of the verb, the two word orders in (ib) can likewise be accounted for by assuming that subject raising need not apply. I refer the reader to Broekhuis (2007/2008) for an extensive discussion of the conditions under which subject raising must/cannot apply.

(i)   a.   dat   <de boeken> de koningin <de boeken> aangeboden   worden.
             that   the books   the Queen   prt.-offered be
             'that the books are offered to the Queen tomorrow.'
       b.   dat   <zijn buurman>   waarschijnlijk <zijn buurman>   het huis   koopt.
             that   his neighbor   probably   the house buys
             'that his neighbor will probably buy this house.'

surface orders are then determined by the question whether these movements normally do or do not apply in the languages under investigation; see Section 6 for a discussion of some issues that may complicate this issue (such as apparent optional movements).

The second question is how we can account for Greenberg's Universal 1, and I will argue that the structure building mechanisms proposed in Grimshaw (1997) may shed some new light on this question by showing that under a number of natural assumptions at least the exceptional OSV- and OVS-languages are not likely to be derived by means of head/A-movement, so that their rarity may be due to the fact that more intricate derivations may be required to derive them (like remnant VP-movement; cf. fn. 9).
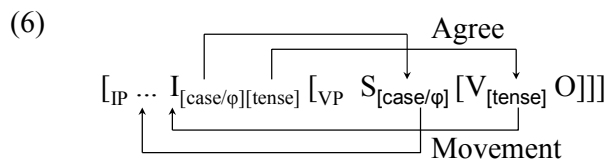
3   Word order in generative grammar: historical background

The European structuralist Paardekooper (1961) has shown that, in Dutch, complementizers in embedded clauses and finite verbs in main clauses have a similar position relative to the subject of the clause. Den Besten (1983) accounted for this observation by assuming that in main clauses finite verbs move by means of head-movement from their original clause-final position into the position normally occupied by the complementizer in embedded clauses.

(5)   a.   <u>dat Jan</u> dat boek   morgen   koopt
             that Jan   that book   tomorrow   buys
             'that Jan will buy that book tomorrow.'
       b.   Morgen   <u>koopt Jan</u> dat boek ~~koopt~~?

This head-movement proposal has had a major impact on present-day generative grammar in that it has led to the postulation of a number of functional heads, which perform a twofold role in the grammar: first, the projections of the these heads introduce landing sites for head- and XP-movement and thus play an important role in accounting for word order phenomena, and, secondly, the heads themselves are assumed to carry features that play a role in expressing certain grammatical relationships between the constituting elements of the clause, like case and agreement features, or in the interpretation of the clause, like tense features.

In more recent proposals these two functions are normally claimed to be intimately related. The inflectional head I in (4a), for example, has been argued to contain nominal features that are responsible for nominative case-assignment and subject-verb agreement as well as tense features that are relevant for the interpretation of the verb; these features are claimed to enter in an Agree relation with corresponding features on the subject and the verb, and it is these Agree relations that license the subject and verb movements in (4b&c). In a sense, we may say that movement serves to make the Agree relations visible in the syntactic representation of the clause by placing the elements that enter in such a relation in a local, head-adjunction or specifier-head relation. The combination of Agree + Movement will henceforth be referred to as Attract: I may attract the verb and the subject in a configuration like (6), in which φ is used as a shorthand for the nominal features that are involved in subject-verb and object-verb agreement (person, number and gender).

(6)
$$[_{IP} \cdots I_{[case/\varphi][tense]} [_{VP} S_{[case/\varphi]} [V_{[tense]} O]]]$$

with Agree and Movement relations indicated

Although the number and nature of available functional heads is still subject of ongoing debate, it seem likely that the clause contains more functional heads than just the inflectional head I in (4). Pollock (1989), for example, argued that there is an additional functional layer on top of VP, which he called AGRP, that can likewise function as the landing site of V. In, e.g., the papers collected in Chomsky (1995) it was further suggested that the AGR-head contains features that can be held responsible for accusative case assignment and, e.g., Italian object-participle agreement, and that this head can therefore also trigger movement of the object, as in (7b).

(7)   a $[_{AGRP} ... AGR [_{VP} S [V O]]]$
       b. $[_{AGRP} O AGR+V [_{VP} S [t_V t_O]]]$

Adopting the proposal in (7) for the moment, we can continue the derivation by adding the inflectional head I, as in (8a). As we have already seen in (6), this functional head licenses movement of the verb and the subject, which results in the structure in (8b).

(8)   a. $[_{IP} ... I [_{AGRP} O AGR+V [_{VP} S [t_V t_O]]]]$
       b. $[_{IP} S I+AGR+V [_{AGRP} O t_{AGR+V} [_{VP} S [t_V t_O]]]]$

The C-head identified by Den Besten was claimed to carry features related to the illocutionary force of the clause (e.g., declarative or question). These features again license verb movement as well as movement of topical/focus phrases in declarative or *wh*-phrases in interrogative clauses. This results in the structure in (9).
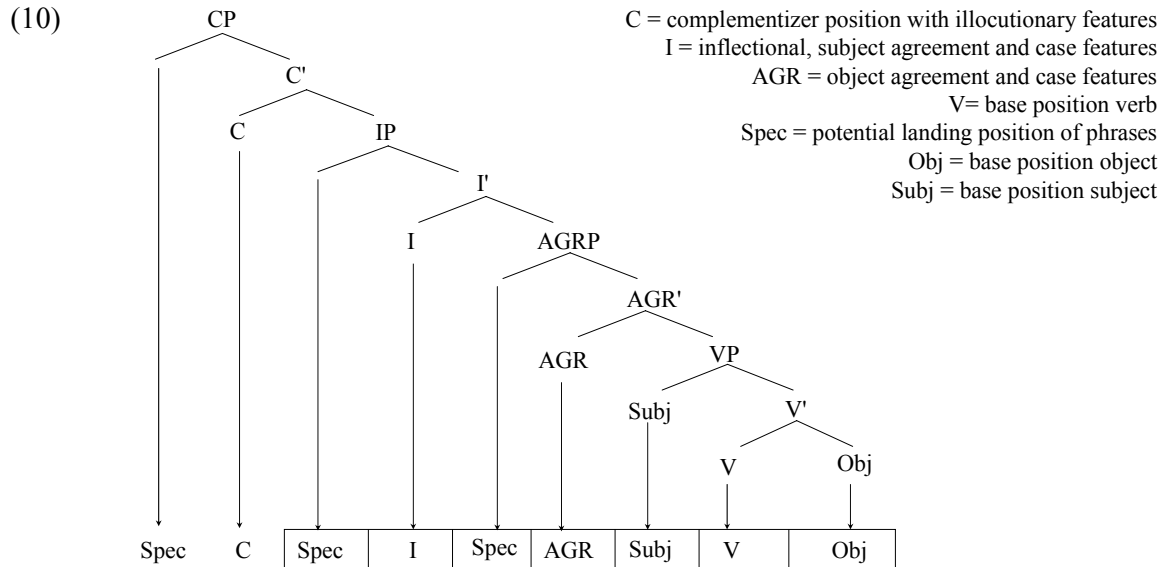
(9)   a. $[_{CP} ... C [_{IP} S I+AGR+V [_{AGRP} O t_{AGR+V} [_{VP} S [t_V t_O]]]]]$
       b. $[_{CP} Topic/Wh C+I+AGR V [_{IP} S t_{I+AGR+V} [_{AGRP} O t_{AGR+V} [_{VP} S [t_V t_O]]]]]$

In the early 90's, the structure in (9) was the more or less generally accepted one for regular transitive clauses (although some claimed that the inflectional head I should be divided in an AGR-head for the subject and a separate Tense-head). For expositional reasons, I will also adopt it as my point of departure for the discussion in this subsection, although (in line with more recent insights) I will replace it in the later sections by a somewhat different proposal that does not make use of AGR-heads.

Example (10) shows that the syntactic representation in (9) in a sense defines a syntactic template. I will show in the remainder of this section that this template can be used to formally account for the syntagmatic relationships within the clause that we cross-linguistically find; I will focus on the boxed part of the template since we are concerned with the *basic* word order typology and the CP-layer is mainly used to obtain special semantically conditioned effects related to the illocutionary force of the clause.[3] I will continue to assume that the output structures are formed by moving the verb and its arguments into the available designated positions of the template; the verbal features on AGR and I may trigger movement of the verb, the accusative case and agreement features for the object on AGR may trigger

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[3] For this reason, I will also ignore the fact that in asymmetric Verb-Second languages like Dutch and German (as well as Danish) the basic word order can be obscured in main clauses by an additional movement of the finite verb into the "second position"; cf. Den Besten's analysis of Verb Second in (5). This does of course not mean that asymmetric Verb-Second would not be interesting from a typological point of view; see Broekhuis (2008:Section 4.1) for relevant discussion and a verb movement typology that includes this property.

movement of the object into the specifier of AGRP, and the nominative case and agreement features for the subject on I may trigger movement of the subject into the specifier of IP.[4]

(10)

C = complementizer position with illocutionary features
I = inflectional, subject agreement and case features
AGR = object agreement and case features
V= base position verb
Spec = potential landing position of phrases
Obj = base position object
Subj = base position subject

One of the main findings of the last decade of generative research is that word order differences between languages can be reduced to the question whether or not, in a certain language L, the Agree relation is made visible by movement, that is, whether or not the features on the functional heads force movement of their associates. This replaces the earlier claim that the pertinent movements are obligatory in all languages but that languages are parameterized with respect to the question whether these movements apply before or after the spell-out operation that transfers the phonological features to the PF-component; movement applying after spell-out is invisible in the PF-output and therefore also in the actual utterance. In more technical terms, the more recent proposal claims that the long-distance dependency Agree is in principle sufficient for establishing the relation between functional heads and their associates, and that something extra is needed to trigger movement. In the current versions of the minimalist program this "something extra" is normally given shape by postulating epp- or edge-features associated with the functional heads that force movement of their associates, although (in my view: better) alternatives are available; see Broekhuis (2008) for extensive discussion and illustration. However, since we are just dealing with the strong generative capacity of C_{HL}, this need not concern us here.

Table (11) shows that by assuming that the movements that derive the surface structure are optional in the sense that they need not occur in all languages (while they may be obligatory in some), we can readily derive the six basic word orders from the universally available structure in (10); the traces in this table indicate that the relevant positions have been filled at some stage in the derivation; the cells marked with the number sign # in the I and AGR columns indicate that these positions are filled by phonetically empty occurrences of these functional heads, and the remaining empty specifier positions are radically empty.

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[4] The structure in (10) follows Kayne's (1994) universal base hypothesis, according to which surface structures are derived by leftward movement from a universally available SVO base structure. Arguments in favor of an underlying SOV structure are given in, e.g., Haider (2000) and Barbiers (2000). In Broekhuis (2008), I compare the various proposals and conclude that the original SVO-hypothesis is superior to the SOV-hypotheses.

(11) Language types w.r.t. the order of subject, verb and object

	SpecIP	I	SpecAGRP	AGR	Subj	V	Obj
SVO		#		#	**S**	**V**	**O**
	S	#		#	t_S	**V**	**O**
	S	#		**V**	t_S	t_V	**O**
	S	**V**		t_V	t_S	t_V	**O**
	S	**V**	**O**	t_V	t_S	t_V	t_O
SOV	**S**	#	**O**	#	t_S	**V**	t_O
	S	#	**O**	**V**	t_S	t_V	t_O
VSO		#		**V**	**S**	t_V	**O**
		V		t_V	**S**	t_V	**O**
OSV		#	**O**	#	**S**	**V**	t_O
VOS		**V**	**O**	t_V	**S**	t_V	t_O
OVS		#	**O**	**V**	**S**	t_V	t_O

If the assumptions so far are on the right track, Table (11) shows that the standard division on the basis of word order in six typological different languages is too simple; there are actually more than six basic types available. That this is not just a theoretical possibility but an apt description of the actual state of affairs is clear from the fact that it can be readily shown that at least some of the competing structures co-occur among the languages of the world. I will illustrate this here for the competing SVO-structures, which are repeated in a slightly different form in (12); the elements in boldface are the ones that are spelled out.

(12) a. [$_{IP}$ I   [$_{AGRP}$ AGR   [$_{VP}$ **S**   **V**   **O**]]]
      b. [$_{IP}$ **S** I   [$_{AGRP}$ AGR   [$_{VP}$ t_S **V**   **O**]]]
      c. [$_{IP}$ **S** I   [$_{AGRP}$ AGR+**V** [$_{VP}$ t_S t_V **O**]]]
      d. [$_{IP}$ **S** AGR+I+**V** [$_{AGRP}$ t_{AGR+V} [$_{VP}$ t_S t_V **O**]]]
      e. [$_{IP}$ **S** AGR+I+**V** [$_{AGRP}$ **O** t_{AGR+V} [$_{VP}$ t_S t_V t_O]]]

That at least some of the representations in (12) do actually occur can be established on the basis of the orderings of S, V, and O with respect to certain types of adverbial phrases; cf. Emonds (1978/1985). The examples in (13) show that the relative order of finite main verbs and frequency adverbs like *souvent*/*often* differ in French and English: the verb must precede *souvent* in French (13a), but follow *often* in English (13b).

(13) a. John often sees Mary.
      b. Jean voit souvent Marie.

When we assume that frequency adverbs immediately precede the AGRP-projection, the difference between French and English follows when we assume that the verb occupies I in French, but AGR or V in English.[5] This means that two of the typologically different SVO-languages defined in (12) can now be identified: French has the representation in (12d) or

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[5] I follow here Emonds' (1985:ch.5) analysis as rephrased by Chomsky (1991). The anonymous reviewer correctly notes that alternative analyses are possible within the AGR-based theory. For example, we may assume that English and French both have V-to-AGR but no V-to-I movement. In that case we can still derive the difference by assuming that the languages differ in the adjunction site of the adverb–VP in English and AGRP in French; see Van den Wyngaerd (1989b) for a proposal of this sort. I will not discuss this option here given that it does not arise in the AGR-less theory adopted in Section 4.

(12e), whereas English has the structure in (12b) or (12c). When we abstract away from the internal structure of AGRP (that is, the exact placement of the object *Marie*/*Mary* and the English verb *sees*), the representations of the examples in (13) are as indicated in (14).

(14) a. [$_{IP}$ John I   often   [$_{AGRP}$ t_{John} sees Mary]]   [cf. (12b/c)]
      b. [$_{IP}$ Jean voit souvent [$_{AGRP}$ t_{John} t_{voit} Marie]]   [cf. (12d/e)]

Observe that the difference between English and French cannot be accounted for by assuming that French and English differ in the placement of the frequency adverb with respect to I (e.g., below I in French and above I in English) as this would run afoul with the common assumption that auxiliary and modal verbs do occupy I in English; since such verbs precede *often*, the latter must be placed below I.[6]

(15) a. [$_{IP}$ John I   often [$_{AGRP}$ t_{John} sees Mary]].
      b. [$_{IP}$ John has   often [$_{AGRP}$ t_{John} seen Mary]].

        I want to conclude this section by noting that the proposals reviewed above do not only change our perspective on word order typology (in the sense that the typology is more complex than assumed earlier), but that they also mean an important step in reaching the main objective of generative grammar of accounting how children can acquire their mother language so quickly and accurately in a relatively short time; since children already know the (universal) structure of their language, they can readily deduce from the relative order of the verb/nominal arguments and certain types of adverbs, which movements do or do not apply in their target language and, hence, what type of language their target language is.

4 Phrase structure and word order typology: a possible implementation

This section argues that typologically predictions concerning the relative order of the verb and its arguments mainly depend on the strong generative capacity of the computational system C_{HL}. In order to show this, I will adopt a very specific version of C_{HL} and spell out the predictions of this system in detail; other versions of C_{HL} may make other typological predictions but I leave it to future research to make these explicit. The discussion in this section will result in a language typology in terms of fairly abstract clause structures. Section 5 will discuss ways in which these abstract structures can be brought to light in the linear order of the corresponding utterances.

4.1 Phrase structure theories without AGR

The postulation of AGR-nodes has been criticized for two reasons. First, although AGR and I are both part of the projection line of the verb, it seems that the two differ in that only the former has interpretable features; whereas it is traditionally assumed that I introduces tense features, it is not clear whether AGR has a similar semantic contribution (see Chomsky 1995: 349). Secondly, although it was originally assumed that AGR has formal case and agreement features for the object, such features seem to be inherent features of the verbs themselves: transitive verbs may agree with their internal arguments and can assign accusative case to them, whereas unaccusative verbs can agree with their internal argument but cannot assign

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[6] Because this will become relevant in Section 6.2, it may be useful to note here that auxiliaries (and modal verbs) are not base-generated in I but are also moved there by V-to-I. That this must be the case is clear from the fact that they may follow sentence adverbs like *often* when they are non-finite: *John will often have seen Mary*. The fact that *often* may also occur between the auxiliary and the main verb suggests that clause adverbs can be generated either on top of the projection of the lexical verb or on top of the projection of the auxiliary.

accusative to them as a result of which the internal argument surfaces as the subject of the clause. By eliminating AGR-heads altogether, we avoid the need to express these verbal properties by adopting the *ad hoc* stipulation that there are several types of Agr-heads (some with case and agreement features, some with agreement features only, perhaps some with no features at all). If these two objections are indeed valid, it follows that AGR is feature-less and Chomsky (1995:ch.4) concluded from this that AGR should be eliminated from the theory.

The need to eliminate AGR does not necessarily imply, however, that the template in (10) is entirely incorrect. In fact, we can do away with AGR while still maintaining that the derivation proceeds along the lines indicated in (7) and (8) by adopting some version of Grimshaw's (1997) theory of extended projections. I will maintain that V has an accusative case feature that must enter in an Agree relation with the object of the clause and that this Agree relation can be made visible in the syntactic representation of the clause by placing the elements that enter in this relation in a local, specifier-head configuration. According to Grimshaw's theory, this configuration will arise by creating an additional projection above VP by movement (remerge) of V and the object, as in (16b&c); see Ackema, Neeleman & Weerman (1992) and Nash & Rouveret (1997) for similar ideas. For convenience, we may think of the extended projection as AGRP (in the same way as Grimshaw (1997) maintains the traditional labels in her work), but since this projection is headed by the moved V, I will label it VP.

(16) a. $[_{VP}$ S $[$V O$]]$
       b. $[$V $[_{VP}$ S $[t_V$ O$]]]$ [remerge of V]
       c. $[_{VP}$ O $[$V $[_{VP}$ S $[t_V$ O$]]]]$ [remerge of O]

When we subsequently add the functional head I, and apply V-to-I movement (which is motivated by the need to establish a local relation between V and the tense feature on I) and movement of the subject into the specifier of IP (which is motivated by the need to establish a local relation between the subject and the agreement and case features on I), we end up with the representation in (17), which is virtually identical to the one in (10); the two structures differ only with respect to the label of the AGR-nodes in (10). This means that we can maintain the earlier analysis of the contrast in (13) without any further ado, and that the other results from Section 2 will also carry over.[7]

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[7] Transfer of the earlier results does not necessarily hold for the competing multiple specifier theory proposed in Chomsky (1995: Section 4.10). My main reason to reject this alternative, however, is that it has given rise to certain descriptive problems with Icelandic transitive expletive constructions (Chomsky 1995:354) from which Chomsky concluded that verb movement is not part of core syntax but results from some PF-rule (Chomsky 1995:368). Since, so far, this PF-rule has not been made explicit, the minimalist program has become empirically void when it comes to word order typology. Fortunately, Section 6.3 will argue that Chomsky is wrong and that there are strong reasons to maintain that verb movement is part of core syntax. This would mean that the original problem with Icelandic transitive expletive constructions still stands and from the fact that this problem does not arise with the extended projection approach (see Broekhuis 2000: fn.7), I conclude that this approach is superior to the multiple specifier approach.

(17)
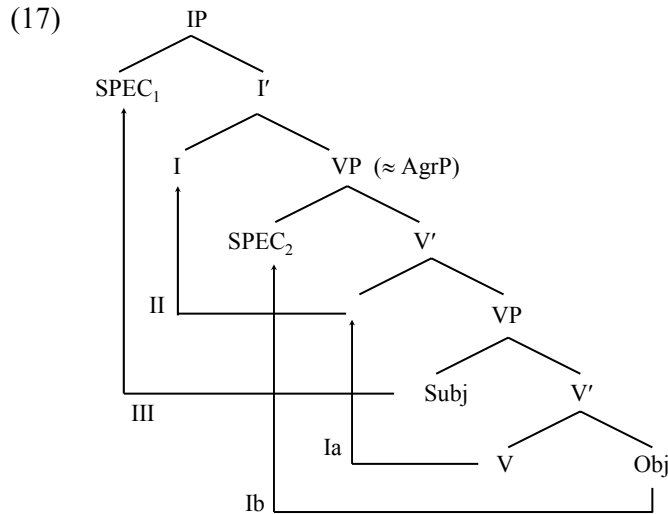
It is important to note, however, that the creation of the extended projection involves the simultaneous application of verb and object movement: movement Ia cannot occur without movement Ib, and vice versa, because economy considerations will only allow the creation of an extended VP-projection when this serves the purpose of placing the verb and the object in a local (here: specifier-head) configuration. This is in line with the fact that all movements in (17) are motivated by the fact that they make Agree-relations structurally visible: movement III is motivated by the fact that it places the subject in a local relation with the agreement and nominative case features on I, movement II is motivated by the fact that it places the verb in a local relation with the tense features on I, and movements Ia & Ib are motivated by the fact that they place the object in a local relation with the agreement and accusative case features on V.

The claim that movements Ia and Ib necessarily co-occur is not innocuous; when we maintain that all movements are optional in the sense that they need not occur in all languages, this reduces the number of logically possible SVO-structures to four, which are furthermore partly different from those given in (12). First, whereas the representations in (12a-d) were possible in the AGR-based proposal, the corresponding representations in (18) are now excluded since they do not involve movement at all or movement of the verb without the required accompanying object movement.

(18)   a. *$[_{IP}$ I $[_{eP}$ e $[_{VP}$ **S**   **V O**]]]
       b. *$[_{IP}$ **S**   I $[_{eP}$ e $[_{VP}$ t_S **V O**]]]
       c. *$[_{IP}$ **S**   I $[_{VP}$ **V** $[_{VP}$ t_S t_V **O**]]]
       d. *$[_{IP}$ **S**   I+**V** $[_{VP}$ t_V $[_{VP}$ t_S t_V **O**]]]

Secondly, the verb can move into I without first forming an extended VP-projection and as a result we predict the representations in (19a-c) to be possible alongside (19d).

(19)   a. $[_{IP}$ I $[_{VP}$ **S**   **V O**]]
       b. $[_{IP}$ **S**   I $[_{VP}$ t_S **V O**]]
       c. $[_{IP}$ **S**   I+**V** $[_{VP}$ t_S t_V **O**]]
       d. $[_{IP}$ **S**   I+**V** $[_{VP}$ **O** t_V $[_{VP}$ t_S t_V t_O]]]

To make things a bit more concrete, let us consider again the examples in (13). English (13a), *John often sees Marie*, has the structure in (19b): the adverb *often* is generated in between I and VP, and is therefore crossed by subject raising (movement III). The French example in (13b), *Jean voit souvent Marie*, is derived by applying subject raising (movement II) and V-to-I (movement III), which leaves us with the structures in (19c) and (19d).

Table (20) provides the full set of typological predictions of the extended projection approach; the number sign in the I column again indicates that this position is filled by a phonetically empty occurrence of this functional head, the grey cells indicate that the extended projections of V is not realized, and the cells marked with traces indicate either the base positions or the positions that have been used as intermediate landing of the moved elements. The table shows that the number of available representations for the SOV and VSO order is now reduced to one, and that the OSV order can no longer be generated given that object movement into Spec_2 requires that V be moved as well. Recall that we investigate the *basic* word order typology and that the CP-layer of the clause is therefore left out of consideration.

(20) Typological predictions of the extended projection approach

	Spec$_1$	I	Spec$_2$	V-ext	Subj	V	Obj
SVO		#			**S**	**V**	**O**
	S	#			t_S	**V**	**O**
	S	**V**			t_S	t_V	**O**
	S	**V**	**O**	t_V	t_S	t_V	t_O
SOV	**S**	#	**O**	**V**	t_S	t_V	t_O
VSO		**V**			**S**	t_V	**O**
*OSV		#	**O**		**S**	**V**	t_O
VOS		**V**	**O**	t_V	**S**	t_V	t_O
OVS		#	**O**	**V**	**S**	t_V	t_O

4.2 Verbs as composites

Another more recent development is the claim that verbs are not introduced in the structure as units: a verb consists of a verbal root V, which only gets its verbal properties by entering in a relation with a so-called light verb *v*; cf. Hale & Keyser (1993). In transitive constructions, the object (theme argument) is selected by the verbal root V and the subject (agentive argument) is introduced by the light verb, as in (21).

(21)   [$_{vP}$ S *v* [$_{VP}$ V O]]

Since the verb is a composite of *v* and V, it is not *a priori* clear where the case and agreement features are situated. I will assume that the accusative case feature is situated on the light verb *v* given that this is a typical verbal property. For the object agreement features, I will assume that they are situated on the verbal root V given that these also occur on adjectives, cf. *Maria è malata* 'Maria is ill$_{fem.}$' (Burzio 1986:80). Assuming this distribution of features is again not innocuous, given that this actually adds a possible landing site for the object, as will be clear from the derivation in (22). The φ-features on V in (22a) may attract the corresponding features on the direct object, as a result of which an extended VP-projection will be created, as in (22b). In (22c), the light verb and the subject are added; the accusative case feature on *v* may attract the corresponding case features on the object, as a result of which an extended *v*P-projection will be created, as in (22d). The derivation is completed by adding I, the

nominative case and agreement features of which may attract the corresponding features of the subject.

(22) a. $[_{VP}\ V_{[\varphi]}\ O_{[\varphi/case]}]$
      b. $[_{VP}\ O_{[\varphi/case]}\ V_{[\varphi]}\ [_{VP}\ t_V\ t_O]]$
      c. $[_{vP}\ S\ v\ [_{VP}\ O_{[\varphi/case]}\ V_{[\varphi]}\ [_{VP}\ t_V\ t_O]]]$
      d. $[_{vP}\ O_{[\varphi/case]}\ v_{[case]}\ [_{vP}\ S_{[\varphi/case]}\ t_v\ [_{VP}\ t_O\ V_{[\varphi]}\ [_{VP}\ t_V\ t_O]]]]$
      e. $[_{IP}\ S_{[\varphi/case]}\ I_{[\varphi/case]}\ [_{vP}\ O_{[\varphi/case]}\ v_{[case]}\ [_{vP}\ t_S\ t_v\ [_{VP}\ O_{[\varphi/case]}\ V_{[\varphi]}\ [_{VP}\ t_V\ t_O]]]]]$

In the derivation in (22), we focused on movement of the nominal arguments but on top of that the verbal root V can in principle move to *v*, and via *v* to I. The derivation is therefore as indicated in (23), where all movements are again optional in the sense that they need not occur in all languages, and the a- and b-movements involved in the creation of extended projections of V and *v* necessarily co-occur.

(23)
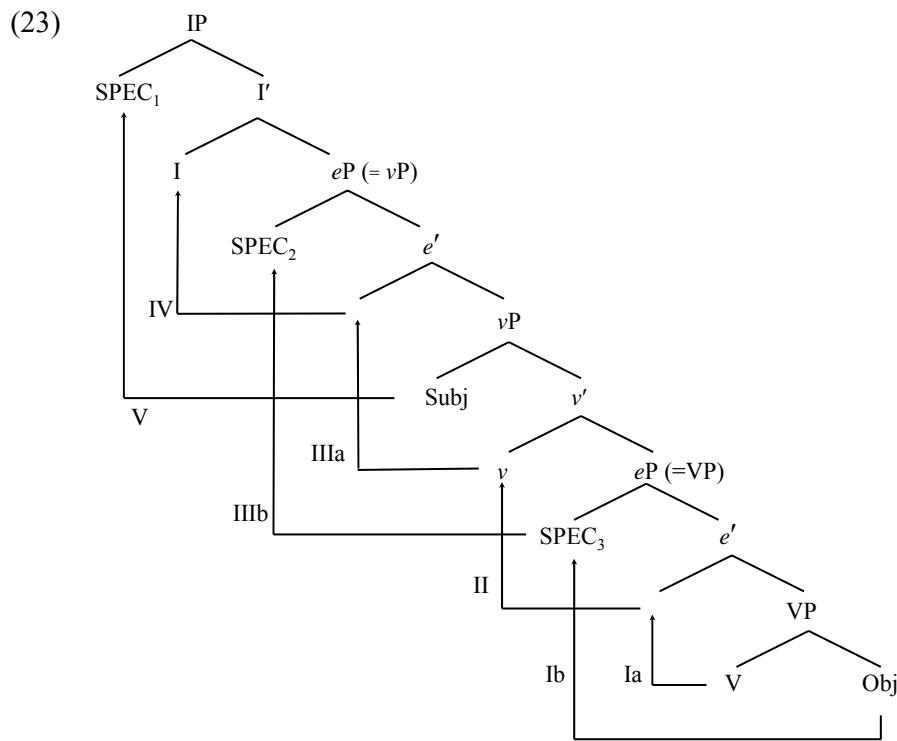
        When we compare the derivation in (23) with the one in (17), we see that the new assumption that the verb consists of a verbal root V and a light verb *v*, which can each separately attract the object, adds additional landing sites for the object (SPEC$_3$) and the verb (the position of the light verb *v*). We therefore expect that this will extend the word order typology, but we will see that this expectation is only partly borne out. First, consider Table (24), which provides the available structures for the SO languages; the grey cells again indicate that the extended projections of V and *v* are not realized, and the cells marked with traces indicate either the base positions or the positions that have been used as intermediate landing of the moved elements.

(24) Predicted structures for SVO, SOV and VSO languages

	Spec$_1$	I	Spec$_2$	v-ext	Subj	v	Spec$_3$	V-ext	V	Obj
SVO		#			**S**	v			**V**	**O**
		#			**S**	**V**+v			t_V	**O**
		#			**S**	**V**+v	**O**	t_V	t_V	t_O
	S	#			t_S	v			**V**	**O**
	S	#			t_S	**V**+v			t_V	**O**
	S	#			t_S	**V**+v	**O**	t_V	t_V	t_O
	S	**V**+v+I			t_S	t_{V+v}			t_V	**O**
	S	**V**+v+I			t_S	t_{V+v}	**O**	t_V	t_V	t_O
	S	**V**+v+I	**O**	t_{V+v}	t_S	t_{V+v}	t_O	t_V	t_V	t_O
SOV		#			**S**	v	**O**	**V**	t_V	t_O
	S	#			t_S	v	**O**	**V**	t_V	t_O
	S	#	**O**	v	t_S	t_v	t_O	**V**	t_V	t_O
	S	#	**O**	**V**+v	t_S	t_{V+v}	t_O	t_V	t_V	t_O
VSO		**V**+v+I			**S**	t_{V+v}			t_V	**O**
		V+v+I			**S**	t_{V+v}	**O**	t_V	t_V	t_O

It is important to note that the typology in (24) silently adopts two assumptions. First, I have assumed that object movement must always proceed via the extended projection of V; if incorrect, this will add one additional structure for both the SVO and the SOV order, in which the object has been moved in one fell swoop into the specifier position of the extended projection of the light verb. Secondly, I have assumed that v can only be moved into I when it has obtained phonological feature by V-to-v movement. This claim is based on the vacuous movement hypothesis from Chomsky (1986) and the effect-on-output condition from Chomsky (2001) and Sabel (2005), according to which movement must have some word order or semantic effect on the output.[8] Although these restrictions seem natural, they need not be correct; if wrong, this will add five extra representations (two for the SVO and three for the SOV languages). Note in this connection that, despite the fact that v has no phonological features, the creation of the extended vP-projection in the third SOV-structure is allowed given that it is necessarily accompanied by regular object shift which has a semantic effect in the sense of Chomsky (2001) and will affect the relative order of the object and the

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[8] Both reviewers have asked whether or not the vacuous movement hypothesis and effect-on-output condition are conditions on derivations. If so, we predict that in transitive clauses with no material other than verbs and their arguments the structure are cross-linguistically the ones in the top row of each subtype in Table (24), that is, the structure with the minimum number of movements. The question is a bit embarrassing as it is hard to find empirical evidence that bears on the issue and we thus seem to be dealing with a highly theory-internal matter: Chomsky's original vacuous movement hypothesis, for example, seems to predict that movement is blocked when there is no effect on the word order, whereas his effect-on-output condition seems to allow it as long as the movement in question affects the interpretation (which in his proposal can be determined by the actual position of the elements in the structure). In Broekhuis (2008), the ban on vacuous movement and the effect-on-output condition are both formulated as violable OT-constraints and it is therefore predicted that the relevant movements may also apply when no other material is present provided that the constraints that favor movement outrank these constraints; in such cases, the vacuous movement hypothesis and effect-on-output constraints are only relevant when there is a choice between candidates that do and candidates do not obey these constraints (see the discussion of (36) below). This OT-approach to vacuous movement also accounts for the fact that certain phonological (word order) effects of movement can be undone by movement at some later stage of the derivation (such as *wh*-movement).

clause adverbs (if present); the structure as a whole therefore satisfies the effect-on-output condition.

Comparison of Tables in (18) and (24) shows that our expectation that the number of available structures increases by the introduction of the light verb v is indeed borne out as far as the SO-languages are concerned: The number of available representations for the SVO languages has increased from four to nine, for the SOV languages from one to three, and for the VSO languages from one to two. Interestingly, Table (25) shows that the effect is much less drastic for the OS-languages: the only difference with table (18) is that it has become possible again to derive the OSV order.

(25) Predicted structures for OSV, VOS and OVS languages

	Spec$_1$	I	Spec$_2$	v-ext	Subj	v	Spec$_3$	V-ext	V	Obj
OSV		#	**O**	*v*	**S**	t_v	t_O	**V**	t_V	t_O
VOS		**V+v+I**	**O**	t_{V+v}	**S**	t_{V+v}	t_O	t_V	t_V	t_O
OVS		#	**O**	**V+v**	**S**	t_{V+v}	t_O	t_V	t_V	t_O

Note that the OSV order cannot be excluded by appealing to the vacuous movement hypothesis or the effect-on-output condition mentioned above: although the movement of the phonetically empty light verb v is not visible in the output representation, the inversion of the subject and the object does make the creation of the extended vP-projection visible; the structure as a whole therefore satisfies the effect-on-output condition.

4.3 A possible account of Greenberg's Universal 1

The numeral contrast between Table (24) and (25) may tempt us to simply relate the frequency of the SO- and OS-languages to the number of structures made available by the grammar; Table (26) shows that there is at least some correlation between the two.

(26) Correlation between number of available structures and frequency

TYPE	#LANGUAGES (WALS)	#AVAILABLE STRUCTURES
SVO	436	9
SOV	497	4
VSO	85	2
VOS	26	1
OVS:	9	1
OSV:	4	1

However, since it seems very hard to prove or disprove that this correlation is real (and there is in fact no *a priori* reason to expect such a correlation given that languages do not select one of the available structures by change but on the basis of their ancestry), it would be preferable if we could appeal to something testable. Table (25) shows that the two language types that are rarest, OSV and OVS, have in common that their IP-projection does not contain any phonological material. This evokes the traditional formulation of the EPP that requires that the subject position (the specifier of IP) be filled; cf. Chomsky (1981). The EPP in this form is certainly not a universal principle (as will be clear from the structure assigned to the VSO languages in Table (24)), and it is therefore interesting to observe that Alexiadou and Anagnostopoulou (1998) have reformulated this principle by requiring that (i) the specifier of IP be filled by the subject *or* (ii) the I-position be filled by verb movement. This suggests that the EPP can be ultimately reduced to the effect-on-output condition introduced above by requiring that the functional projections of the clause be made visible by filling it with some

phonological material. This account of the rarity of OSV and VOS structures *is* testable given that it predicts that SVO and SOV representations in Table (24) that violate this effect-on-output version of the EPP will also be rare or non-existent.

   When we remove the representations that do not comply with the new version of the EPP (without implying that they are categorically excluded), we arrive at the new word order typology in (27), which include the less frequent VOS structure. This typology seems to do justice to Dryers findings summarized in (3) above.

(27) Word order typology

	Spec$_1$	I	Spec$_2$	v-ext	Subj	v	Spec$_3$	V-ext	V	Obj
SVO	**S**	#			t_S	v			**V**	**O**
	S	#			t_S	**V**+v			t_V	**O**
	S	#			t_S	**V**+v	**O**	t_V	t_V	t_O
	S	**V**+v+I			t_S	t_{V+v}			t_V	**O**
	S	**V**+v+I			t_S	t_{V+v}	**O**	t_V	t_V	t_O
	S	**V**+v+I	**O**	t_{V+v}	t_S	t_{V+v}	t_O	t_V	t_V	t_O
SOV	**S**	#			t_S	v	**O**	**V**	t_V	t_O
	S	#	**O**	v	t_S	t_v	t_O	**V**	t_V	t_O
	S	#	**O**	**V**+v	t_S	t_{V+v}	t_O	t_V	t_V	t_O
VSO		**V**+v+I			**S**	t_{V+v}			t_V	**O**
		V+v+I			**S**	t_{V+v}	**O**	t_V	t_V	t_O
VOS		**V**+v+I	**O**	t_{V+v}	**S**	t_{V+v}	t_O	t_V	t_V	t_O

Note in passing that the relatively low frequency of the VOS order in (3) may reflect a more common phenomenon for natural languages, namely, that they tend to maintain the "underlying" word order of the nominal arguments, which I take to be S-IO-DO. This can be readily illustrated by the following object shift constructions from Icelandic: the examples in (28) show that whereas both the indirect object and the direct object can optionally undergo object shift, it is not possible to shift the direct object across the indirect object. This also holds for examples like (29), where object shift of the indirect object is forced in order to allow satisfaction of the requirement that pronominal objects be shifted.

(28)   a.   Pétur sýndi   oft   Maríu bókina.
             Pétur showed often Maríu the.book
       b.   Pétur sýndi Maríu oft t_{IO} bókina.
       c.   Pétur sýndi Maríu bókina oft t_{IO} t_{DO}.
       d.   *Pétur sýndi bókina oft Maríu t_{DO}.

(29)   a.   *Pétur sýndi   oft   Maríu hana.
             Pétur showed often Maríu it
       b.   *Pétur sýndi Maríu oft t_{IO} hana.
       c.   Pétur sýndi Maríu$_i$ hana$_j$ oft t_{IO} t_{DO}.
       d.   *Pétur sýndi hana$_j$ oft Maríu t_{DO}.

Given that this requirement that the underlying order of the arguments be preserved is clearly language-specific (it does not hold for German, for example), it may be relevant to account

for the fact that VOS languages are possible but relatively rare;[9] I refer the reader to Müller (2000/2001), Williams (2003), Fox and Pesetsky (2005), Koeneman (2006), Broekhuis (2008) for recent discussions and formalizations of this kind of order preservation. For completeness' sake, note that under the assumptions adopted in this article, order preservation is a condition on A-movement; A′-movement is not subject to this condition.

    According to our present proposal, the structures in (27) define the basic language types that make up the vast majority of the world's languages. The following section will develop one possible diagnostic that can be used to identify the various language types.

5 Adverb placement

Table (27) constitutes a research program for language typology in the sense that we need to establish whether the predicted representations do indeed constitute the basic declarative orders of the world's languages and whether they indeed exhaust the possibilities. Unfortunately there are no ready-made tests that can be applied to establish the basic structure of a language and all I can do in this section is to summarize some more or less familiar facts from the literature in the hope that this will provide a starting point of the development of a reliable set of diagnostics. The discussion will mainly focus on the two types of object movement that are predicted to exist; the object movement into $Spec_3$ (the specifier of the extended projection of the verbal Root V), which will be called short object shift, and the object movement into $Spec_2$ (the extended projection of the light verb v), which will be called regular object shift given that it is this movement that is normally referred to as object shift in the literature; see, e.g., Holmberg (1986/1999), Vikner (1994/2006), Thráinsson (2001), Chomsky (2001), Broekhuis (2000/2008), and the references cited therein.

5.1 Short object shift and VP-adverbs

Although it is normally taken for granted that English differs from Icelandic in that it does not exhibit regular object shift, it has been proposed that English does exhibit a more limited form of object movement. Johnson (1991), for example, postulated such movement in order to account for –among other things– the fact that objects may and sometimes must be placed in front of verbal particles; see also Koizumi (1993).

(30) a.   John looked up the information/*it.
      b.   John looked the information/it up.

Lasnik (1999a: ch.2&8) provides further evidence in favor of short object shift on the basis of a number of binding facts. First consider the unacceptable example in (31a), which involves a violation of binding condition A: the anaphor *each other* is embedded in an adjunct of the matrix clause and is therefore not c-commanded by the intended antecedent *the defendants*. However, when we replace the finite clause by an infinitival clause, as in (31b), the result improves considerably; according to Lasnik (31b) has more or less the same status as (31c).

(31) a.   *?The DA proved [that *the defendants* were guilty] during *each other*'s trials.
      b.   The DA proved [*the defendants* to be guilty] during *each other*'s trials.
      c.   The DA accused *the defendants* during *each other*'s trials.

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[9] I am aware that there are proposals that claim that at least some typological VOS-languages (as well as some VSO-languages) are derived not by V-movement but by means of VP-topicalization; cf. Massam (2000). If these proposals are on the right track, this simply underlines the claim in the main text that VOS-languages of the type in Table (27) are rare.

The acceptability of (31b) suggests that the surface position of the exceptionally case-marked subject is not internal to the infinitival clause, but that it has moved into a position of the matrix clause where it c-commands the anaphor. Note that, for this reason, the placement of the brackets in (31b) and some of the later examples is somewhat misleading. I use them only to indicate that the antecedent of the anaphor is base-generated as part of the infinitival clause, without implying that it is still part of this clause when the binding relations are established. The examples in (32) show that the acceptability of (31b) is crucially related to the surface position of the antecedent: in (32a) the intended antecedent is sandwiched by other elements of the infinitival clause and therefore clearly internal to the infinitival clause; the subject of the infinitival clause only becomes available as antecedent of the reciprocal after leftward movement.[10]

(32)   a.   *The DA proved [there to have been *two men* at the scene of the crime] during
              each other's trials.
        b.   The DA proved [*two men* to have been at the scene of the crime] during *each
              other*'s trials.

Under the standard assumption that binding requires c-command, the binding facts in the infinitival constructions in (31) and (32) provide conclusive evidence in favor of the claim that there is short object shift in English. In fact, under the assumptions that adverbials are generated external to VP, the much simpler example *The DA accused the defendants during each other's trials* in (31c) already shows the same thing: if short object shift does not apply, the object is VP-internal and therefore does not c-command the reciprocal embedded in the adverbial phrase, and binding would wrongly be predicted to be impossible; if we do assume short object shift, as in the schematic representation in (33), the c-command requirement is satisfied, and binding is correctly predicted to be possible.

(33) $[_{vP}... v+V [_{VP}$ *the defendants* V [during *each other*'s trials $[_{VP} t_V t_{DO}]]]$

The structure in (33) is important because it shows that short object shift may cross VP-adjuncts (which are typically manner adverbs), which may therefore be used as a diagnostic for short object shift.[11] Vice versa, short object shift may account for the fact that in languages like Swedish, which does not have regular object shift of non-pronominal objects, objects normally do precede the VP-adverbs; see Sells (2001:143), who claims that VP-adverbs can only appear in front of the direct object for "purposes of emphasis or due to other discourse related factors", Christensen (2005:52) for a similar remark on Danish, and

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[10] The binding argument can be replicated by the examples in (i). The (a)-examples show that a bound variable reading of the possessive pronoun *his* is only possible when the subject of the infinitival clause has moved leftward, and the (b)-examples that licensing of the negative polarity item *any* likewise requires leftward movement of the subject.

(i)   a.   *The DA proved [there to be *no suspect* at the scene of the crime] during *his* trial.
        a′.   The DA proved [*no suspect* to be at the scene of the crime] during *his* trial.
        b.   *The DA proved [there to be *no one* at the scene of the crime] during *any* of the trials.
        b′.   The DA proved [*no one* to be at the scene of the crime] during *any* of the trials.

[11] I assume that VP-adjuncts and sentential adjuncts can be distinguished by means of paraphrases. The former can be split off from their clause by means of an ... *and pronoun does so ADVERB* phrase (in which the pronoun refers to the subject of the modified clause), whereas the latter can be used in the frame *It is ADVERB the case that* ... Some adverbial phrases seem to be ambiguous; frequency adverbs like *often*, for example, can be used in both frames.

Koeneman (2006:fn.7) for the claim that in Scandinavian VP-adverbs are placed uniformly after the object.

(34) a. Han tvättar   <bilen> gärna <#bilen>.   (✓ short object shift)
          he   washes   the car gladly
      b. Han tvättar   <*bilen> ju/inte <bilen>.   (*regular object shift)
          he   washes   the car   indeed/not

The adverb test must be applied with care, however, given that the OV-languages may behave differently in this respect: although Table (27) shows that such languages require that short object shift take place, the object can nevertheless readily follow manner adverbs. This is illustrated in (35) for Dutch.

(35)   dat hij voorzichtig de auto   wast.
            that he   carefully   the car   washes
            'that he washes the car carefully.'

This can again be attributed to the effect-on-output condition. Assume that adjuncts must adjoin to the phrase they modify and that VP-adjuncts adjoin to VP for this reason. Assume further that that the order of adjunction and short object shift is essentially free because the required modification relation will be established irrespective of whether the adjunct is adjoined to the lower or the higher part of the extended projection of VP. If so, we can in principle derive both representations in (36) for SVO-languages like English. However, since there is no phonetically realized material between the object and its trace in the representation in (36b), the effect-on-output condition will block this representation in favor of the representation in (36a), where the adverb intervenes between the object and its trace and thus makes the object shift visible.[12]

(36) • Short object shift in SVO-languages
      a. [$_{IP}$ S I [$_{vP}$ t_S V+v [$_{VP}$ O t_V [adverb [$_{VP}$ t_V t_O]]]]]   (Merge adverb > Move O)
      b. [$_{IP}$ S I [$_{vP}$ t_S V+v [adverb [$_{VP}$ O t_V [$_{VP}$ t_V t_O]]]]]   (Move O > Merge adverb)

The available representations for SOV-languages are given in (37), which only differ from those in (36) in that V does not raise to v. As a result, the effect-on-output condition is satisfied in both representations in (37), due to the fact that verbal root V intervenes between the object and its trace. Consequently, both orders are expected to be possible. This accounts for the fact that, contrary to the SVO-language, the object may follow VP-adjuncts.

(37) • Short object shift in SOV-languages
      a. [$_{IP}$ S I [$_{vP}$ t_S v [$_{VP}$ O V [adverb [$_{VP}$ t_V t_O]]]]]   (Merge adverb > Move O)
      b. [$_{IP}$ S I [$_{vP}$ t_S v [adverb [$_{VP}$ O V [$_{VP}$ t_V t_O]]]]]   (Move O > Merge adverb)

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[12] Olaf Koeneman correctly notes that the availability of *John looked up the information carefully* constitutes a potential problem for the analysis here: the order particle-DP shows that no short object shift has taken place, but nevertheless the object may precede the manner adverb. The reason for this is that the particle and the DP are part of a small clause and that English sometimes allows small clauses to be moved across VP-adjuncts. Unfortunately, I will not be able to substantiate these claims here and have to confine myself to giving references; that the particle and the DP are part of small clause is extensively discussed in Den Dikken (1995a) and that English allows small clauses to shift across VP-adjunct is discussed in Broekhuis (2008: section 5.3.2.1) and Broekhuis & Hegedűs (2009).

5.2 Regular object shift and sentential adverbs

A large part of Broekhuis (2008) is devoted to establishing that Scandinavian object shift as well as some forms of Dutch/German scrambling are instantiations of object movement into the specifier of the extended projection of the light verb *v**. The well-known observation that Scandinavian object shift is characterized by the fact that it obligatorily crosses certain sentential adverbs (like the modal adverbs *probably*) can again be accounted for by an appeal to the effect-on-output condition. Assume that the relevant sentential adverbs are modifiers of the proposition and must therefore be adjoined to *v*P, but that the order of adjunction and regular object shift is essentially free. If so, we can in principle derive the intermediate representations in the primeless examples in (38), and the SVO order can subsequently be derived from these structures by moving the verb and the subject into their designated positions within IP, as in the primed examples. This means that regular object shift will only be visible in the output when the adverb intervenes between the object and its trace: the effect-on-output condition therefore correctly predicts that regular object shift must cross (at least one) *v*P-adjunct.[13]

(38)   • Regular object shift in SVO-languages
   a. $[_{vP}$ O V+v [adverb $[_{vP}$ S t_{V+v} [$_{VP}$ t_O t_V [$_{VP}$ t_V t_O]]]]]   (Merge adverb > Move O)
   a′. $[_{IP}$ S I+V+v $[_{vP}$ O t_{V+v} [adverb $[_{vP}$ t_S t_{V+v} [$_{VP}$ t_O t_V [$_{VP}$ t_V t_O]]]]]]
   b.   [adverb $[_{vP}$ O V+v $[_{vP}$ S t_{V+v} [$_{VP}$ t_O t_V [$_{VP}$ t_V t_O]]]]]   (Move O > Merge adverb)
   b′. $[_{IP}$ S I+V+v [adverb $[_{vP}$ O t_{V+v} $[_{vP}$ t_S t_{V+v} [$_{VP}$ t_O t_V [$_{VP}$ t_V t_O]]]]]]

The representations in (39) show that the same holds for SOV-languages: although regular object shift crosses the underlying position of the subject, the latter is moved into the specifier of IP in order to derive the SOV order and regular object shift will therefore only be visible in the output when the adverb intervenes between the object and its trace. Consequently, the effect-on-output condition correctly predicts that regular object shift must cross (at least one) *v*P-adjunct in SOV languages like Dutch.

(39)   • Regular object shift in SOV-languages
   a. $[_{vP}$ O v [adverb $[_{vP}$ S t_v [$_{VP}$ t_O V [$_{VP}$ t_V t_O]]]]]   (Merge adverb > Move O)
   a′. $[_{IP}$ S I $[_{vP}$ O v [adverb $[_{vP}$ t_S t_v [$_{VP}$ t_O V [$_{VP}$ t_V t_O]]]]]]
   b.   [adverb $[_{vP}$ O v $[_{vP}$ S t_v [$_{VP}$ t_O V [$_{VP}$ t_V t_O]]]]]   (Move O > Merge adverb)
   b′. $[_{IP}$ S I [adverb $[_{vP}$ t_O v $[_{vP}$ t_S t_v [$_{VP}$ t_O V [$_{VP}$ t_V t_O]]]]]]

5.3 Verb movement and adverb placement

The discussion above implies that adverbs may also help in detecting verb movement: VP-adverbs are adjoined to VP and will therefore invariably be crossed by V-to-*v* movement; sentential adverbs of the type crossed by regular object shift are adjoined to *v*P and will therefore invariably be crossed by V-to-I movement. Verb movements associated with the creation of extended VP- or *v*P-projections, on the other hand, only need to cross the VP- and *v*P-adjuncts when this is forced by the effect-on-output condition.

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[13] It is not clear to me whether it would be possible for regular object shift to cross the adverb in the multiple specifier approach as this will give rise to a representation in which the adverb intervenes between the inner and outer specifier of *v*P: $[_{vP}$ O [adverb $[_{vP}$ S v [V O]]]]. This might be infelicitous for set-theoretical reasons: in Chomsky's Bare Phrase Structure notation, for example, the node dominating the displaced object would have the label <V,V>, which defines an adjunction structure. If the suggested structure is indeed excluded, the relative order of shifted objects and adverbs cannot be handled within core syntax.

6 Three concluding remarks

Section 4 has proposed a new word order typology which, contrary to the more traditional six-way distinction, is based on the hierarchical structure of the clause: it is assumed (i) that there are a number of movement potentials for verbs and their nominal arguments and (ii) that languages differ in the extent to which these potentials are realized. Furthermore, Section 5 has shown that movement is often only indirectly observable by inspection of the relative order of the verb and its nominal arguments, on the one hand, and certain types of adverbial phrases, on the other. This section will conclude the discussion with a number of brief remarks on the fact that the typology in Table (27) interacts with other typological differences between languages, and that as a result of this the basic patterns may be obscured. These complications will be illustrated by means of Scandinavian object shift and verb movement in English.

6.1 Interacting factors

Icelandic is generally described as a language that allows regular object shift. There is, however, a difference between pronominal and non-pronominal objects: whereas the former normally must undergo object shift, object shift of the latter is optional. This is illustrated in the examples in (40), where the angled brackets indicate alternative placements of the objects.

(40) a.   Jón las   <þessa bók>   ekki <þessa bók>.   [non-pronominal DP]
          Jón read   this book   not
      b.   Jón las   <hana> ekki <*hana>.   [pronominal DP]
          Jón read   it   not

The word order variation in (40a) is not entirely free but illustrates another familiar fact about regular object shift, namely that it can be blocked by information structural considerations: a shifted object cannot be part of the new information of the clause (Holmberg 1999). This is not unexpected as it just shows that the *basic* structure of the clause can be affected by external factors (just as in the case of *wh*-movement or topicalization). It does complicate issues, however, in that we now have to determine whether the basic structure is the one with or the one without regular object shift; see Broekhuis (2008:ch.3) for arguments in favor of the former option.

6.2 Tripartitions

The typology in Table (27) is based on the idea that the movements made available by C_{HL} are optional in the sense that they need not occur in all languages. This implicitly suggests that there is a set of binary parameters that determine whether a given movement does or does not apply, but this is not what we always find; in some cases we are arguably dealing with tripartite parameters instead. Even if we just consider the Scandinavian languages, it is clear that it does not suffice to make a distinction between languages like Icelandic that do and languages like Finnish-Swedish that do not allow for this type of object shift. In addition there are languages like Danish that do have regular object shift but with pronominal DPs only. This will become clear by comparing the Icelandic examples in (40) to the Danish examples in (41).

(41) a.   Hvorfor læste   studenterne <*artiklen> ikke <artiklen>? [non-pronominal DP]
          why   read   the students the article   not
      b.   Hvorfor læste   studenterne <den> ikke <*den>?   [pronominal DP]
          why   read   the students it   not

This contrast between Icelandic and Danish shows that we are actually dealing with a tripartition: languages may exhibit "full" object shift, no object shift at all, or "partial" object shift, that is, object shift with pronominal DPs only. This shows that the basic typology proposed in Table (27) is actually too simple: next to the language types with "full" short/regular object shift, we expect to find languages with "partial" object shift only Broekhuis (2008: section 3.2).

(42)   a.   Language type I (e.g., English); no object shift
       b.   Language type II (e.g., Icelandic): object shift
       c.   Language Type III (e.g. Danish): object shift with pronominal DPs only

Something similar can be found in the domain of verb movement. Section 3 has already shown that English verb movement exhibits a dichotomy between auxiliary/modal verbs and main verbs: whereas the former can be placed in the I-position, the latter cannot. The relevant data are repeated in simplified form in (43).

(43)   a.   John   I   often   sees Mary.
       b.   John   has   often   seen Mary.

This contrast suggests again that we are dealing with a tripartition: languages may exhibit "full" verb movement, no verb movement at all or "partial" verb movement, that is, verb movements with non-main verbs only; see Broekhuis (2008: section 4.1.2). Again this will complicate the basic typology in Table (27).

(44)   a.   Language type I (e.g., Japanese); no V-to-I
       b.   Language type II (e.g., Icelandic): V-to-I
       c.   Language Type III (e.g., English): V-to-I with non-main verbs only

I like to conclude this section by mentioning that the anonymous reviewer claims that data of the type discussed in this subsection show that I am providing not a typology of languages, but a typology of sentence types. I strongly disagree; the discussion shows that the typology in (27) must be refined by incorporating the insight that certain languages may allow the indicated movements with a subset of the potential goals only. This is especially interesting when languages with "partial" movement always apply the relevant movement to a well-defined subclass of the potential goals, such as definite pronouns in the case of object shift or non-main verbs in the case of verb movement; see Broekhuis (2008) for a formal approach that is able to account for this fact.

6.3   Interaction of verb movement and object shift

The clause structure typology proposed in this article is based on the idea that typologically different languages arise as the result of the extent in which they exhibit movement of the verb and its nominal argument. Despite the potential of this approach, Chomsky (1995: 368) suggested that verb movement is actually not a syntactic process, but rather involves some phonological "rearrangement" process, which applies after spell-out in the phonological component of the grammar; see also Boeckx & Stjepanovic (2001), who explicitly argue that head-movement in general is a PF phenomenon. Eliminating head movement from core syntax would, of course, completely undermine the present undertaking of setting up a new word order typology and thus merits further scrutiny.

Although the original motivation for assuming that verb movement is not part of core syntax was highly theory-internal in the sense that it repairs a deficit of the multiple specifier

approach (see fn.7), Chomsky (2001:15) provides an important conceptual reason for assuming that head movement is not a syntactic phenomena: he claims that verb movement exhibits a property that is expected of "displacement rules interspersed in the phonological component", namely that it has "little semantic effect". The English examples in (45) show, however, that this claim is disputable. The difference between the two examples is normally accounted for by assuming that the modal occupies the I-position in (45a) but is moved into the C-position in (45b); the placement of the verb is therefore clearly related to the meaning (illocutionary force) of the sentence. The fact that this kind of semantic information is not available in the phonological component of the grammar makes it very unlikely that the position of the verb is the result of a phonological "rearrangement" process. I refer the reader to Lechner (2005) for more complex evidence against the claim that verb movement has "little semantic effect".

(45)   a.   John will go to the movies.
       b.   Will John go to the movies?

Another reason to doubt that verb movement is phonological in nature is related to Holmberg's (1986/1999) Generalization, that is, the fact that Scandinavian regular object shift cannot cross the main verb. This is illustrated in (46): the finite main verb in (46a) has been moved into I and object shift is therefore possible; the past participle in (46b), on the other hand, is still vP-internal and therefore blocks object shift.

(46)   a.   Jón keypti   <bókina>   ekki <*bókina>.
            Jón bought   the book   not
       b.   Jón hefur   <*bókina>   ekki keypt <bókina>.
            Jón has   the book not   bought

Chomsky (2001) conclusively argues that regular object shift must be a syntactic operation on the basis that its applicability depends on the information structure of the clause and thus has semantic import; see Section 6.1 above. But if object shift is indeed subject to Holmberg Generalization, verb movement must also be syntactic in his system: object shift is explicitly claimed to be licit only in LF-representations in which the main verb does not occupy his base-position within vP, that is, in which it has raised to I.

      In short, Chomsky's claim that verb movement is part of the phonological component is based on an erroneous claim concerning the semantic impact of verb movement and is incompatible with Chomsky's (2001) correct claim that (the restrictions on) Scandinavian object shift must receive a syntactic account: interaction between object shift and verb movement is only expected when verb movement and regular object shift are both part of core syntax. See Den Dikken (2007) for more reasons to assume that V-movement is syntactic.

7   Conclusion

This article has proposed a new word order typology which, contrary to the more traditional six-way distinction, is based on the hierarchical structure of the clause. Although Section 6.2 has shown that there may be some complications, the new typology is as given in Table (27), repeated here for convenience as (47).

(47) Word order typology

	Spec$_1$	I	Spec$_2$	v-ext	Subj	v	Spec$_3$	V-ext	V	Obj
SVO	**S**	#			t_S	v			**V**	**O**
	S	#			t_S	**V**+v			t_V	**O**
	S	#			t_S	**V**+v	**O**	t_V	t_V	t_O
	S	**V**+v+I			t_S	t_{V+v}			t_V	**O**
	S	**V**+v+I			t_S	t_{V+v}	**O**	t_V	t_V	t_O
	S	**V**+v+I	**O**	t_{V+v}	t_S	t_{V+v}	t_O	t_V	t_V	t_O
SOV	**S**	#			t_S	v	**O**	**V**	t_V	t_O
	S	#	**O**	v	t_S	t_v	t_O	**V**	t_V	t_O
	S	#	**O**	**V**+v	t_S	t_{V+v}	t_O	t_V	t_V	t_O
VSO		**V**+v+I			**S**	t_{V+v}			t_V	**O**
		V+v+I			**S**	t_{V+v}	**O**	t_V	t_V	t_O
VOS		**V**+v+I	**O**	t_{V+v}	**S**	t_{V+v}	t_O	t_V	t_V	t_O

Section 5 has argued that the distinguished types can be recognized by taking the relative position of certain types of adverbial phrases into account. This sets a new goal for typological research since relatively little is known about the position of verbs and their nominal arguments relative to adverbial phrases: *The World Atlas on Syntactic* Structures, for example, is entirely silent on the issue.

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