ASCENDING AND DESCENDING VPS IN ENGLISH

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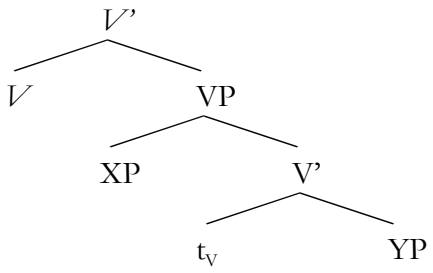
Abstract: We argue that English allows both rightward descending VP-shell structures and more traditional rightward ascending VPs. The choice between these depends on case theory and economy. Case theory triggers VP-shell formation whenever the verb is merged with a DP-object after it has been merged with some other category. The reason is that VP-shell formation allows verb and object to surface in adjacent positions, a prerequisite for case licensing in English. Economy has the effect that in all other circumstances, VP-shell formation is blocked. Our argument is based on range of intricate data, many of which involving the distribution of object-oriented floating quantifiers. We end with a discussion of the binding data that are often taken to support a uniformly descending structure, incorrectly in our view.

1. Introduction

In research into the English VP, binding and related phenomena have played an important role. Larson (1988a, 1990), basing himself on binding asymmetries first reported in Barss and Lasnik 1986, argued that if a verb is followed by two arguments, these are accommodated by a structure like (1a) (abstracting away from details). We call such structures 'descending', because constituents further to the right are attached lower. Subsequent debate demonstrated that subtle adjustments of conditions on binding would allow very different conclusions (see Jackendoff 1990 and Ernst 1994). Ernst, for example, argues that if binding is conditioned by m-command and linear order, the more traditional structure in (1b) may be adopted. We will call this structure 'ascending', because constituents further to the right are attached higher.

(1) a.



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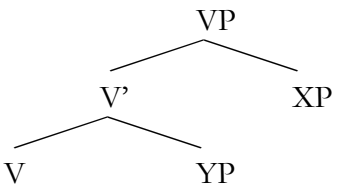


Most researchers have accepted standard conditions on binding as correct and have therefore opted for (a version of) Larson's analysis. Further work on adverbials has uncovered cases, often referred to as Pesetsky paradoxes, in which patterns of binding suggest a descending structure while standard constituency tests suggest an ascending structure for the same string. This has led to proposals according to which the ascending structure co-exists with the descending structure (Pesetsky 1995) or is related to it derivationally (see Phillips 1996, 2003, Lechner 2003 and Landau 2007).

In this paper we argue that English allows both ascending and descending VPs, focusing almost entirely on double-complement constructions (adverbials are discussed briefly in section 4.4). We accept that the structure in (1a) exists, but we deny that it is present in every double-complement construction. Some double-complement constructions are characterized by (1a), some by (1b), and some are ambiguous. Importantly, no double-complement construction is characterized simultaneously by (1a) and (1b).

The distribution of the two structures is not arbitrary, but driven by case theory. A VP-shell is generated only if the constituent in Spec-VP – XP in (1a) – is dependent on the verb for case. This is because in the alternative ascending structure the same order of merger will lead to a violation of case adjacency. In (1b), YP intervenes between XP and the verb.

The evidence we consider initially is based on constituency tests, the distribution

of object-oriented floating quantifiers and their interaction in a variety of structures. We turn to binding and related phenomena later, arguing that the data discussed by Larson and others do not show what they are purported to, given certain independently required adjustments of binding theory. In light of these observations, we finally consider whether there is convincing evidence for the existence of true Pesetsky paradoxes.

2. Case and VP-Shell Formation

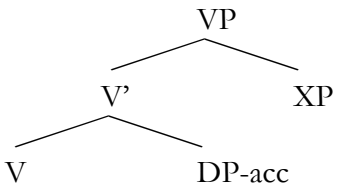
In English, accusative case can only be licensed under adjacency with a preceding verb (or preposition). We formulate the adjacency condition as in (2a), where CD stands for case domain, as defined in (2b). A case domain is essentially the set of positions within reach of the case-assigning head.

(2) a. *Case Adjacency*: $*<_{CD}$ XP DP-acc >

b. The case domain of a head consists of all positions m-commanded by that head and not m-commanded by a closer case assigner.[1]

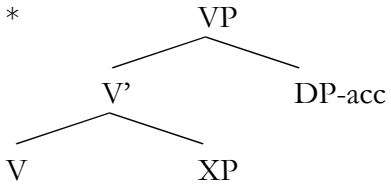
We propose that case adjacency determines which structure a verb projects in English (see also Neeleman & Weerman 1999). If the first constituent merged with the verb is an accusative DP, while subsequent VP-internal constituents do not rely on the verb for case, a simple ascending structure suffices. This is because the accusative DP in (3) is adjacent to the verb:

(3)



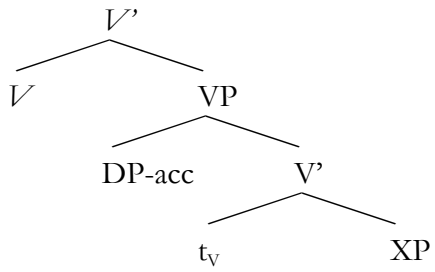
But if the order of merger is reversed, a simple ascending structure will not do. The accusative DP is no longer adjacent to the verb, in violation of case adjacency. (Note that the ungrammaticality of (4) cannot be attributed to θ-theory, since the verb can assign its internal θ-role to spec-VP elsewhere; see below.)

(4) *



This problem can be solved by merger of the accusative DP to the left of V', followed by verb movement across it. In the structure thus derived, the accusative DP is right-adjacent to the verb, as required (VP-shells appear in italics):

(5)



In sum, a VP-shell is generated whenever an accusative DP is not the first phrase to merge with the verb. We propose that in all other circumstances VP-shell formation is blocked by economy considerations. One rendition of economy that has the desired effect is given in (6).

(6) a. Two structures are in competition iff (i) they are well-formed, and (ii) they are characterised by identical hierarchical relations, except for those hierarchical relations created by movement.

b. From a set of competing structures, choose the one with the fewest movements.

According to this definition, movement is a repair strategy used to rescue otherwise ungrammatical structures.[2] VP-shell formation, which requires verb movement, is therefore blocked under the following circumstances: (i) when the VP contains only one constituent other than the verb, (ii) when no constituent other than the one merged first carries accusative, or (iii) when the verb selects a PP as its sole argument (even if the VP contains other material).

This proposal shares with Larson's original approach the assumption that VP-

shells are generated only if certain conditions are met. However, it differs in what these conditions are taken to be. Larson assumes that the number of argument positions within VP is limited to two (namely the head's specifier and complement position). Therefore, intransitive and simple transitive verbs need not project a VP shell. VP-shell formation is required, however, if the verb selects a subject and two internal arguments. (A similar claim is made in Haider's work on VP shells; see Haider 2005). Our analysis is different in that ditransitives need not project a VP shell unless the second argument merged with the verb depends on it for case.

The difference between our proposal and those of Hale and Keyser (1993, 2003) and Chomsky (1995) is more pronounced. These authors argue that the higher head in a VP-shell structure is a light verb introducing the external θ-role. Thus a double-object verb like *give* is decomposed into a verbal root meaning something like 'get' and a causative morpheme that heads vP. On this view, any verb that has an external argument of the relevant semantic type must project a VP-shell structure. Such verbs include intransitives like *work* as well as simple transitives like *paint:*

(7) a. $[_{IP}$ John $[_{vP}$ worked-v $[_{VP}$ $t_V]]]$.

b. $[_{IP}$ John $[_{vP}$ painted-v $[_{VP}$ t_V the barn$]]]$.

If VP-shells are motivated by case adjacency and subject to economy, however, the projection of these verbs will not usually expand to a VP-shell structure:

(8) a. $[_{IP}$ John $[_{VP}$ worked$]]$.

b. $[_{IP}$ John $[_{VP}$ painted the barn$]]$.

In this respect, our proposal resembles the approach adopted in Larson 1988a.

There are three immediate advantages to the case-based theory of VP-shell formation. First, it explains why movement of the verb into a VP-shell cannot cross an adverbial left-adjoined to the original VP: such movement would create a structure that violates case adjacency. This fact remains mysterious on all competing proposals.

Second, our proposal explains why VP-shell formation goes hand in hand with verb movement. After all, the very motivation of the process is to create a structure in which the verb is left-adjacent to an accusative DP. On the thematic analysis of VP-shells it is unclear why the verb should move in overt syntax; a separate trigger must be posited.

Third, the case-based theory enables us to analyse VP-shell formation as an instance of *self attachment*, whereas at least Hale and Keyser (1993, 2002) and Chomsky (1995) must rely on head-to-head adjunction (in these proposals *v* is a θ-assigning head separate from V). As well-known, there are problems associated with an adjunction analysis of head movement that are circumvented by self attachment (see Ackema et al. 1993, Koeneman 2000, Hornstein & Uriagereka 2002, Bury 2003, Fanselow 2003, Suranyi 2005, Bayer and Brandner 2007, among others; see also Van Riemsdijk 1989). For example, a moved verb c-commands its trace if it undergoes self attachment, but not if it is adjoined to a higher head.

3. Double-Complement Constructions: A First Pass

In the literature on the English VP, double-object constructions like (9a) and dative constructions like (9b) have been discussed frequently. In addition, there are structures in which the verb selects two PPs. We will refer to those as double-PP constructions:[3]

(9) a. John gave Mary the newspaper. (double-object construction)

b. John read the newspaper to Mary. (dative construction)

c. John talked about journalism with Mary. (double-PP construction)

It is informative to compare the syntax of double-complement constructions in Dutch with that of their English counterparts. Whereas the order of the DP and PP complements in the dative construction is free in Dutch, word order is fixed in the double-object construction (we return to double-PP constructions below):[4]

(10) a. Jan heeft [Marie [de krant gegeven]].

John has Mary the newspaper given

a'. *Jan heeft [de krant [Marie gegeven].

John has the newspaper Mary given

b. Jan heeft [de krant [aan Marie voorgelezen]].

John has the newspaper to Mary PRT-*read*

b'. Jan heeft [aan Marie [de krant voorgelezen]].

John has to Mary the newspaper PRT-*read*

It would take us too far afield to account for the different ordering possibilities in (10). Neither will we be able to provide an analysis of scrambling within this paper. For simplicity's sake, we will assume that the different linear orders in (10b,b') stem from variation in the order of merger. If so, the order of merger is fixed for verbs that select two DPs, but free if the verb selects a PP interpreted as goal or beneficiary.[5]

On the null hypothesis that Dutch and English are identical in the order in which they merge complements, the theory outlined in section 2 predicts that the structures in (9) will pattern variably with respect to constituency tests, despite their superficial similarity. VP-shell structures are generated if and only if the second complement to merge with the verb is a DP dependent on it for case. Therefore, if a verb selects two DP complements, it must project a VP-shell (see (11a,a')). This is the only way in which both DPs can adhere to case adjacency: one DP immediately follows the moved verb and the other immediately follows its trace. Without VP-shell formation, the case of the rightmost DP cannot be licensed.

In dative constructions, the order of merger is free, and hence both an ascending and a descending VP can be generated (see (11b,b')).

(11) a. John [$_{V'}$ gave [$_{VP}$ Mary [$_{V'}$ t_V the newspaper]]].

a'. *John [$_{VP}$ [$_{V'}$ gave Mary] the newspaper].

b. John [$_{V'}$ read [$_{VP}$ the newspaper [$_{V'}$ t_V to Mary]]].

b'. John [$_{VP}$ [$_{V'}$ read the newspaper] to Mary].

In contrast to the double-object and dative constructions, double-PP constructions cannot have a VP-shell structure. Because VP-shell formation is triggered by case adjacency and PPs are not assigned case, double-PP constructions must have an ascending structure, whatever the order in which the two complements are merged.[6] In this respect, they are the exact opposite of double-object constructions, whose structure must involve a VP-shell:

(12) a. *John [$_{V'}$ talked [$_{VP}$ about journalism [$_{V'}$ t_V with Mary]]].

b. John [$_{VP}$ [$_{V'}$ talked about journalism] with Mary].

The structures in (11) and (12) are confirmed by standard constituency tests. As is well-known, ellipsis is sensitive to constituency, precluding omission or replacement of the moved verb and the post-verbal DP in a VP-shell structure. This is what rules out the examples in (13), which involve *do so* substitution and regular VP-ellipsis.

(13) a. *If he [$_{V'}$ gave [$_{VP}$ Mary [$_{V'}$ t_V anything]]],
he did so$_{??}$ a woollen scarf .

b. *If he [$_{V'}$ gave [$_{VP}$ Mary [$_{V'}$ t_V anything]]],
he did $e_{??}$ a woollen scarf.

By contrast, many native speakers allow ellipsis of the V-DP string in the dative construction. This suggests that such constructions can be ascending: the grammaticality of the examples in (14) requires that the verb and the accusative DP can form a constituent excluding the PP. (We assume that speakers who reject (14a,b) also allow an ascending structure for dative constructions, but have more stringent conditions on what can be stranded under *do so* substitution and VP-ellipsis.)

(14) a. If he [$_{VP}$ [$_{V'}$ read a sonnet] to anyone famous],
he did [$_{VP}$ *so*$_{V'}$ to Salman Rushdie].

b. If he [$_{VP}$ [$_{V'}$ read a sonnet] to anyone famous],

he did [$_{VP}$ $e_{V'}$ to Salman Rushdie].

The above pattern of judgments extends to structures in which the V-DP string is topicalised, confirming that this string can be a constituent in the dative, but not the double-object construction:

(15) a. *He wanted to [$_{V'}$ give [$_{VP}$ Mary [$_{V'}$ t_V something itchy]]],

so give Mary he did $t_{??}$ a woollen scarf (yesterday).

b. He wanted to [$_{VP}$ [$_{V'}$ read a sonnet] to someone famous],

so [$_{V'}$ read a sonnet] he did [$_{VP}$ $t_{V'}$ to Salman Rushdie] (yesterday).

We finally consider the double PP-construction. As expected, constituency tests confirm that the verb and the first PP form a unit excluding the second PP:

(16) a. If he [$_{VP}$ [$_{V'}$ talked about literature] with anyone famous],

he did [$_{VP}$ *so*$_{V'}$ with Salman Rushdie].

b. If he [$_{VP}$ [$_{V'}$ talked about literature] with anyone famous],

he did [$_{VP}$ $e_{V'}$ with Salman Rushdie].

c. He wanted to [$_{VP}$ [$_{V'}$ talk about literature] with a renowned expert],

so [$_{V'}$ talk about literature] he did [$_{VP}$ $t_{V'}$ with Salman Rushdie] (yesterday).

The scopal properties of double-complement constructions fit neatly with the structures we have proposed. Although scope is an interpretive notion, there is a default association of syntactic structure and semantic scope: the surface c-command domain of an operator tends to coincide with its scope. Deviations from this rule are impossible in certain cases, and possible but marked in others (Reinhart 2006). In the English VP, we would therefore expect to find default right-to-left scope in ascending structures like (17a) and default left-to-right scope in descending structures like (17b). In fact, the system is a bit stricter. It appears that in descending VPs, surface scope is the only possibility: a quantifier in the specifier of the lower VP *must* outscope a quantifier in the verb's complement

position, a phenomenon known as scope freezing (see Aoun & Li 1989, Bruening 2001 and Williams 2006).

(17) a. [[V Q_1] Q_2] $Q_2 > Q_1 >> Q_1 > Q_2$

b. [V [Q_1 [t_V Q_2]]] $Q_1 > Q_2$; $*Q_2 > Q_1$

Thus, in the double object construction, an existential indirect object cannot be scopally dependent on a universal direct object, whereas the reverse is possible (see (18)). (Since indefinites can be specific, a wide scope reading is always available for them. We will place readings that result from this between parentheses.)

(18) a. I [$_{V'}$ gave [$_{VP}$ a student [$_{V'}$ t_V every book]]]. $\exists > \forall$; $*\forall > \exists$

b. I [$_{V'}$ gave [$_{VP}$ every student [$_{V'}$ t_V a book]]]. $\forall > \exists$ ($\exists > \forall$)

Consequently, if all double-complement constructions required VP-shell formation, we would expect to find that the leftmost complement always takes scope over the rightmost one. This is illustrated in (19) for the dative construction.[7]

(19) a. I [$_{V'}$ read [$_{VP}$ a book [$_{V'}$ t_V to every student]]]. predicted: $\exists > \forall$; $*\forall > \exists$

b. I [$_{V'}$ read [$_{VP}$ every book [$_{V'}$ t_V to a student]]]. $\forall > \exists$ ($\exists > \forall$)

In fact, the string in (19a) is ambiguous. It is possible for the existential to be scopally dependent on the universal contained in the PP. The availability of this reading follows from the proposed structural ambiguity of the dative construction. If the DP is merged with the verb before the PP, an ascending structure results for which the relevant reading is the default interpretation:

(20) I [$_{VP}$ [$_{V'}$ read a book] to every student]. $\forall > \exists$ ($\exists > \forall$)

Recall that double-PP constructions must have an ascending VP. Indeed, there is a preference in such structures for the rightmost PP to take scope over the leftmost one:[8]

(21) a. He [$_{VP}$ [$_{V'}$ talked about a student] with every professor]. $\forall > \exists$ ($\exists > \forall$)

b. He [$_{VP}$ [$_{V'}$ talked about every student] with a professor]. $\exists > \forall \gg \forall > \exists$

There is one further prediction regarding the dative construction that we should explore in this section: quantifier scope under VP-fronting.

On an ascending parse, the default reading of a dative construction should be one in which the PP takes scope over the DP, with the inverse scope reading available only as a marked option. In general, this prediction is hard to test, because the dative construction also allows a descending parse (with different scopal properties). However, fronting of the V-DP string necessitates an ascending structure. Therefore, the predicted scopal preference should obtain (after reconstruction of the fronted category), which indeed seems to be the case. In (22a), the existential can very easily depend on the universal. But in (22b), there is a very clear preference for a wide-scope reading of the existential.

(22) a. He wanted to $[_{VP}\ [_{V'}$ read a book] to every student],
and $[_{V'}$ read a book] he did $[_{VP}\ t_{V'}$ to every undergraduate]. $\forall > \exists$ ($\exists > \forall$)

b. He wanted to $[_{VP}\ [_{V'}$ read every book] to a student]
and $[_{V'}$ read every book] he did $[_{VP}\ t_{V'}$ to an undergraduate]. $\exists > \forall \gg \forall > \exists$

Lechner (2003) suggests that in structures like (22b) it is impossible for the indefinite to be dependent on the universal. Our informants do allow this reading, albeit marginally. This is in agreement with the judgments given in Phillips 2003 (see also Landau 2007). Phillips gives the following example in support of the availability of left-to-right scope.

(23) John didn't want to sing just some of his songs. He intended to sing every single song, and $[_{V'}$ sing every single song] he did $[_{VP}\ t_{V'}$ to one or another of his second-graders].

In view of the above, we would also expect scopal interpretation of in double-PP constructions to be unaffected by VP-fronting. This appears to be correct. Although right-to-left scope is preferred, we can construct examples which permit left-to-right scope:[9]

(24) John didn't want to talk about just some of his students. He intended to talk about every single student, and [$_{V'}$ talk about every single student] he did [$_{VP}$ $t_{V'}$ with one or another of his senior colleagues].

In sum, constituency tests and scope provide evidence that English has both ascending and descending VPs. We will strengthen our case with evidence from the distribution of floating quantifiers (section 4) and particles (section 5) and certain interactions between tests that probe syntactic structure (section 6). In section 7 we turn to the binding data often argued to require (uniformly) descending structures.

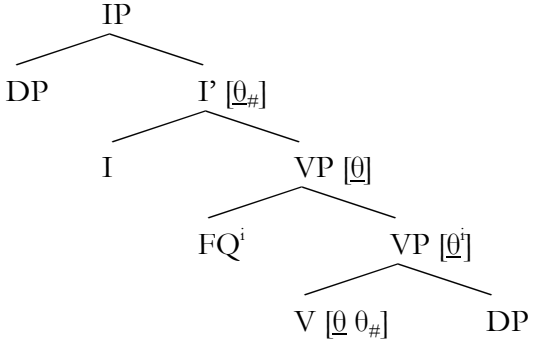
4. Floating Quantifiers

4.1 The analysis of floating quantifiers

We analyse floating quantifiers as adverbials that precede the verbal category to which they attach and that are linked to an unassigned θ-role. The claim of precedence is shared with many other researchers (see Baltin 1978, 1982, 1995, Bobaljik 1995 and Doetjes 1997). The association with an unassigned θ-role is a particular instantiation of the claim that floating quantifiers are anaphoric elements (Belletti 1982). We are aware of the vast literature on the topic, but must omit discussion because of space limitations (but see Bobaljik 2003 and Janke & Neeleman 2005).[10]

In an example like *The boys both read the same book*, the floating quantifier *both* is linked to the verb's external θ-role, as indicated by co-superscripting in (25). Since this θ-role is assigned to the DP in spec-IP, the latter is interpreted as the antecedent of *both*:

(25)



The simplest implementation of this analysis involves association of the floating quantifier and the unassigned θ-role under sisterhood. This can be achieved if we assume that θ-role assignment takes the form of θ-role percolation and subsequent assignment in a strictly local configuration (marked as such by the #-symbol). A system of θ-role assignment along these lines has been developed in Neeleman & Van de Koot 2002, 2010.

This analysis rules out the examples in (26). Despite being hierarchically identical to (25), (26a) is ungrammatical because *both* follows the category to which it is attached. (26b) is ruled out as interpretively the floating quantifier can only be linked to the verb's internal θ-role. But since this role is assigned before *both* is merged, it does not percolate to the node that is the sister of the floating quantifier.[11]

(26) a. *[$_{IP}$ The boys [$_{VP}$ [$_{VP}$ sat the exam] both]].

b. *[$_{IP}$ I [$_{VP}$ both [$_{VP}$ photographed the boys]]].

The ungrammaticality of (26b) only follows if the verb cannot be merged with the floating quantifier before it merges with the object (as in **I* [$_{VP}$ [*both photographed*] *the boys*]). The unavailability of this structure cannot be due to the licensing conditions that hold of floating quantifiers, as these are met. We therefore assume that left attachment of adverbials to V is impossible (as opposed to left attachment to VP):

(27) *[$_{VP}$ [AdvP V] DP]

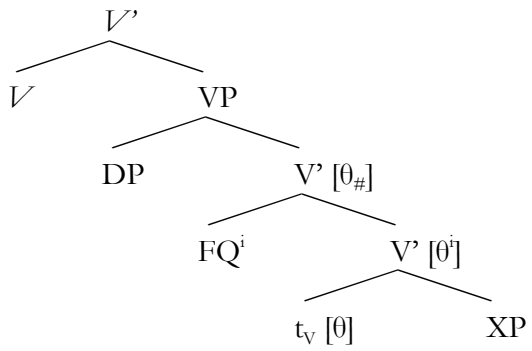
There is independent evidence for this constraint. In (28a), *quickly* can have a distributive interpretation (John's reading of each individual book was quick), as well as a collective one (John's reading of the whole set of books was quick).[12] But (28b) must have a collective reading. Indeed, when a distributive reading is forced, the preverbal position is unavailable, as in **John quickly read each book he ever read* (compare *John read each book he ever read quickly*). This can only be understood if the structure in (27a) is ungrammatical, as that structure would allow a distributive reading (the DP c-commands the adverbial).

(28) a. John read all the books/every book quickly. quickly > ∀; ∀ > quickly

b. John quickly read all the books/every book. quickly >∀;*∀ > quickly

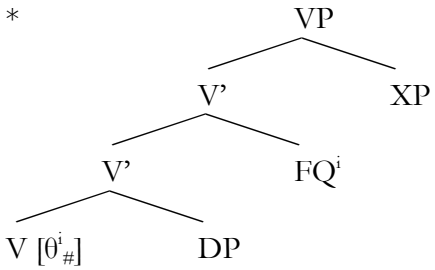
The consequence of the conditions discussed above is that an object-oriented floating quantifier will only be ruled in if a VP shell is generated. In (29), FQ precedes the category it is attached to and can be linked to the θ-role assigned to the DP in spec-VP.

(29)



In contrast, an object-oriented floating quantifier cannot appear in an ascending structure like (30). FQ does not precede V', but follows it. Moreover, the object's θ-role has been assigned before FQ is merged, and hence will not percolate up to FQ's sister.

(30) *

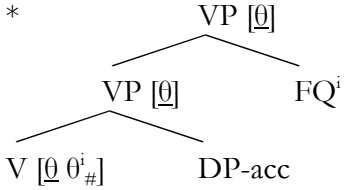


Thus, floating quantifiers can be used as a test for the presence or absence of a VP-shell.

4.2 Nominal transitives (V-DP, V-DP-DP)

Given the proposal in section 2, a simple transitive verb should not normally project a VP-shell (but see section 4.4). We therefore predict that in sentences headed by such a verb, it should be impossible to associate a floating quantifier with the direct object:

(31) *



The structure in (31) violates both conditions on floating quantifiers. FQ does not pre-

cede the category it attaches to, and the θ-role that it is linked to is satisfied prior to merger of FQ. As expected, the example in (32) is ungrammatical (Maling 1976).[13,14]

(32) *I photographed the boys both.

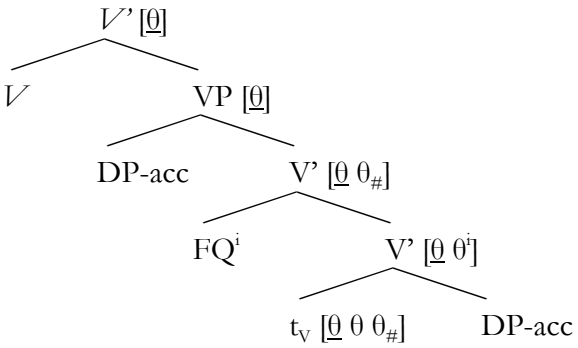
There is an alternative structure for the string in (32) that we need to rule out. Suppose that VP-shell formation takes place, but the verb does not take a complement before combining with the floating quantifier:

(33) *V [DP [FQ t_V]]

The structure in (33) does not violate Economy, as there is no grammatical alternative. Moreover, FQ precedes the category it attaches to and is c-commanded by its associate. However, the structure violates the constraint that bans left attachment of adverbials to V (compare (27)/(28b)).

As opposed to direct objects in simple transitive constructions, indirect objects in double-object constructions are predicted to be possible associates of floating quantifiers, because in these constructions VP-shell formation is obligatory:

(34)



In (34), the floating quantifier precedes V', and is linked to an unassigned θ-role in a sister node. In other words, both requirements that hold of floating quantifiers are met. This explains the grammaticality of examples like (35), first discussed by Maling (1976).

(35) I gave the boys both a good talking to.

Although VP-shell formation makes it possible to relate the indirect object to a floating quantifier, a construal with the direct object is still ruled out. A sentence like (36) is ungrammatical because the floating quantifier does not precede V', and V' does not contain

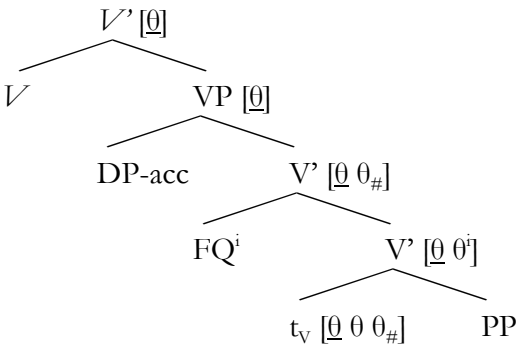
the θ-role assigned to the direct object.

(36) *I [$_{V'}$ showed [$_{VP}$ Mary [$_{V'}$ [$_{V'}$ t_V the pictures] both]]].

4.3 Prepositional ditransitives (V-DP-PP, V-PP-PP)

We have argued that dative constructions are structurally ambiguous. They may have either an ascending or a descending structure. The latter VP-shell structure should allow inclusion of a floating quantifier associated with the post-verbal DP:

(37)



Therefore, dative constructions are correctly predicted to admit object-oriented floating quantifiers (the relevant data were first noted by Maling (1976)):

(38) He read the books both to someone famous.

Note that we need to make sure that *both* in (38) is a floating quantifier and does not function as the DP-portion of an absolutive modifier of the type in (39a). In such constructions, main sentence stress tends to fall on the direct object. Moreover, they are separated from the object by a prosodic break and cannot be followed by a time adverbial with a matrix construal, unless the latter is offset by a second prosodic break:

(39) a. He read both BOOKS *(,) the first to someone famous.

b. *He read both BOOKS, the first to someone famous yesterday.

c. He read both BOOKS yesterday, the first to someone famous.

None of these characteristics hold of the example in (38) (see also footnote 16):

(40) He read the books both to someone FAMOUS yesterday.

In addition, the absolutive modifier is an island for movement, as opposed to the VP in

(38) (but see section 6.3):

(41) a. *Who did he read both books, the first to t_{WH}.

b. ?Who did he read the books both to t_{WH}.

Finally, the conditional structure in (42a) does not permit absolutive modifiers, but it does allow object-oriented floating quantifiers, as (42b) shows.[15]

(42) a. *If he read the sonnets at all,

he read the sonnets, the first to Salman Rushdie.

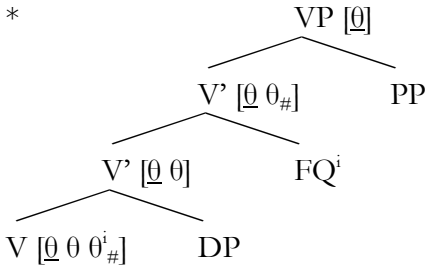
b. If he read the sonnets at all,

he read the sonnets both to Salman Rushdie.

Below, we use these properties to make sure that example sentences intended to test whether a floating quantifier is licensed cannot receive an alternative parse with an absolutive modifier.

The ascending structure optionally projected by verbs like *read to* is predicted not to permit object-oriented floating quantifiers. In (43), FQ neither precedes its sister, nor does its sister contain the θ-role assigned to the DP complement.

(43) *



Therefore, if an ascending structure is forced, we expect that dative constructions should no longer be able to host an object-oriented floating quantifier. This prediction is borne out. The presence of an object-oriented floating quantifier is incompatible with VP-ellipsis and VP-fronting (all examples are grammatical if *both* is omitted):

(44) a. *If he read the sonnets to anyone famous,

he did so both to Salman Rushdie.

b. *If he read the poems to anyone,
he did both to Salman Rushdie.

c. *He wanted to read the poems to someone famous,
and read the poems both he did to Salman Rushdie (yesterday).

d. *He wanted to read the poems to someone famous,
and read the poems he did both to Salman Rushdie (yesterday).

There is a second way in which we can demonstrate that a floating quantifier can only be associated with the object of a prepositional ditransitive verb if VP-shell formation takes place. The argument is based on an observation by Baltin (1995), although our interpretation of it differs from his. Consider the construction in (45), which in our view involves the fronting of a verbal constituent.

(45) [$_{VP}$ Apply for money] though he may t_{VP}, it won't make a difference.

If (45) is derived by movement, it follows that (46a) is ungrammatical: on a VP-shell analysis of double object constructions, *give Mary* is not a constituent. The acceptability of (46b) confirms our claim that prepositional ditransitives may project an ascending structure, as such a structure would allow fronting of *give the books*.

(46) a. *Give Mary though we may the books, it won't make a difference.

b. [$_{V'}$ Give the books] though we may [$_{VP}$ $t_{V'}$ to Mary], it won't make a difference.

The crucial prediction is that structures like (46b) should not allow floating quantifiers that are associated with the DP-object. This is because object-oriented floating quantifiers require VP-shell formation, which is at odds with the movement that derives (46b). Baltin observes that examples like (47) are indeed ungrammatical:

(47) a. *Give the books both though we may to Mary, it won't make a difference.

b. *Give the books though we may both to Mary, it won't make a difference.

Finally consider verbs that select two PP-complements. Examples like (48) are ungrammatical, which is consistent with our claim that double-PP constructions never allow VP-shell formation.

(48) He talked about the men (*both) with a psychologist.

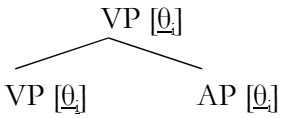
However, as an anonymous reviewer suggests, the ungrammaticality of this example is explained independently by the fact that floating quantifiers must be c-commanded by their associates.

4.4 Secondary predicates and adverbs (V-DP-AP, V-DP-AdvP)

We concluded in section 4.2 that floating quantifiers cannot be associated with objects of monotransitives. This is not quite true. The relevant examples can be rescued by adding an object-oriented secondary predicate, for instance. As we will now argue, this is in fact a consequence of our proposal.

For concreteness' sake, we adopt an analysis of secondary predication based on the notion of θ-role identification (see Higginbotham 1985 and Neeleman & Van de Koot 2002; also compare Dowty's 1979 analysis of resultatives). The θ-role of the secondary predicate is identified with an unassigned θ-role of the verb. So, a subject-oriented depictive can be represented as below:

(49)

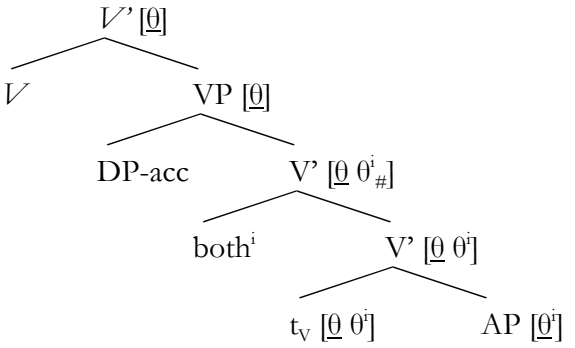


On this analysis, the θ-criterion need not be adjusted to accommodate secondary predication. In an example like *John drank the milk warm*, θ-role identification ensures that the object receives a single (composed) θ-role.

It follows from this view of secondary predicates that they must be c-

commanded by the DP to which they are related (Williams 1980). This is because the mechanism of θ-role assignment introduced in section 4.1 (percolation and assignment under sisterhood) guarantees that arguments c-command predicates. As a consequence, object-oriented secondary predicates must be merged with the verb prior to merger of the object, entailing VP-shell formation and hence the possibility of merger of an object-oriented floating quantifier. We illustrate this in (50) (for related discussion, see Vanden Wyngaerd 1989 and the references mentioned in connection to (56) below.)

(50)



The examples in (51a,b) instantiate the above structure.[16]

(51) a. I [$_{V'}$ photographed [$_{VP}$ the boys [$_{V'}$ t_V both dressed in red]]]] (yesterday).

b. I [$_{V'}$ painted [$_{VP}$ the doors [$_{V'}$ t_V both bright green]]]] (yesterday).

As has been known since Williams (1980), object-oriented secondary predicates have a different structural position to subject-oriented ones. The latter are attached higher, presumably in a position adjoined to VP. This can be seen in structures with two secondary predicates, one linked to a subject and the other to an object. In such structures, the order of the secondary predicates is fixed, with the object-oriented one preceding the subject-oriented one (although a sequence of clause-final APs remains awkward):

(52) a. *The boys ate the meat drunk raw.

b. The boys ate the meat raw drunk.

c. *The boys painted the barn drunk green.

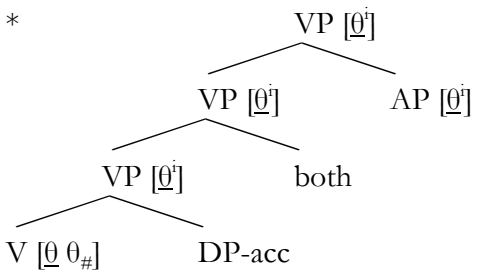
d. The boys painted the barn green drunk.

Williams captures the distribution of subject-oriented secondary predicates through 'c-

subjacency', a locality condition on predication.

Assuming that subject-oriented secondary predicates indeed occupy a VP-external position, they will never be merged prior to an object and can therefore not stand in the way of case assignment. Hence, subject-oriented secondary predicates will not trigger VP-shell formation, and consequently such predicates should be unable to rescue floating quantifiers associated with the object of a mono-transitive verb:

(53) *



Structures like (53) are indeed ungrammatical:

(54) *Henry [$_{VP}$ [$_{VP}$ [$_{VP}$ sat the exams] both] rather drunk]] (yesterday).

Like object-oriented secondary predicates, certain clause-final adverbs can rescue object-oriented floating quantifiers:[17]

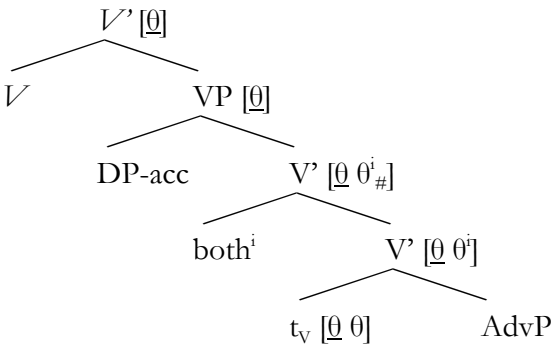
(55) a. If he cleaned the windows at all,
he cleaned the windows both extremely carelessly.

b. If he read the poems at all,
he read the poems both extremely carelessly.

This is unsurprising. If the adverb is merged with the verb before the accusative DP, a VP-shell must be formed, which means that there will be a suitable attachment site for a floating quantifier (see (56)). The claim that non-selected material, or 'adjuncts', can be merged with the verb prior to arguments is hardly new. It has been made for VO languages in Larson 1988b and Chomsky 1995, section 4.7.5, among others. It has also been used to account for free word order effects in OV languages in Bayer & Kornfilt 1994 and Neeleman 1994, among others. In fact, an explicit connection between 'scrambling' in OV and VO languages is argued for in Vanden Wyngaerd 1989, Neeleman & Reinhart

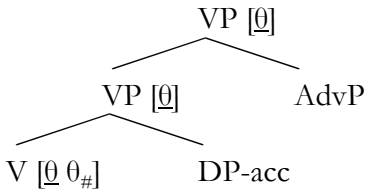
1997 and Neeleman & Weerman 1999.

(56)



Of course, the object can also be merged prior to the adverb, in which case an ascending structure results:

(57)



What we predict, then, is that when we force the structure in (57), insertion of an object-oriented floating quantifier will be impossible. For example, *do so* ellipsis should be incompatible with the presence of a floating quantifier. Indeed, all the examples below are unacceptable (but grammatical if *both* is omitted):

(58) a. *If he painted the boys at all,
he did so both in a modern style.

b. *If he painted the boys at all,
he did both in a modern style.

c. *He wanted to paint the boys,
and paint the boys both he did in a modern style (yesterday).

d. *He wanted to paint the boys,
and paint the boys he did both in a modern style (yesterday).

In conclusion, the distribution of object-oriented floating quantifiers corroborates our hypothesis that English has both ascending and descending VPs. Object-oriented float-

ing quantifiers are acceptable exactly where constituency tests detect the presence of a VP-shell.

5. Particles

A further argument for the existence of both ascending and descending VPs can be based on the distribution of particles. The argument is complex and requires some preparatory groundwork.

There is evidence that a verb and a particle form a complex head in syntax (see Booij 1990, Johnson 1991, Roeper & Keyser 1992, Neeleman & Weerman 1993). It can be argued that, as a consequence, particles project optionally (complex heads can contain both XP- and X^0-categories; see Ackema & Neeleman 2004). Thus, both structures in (59) are available prior to merger of the object.

(59) a. $[_V$ V Prt]

b. $[_V$ V PrtP]

The word order alternation typical of English particle constructions can be explained as a result of the co-existence of these structures. Note that the definition of case adjacency in (2) implies that intervening heads, as opposed to intervening phrases, do not block case assignment. Therefore, an object merged with (59a) can be licensed straightforwardly. If the particle does not project, there is no maximal projection that separates verb and object, and so the verb can license the object's accusative case.

(60) John $[_{VP}$ $[_V$ looked up$_{Prt}$] the information].

This is different for an object merged with (59b). Its case cannot be licensed if it is merged to the right of the verb-particle complex. Since the particle projects, the resulting configuration violates case adjacency:

(61) *John $[_{VP}$ $[_V$ looked up$_{PrtP}$] the information].

The object must therefore be merged in a position preceding the verb, after which the

verb is moved leftward, giving rise to VP-shell formation.[18]

(62) John [$_{V'}$ looked [$_{VP}$ the information [$_{V}$ t_{V} up$_{PrtP}$]]].

Separation of the verb and the projecting particle is obligatory, because if the particle is pied-piped, case adjacency will still be violated:

(63) *John [$_{VP}$ [$_{V}$ looked up$_{PrtP}$] [$_{VP}$ the information t_{V}]].

In the examples discussed so far, the particle does not *have* to project, since it does not take specifiers or complements. If such elements are present, however, projection is necessary, with the consequence that VP-shell formation (and stranding of the particle) must take place in order to license the object's case. This explains the distribution of the modifier *right* in (64) (see Den Dikken 1995 and references mentioned there).

(64) a. *John [$_{VP}$ [$_{V}$ looked [$_{PrtP}$ right up]] the information].

b. *John [$_{V'}$ [$_{V}$ looked [$_{PrtP}$ right up]] [$_{VP}$ the information t_{V}]].

c. John [$_{V'}$ looked [$_{VP}$ the information [$_{V}$ t_{V} [$_{PrtP}$ right up]]]].

If VP-shell formation takes place in order to avoid violations of case adjacency, it follows that verb-particle combinations which select a prepositional complement cannot surface in the 'discontinuous' order. Given that PPs do not depend on the verb for case, verb movement as in (65) will not be triggered, irrespective of whether the particle projects.

(65) a. John [$_{VP}$ [$_{V}$ walked (right) out] on Mary]].

b. *John [$_{V'}$ walked [$_{VP}$ on Mary [$_{V}$ t_{V} (right) out]]].

In the examples in (64), case adjacency forces separation of particle and verb. However, there are structures in which the particle does not project, yet other material forces VP-shell formation (because this material potentially intervenes between the verb and an object dependent on it for case). A prime example is provided by double object constructions projected from a particle verb (see Den Dikken 1995 for extensive discussion).

The simplest structure that accommodates a particle and allows the case of two objects to be licensed is the one in (66), where the particle is stranded under VP-shell

formation. If the particle does not project, the resulting representation should be grammatical (recall that traces can license case):

(66) John [$_{V'}$ sent [$_{VP}$ the stockholders [$_{V'}$ [$_{V}$ t_V off$_{Prt}$] a schedule]]].

Since VP-shell formation in (66) is triggered irrespectively of whether the particle projects, one could imagine that verb movement may pied-pipe a non-projecting particle. As noted in Emonds 1976 and Den Dikken 1995, judgments vary in these circumstances: some speakers accept verb-adjacent particles; others reject them entirely.

(67) %John [$_{V'}$ [$_{V}$ sent off$_{Prt}$] [$_{VP}$ the stockholders [$_{V'}$ t_V a schedule]]].

We take this micro-variation to be indicative of grammars that differ in the extent to which they allow pied-piping. Where stranding is not forced by case adjacency, some speakers permit pied piping, whereas others reject it altogether. We do not know which factors determine whether the pied-piping option is available: this appears to vary per construction and per speaker. At first sight, this puts the validity of particle placement as a test for VP-shell formation into question. But as we will see, there is still an opportunity to test certain predictions, as there is an asymmetry in the system: all speakers allow stranding of the particle under verb movement; variation is limited to pied-piping.

Neither pied-piping nor stranding is compatible with projection of the particle in double object constructions. In (68a), the verb's trace and the direct object are separated by a projecting particle, violating case adjacency. In (68b), the projecting particle blocks the licensing of the indirect object's case. So, this example is predicted to be unacceptable even to speakers who accept (67).

(68) a. *John [$_{V'}$ sent [$_{VP}$ the stockholders [$_{V'}$ [$_{V}$ t_V [$_{PrtP}$ right off]] a schedule]]].

b. *John [$_{V'}$ [$_{V}$ sent [$_{PrtP}$ right off]] [$_{VP}$ the stockholders [$_{V'}$ t_V a schedule]]].

One might expect that a projecting particle may trigger further VP-shell formation, on a par with what happens in simple transitive structures like (64c). If so, the verb would move twice, thus generating two VP-shells.

(69) *John [$_{V'}$ sent [$_{VP}$ the stockholders [$_{V'}$ t_V [$_{VP}$ a schedule [$_{V'}$ t_V right off]]]]].

Although well formed from the perspective of case theory, (69) violates constraints central to θ-theory. In particular, no thematic relation can be established between *the stockholders* and *sent*. The θ-role involved is an internal one, which implies that it must be assigned within the projection of head that introduces it. The head in question is the lowest verbal trace (Brody 1995, 1998). However, the indirect object is not contained within the projection of this trace.

There is a sharp distinction between speakers' judgments regarding the position of particles in double-object and dative constructions. Speakers who reject verb-adjacent particles in the former will typically allow them in the latter. Thus, (70a) is grammatical for all speakers, alongside (70b) (see Emonds 1976 and Den Dikken 1995). This is of course expected on our analysis of the dative construction. Merger of the PP prior to the DP will lead to VP-shell formation, while the opposite order of merger does not. In the descending structure, the particle may or may not be stranded between the two complements, but in the ascending one, lack of verb movement implies that the particle will surface adjacent to the verb:

(70) a. John [$_{VP}$ [$_{V'}$ [$_{V}$ sent off$_{Prt}$] the schedules] to the stockholders].

b. John [$_{V'}$ sent [$_{VP}$ the schedules [$_{V'}$ [$_{V}$ t_V off$_{Prt}$] to the stockholders]]].

c. %John [$_{V'}$ [$_{V}$ sent off$_{Prt}$] [$_{VP}$ the schedules [$_{V'}$ t_V to the stockholders]]].

Modification of the particle is possible only if it surfaces between DP and PP. If it surfaces between V and DP (whether through base generation or pied-piping), it leads to a violation of case adjacency:

(71) a. *John [$_{VP}$ [$_{V'}$ [$_{V}$ sent [$_{PrtP}$ right off]] the schedules] to the stockholders].

b. John [$_{V'}$ sent [$_{VP}$ the schedules [$_{V'}$ [$_{V}$ t_V [$_{PrtP}$ right off] to the stockholders]]].

c. *John [$_{V'}$ [$_{V}$ sent [$_{PrtP}$ right off]][$_{VP}$ the schedules [$_{V'}$ t_{V} to the stockholders]]]

6. Cross-Checks

In this section we consider interactions between phenomena discussed previously, with the aim of strengthening our claim that English allows both ascending and descending VPs. We also consider the interaction between extraction and the licensing of floating quantifiers. The data we discuss serve as a cross-check, allowing us to demonstrate that the results of the various tests we have used are consistent.

6.1 Adverbial scope

We have argued that scope within the VP is determined, at least partly, by whether or not a VP-shell is generated. If so, the fact that a collective and a distributive reading are available for an example like *John read the books quickly* can be understood as stemming from structural ambiguity. The descending structure in (72a) only permits a distributive reading, whereas the ascending structure in (72b) favours a collective one. (Recall that ascending structures favour surface scope, but allow inverse scope as a marked option).

(72) a. John [$_{V'}$ read [$_{VP}$ [$_{VP}$ the books [$_{V'}$ t_{v} quickly]]]]. (distributive only)

b. John [$_{VP}$ [$_{V'}$ read the books] quickly]. (collective preferred)

We can find out whether these structures are indeed associated with different interpretive preferences by inserting floating quantifiers and by applying constituency tests.

Inclusion of an object-oriented floating quantifier forces a descending VP, which implies that it should exclude a collective reading. This is what we observe in (73a). Notice that, while *both* forces a distributive reading with respect to the material it c-commands, higher adverbials can take scope over the entire (distributive) VP. In (73b), for example, *quickly* can apply to the combination of the two poem-reading events. The lack of ambiguity in (73a) therefore shows that *very quickly* must be lower in the VP than the object, as predicted (*very* is added as there is a preference for heavier adverbials fol-

lowing floating quantifiers).

(73) a. John read the books both very quickly (yesterday). (distributive only)

b. John quickly read the poems both to a pupil (yesterday).

Fronting and ellipsis of the verb-object combination give rise to examples in which the wide-scope reading of the adverbial is (strongly) preferred (see (74)). This follows, as such operations require an ascending VP.[19]

(74) a. John wanted to read the books,
and read the books he did quickly. (collective strongly preferred)

b. John wanted to read the books,
and he did so quickly. (collective strongly preferred)

c. John wanted to read the books,
so he did *e* quickly. (collective strongly preferred)

6.2 Variable judgments in particle placement

We next consider how the placement of particles interacts with secondary predication and the distribution of floating quantifiers.

As mentioned above, all speakers allow stranding of a particle under verb movement, while there is considerable variation in the extent to which speakers accept pied-piping. This asymmetry enables us to test certain predictions. Suppose that some grammatical factor F requires VP-shell formation. If F is present in a structure containing a particle, then we expect all speakers to tolerate separation of particle and verb, while only some speakers will allow the particle to surface adjacent to the verb.

The first such factor we will consider is object-oriented secondary predication. As we have already seen, object-oriented depictives trigger VP-shell formation (see section 4). We predict, therefore, that all speakers will allow separation of verb and particle in the presence of an object-oriented depictive, while there will be variation in judgments when

the verb and particle surface together. This appears to be correct:

(75) a. I [$_{V'}$ gulped [$_{VP}$ the beer [$_{V'}$ [$_{V}$ t_{V} down$_{PrtP}$] warm].

b. %I [$_{V'}$ [$_{V}$ gulped down$_{PrtP}$] [$_{VP}$ the beer [$_{V'}$ t_{V} warm].

(76) a. I [$_{V'}$ ate [$_{VP}$ the meat [$_{V'}$ [$_{V}$ t_{V} up$_{PrtP}$] raw].

b. % I [$_{V'}$ [$_{V}$ ate up$_{PrtP}$] [$_{VP}$ the meat [$_{V'}$ t_{V} raw].

Like object-oriented depictives, object-oriented floating quantifiers are licensed only if VP-shell formation takes place. We therefore anticipate that when such a floating quantifier is present in a verb-particle construction all speakers will allow separation, whereas there will be variation in judgments if verb and particle occur together. This effect has already been observed by Svenonius (1994).

To begin with, object-oriented floating quantifiers are licensed in double-object constructions projected by particle verbs, as demonstrated in (77). This is expected, as VP-shell formation is obligatory in such constructions.

(77) John [$_{V'}$ sent [$_{VP}$ the stockholders [$_{V'}$ both [$_{V'}$ [$_{V}$ t_{V} out$_{Prt}$] a schedule]]]].

The same pattern can be observed in dative constructions containing a particle separated from the verb:

(78) John [$_{V'}$ sent [$_{VP}$ the schedules [$_{V'}$ both [$_{V'}$ [$_{V}$ t_{V} out$_{Prt}$] to the stockholders]]]].

However, when the particle appears adjacent to the verb, it must have been pied-piped, and so we expect variability of judgments. Indeed, not all speakers accept examples like (79).

(79) % John [$_{V'}$ [$_{V}$ sent out$_{Prt}$] [$_{VP}$ the schedules [$_{V'}$ both [$_{V'}$ t_{V} to the stockholders]]]] (yesterday).

The pattern repeats itself in particle constructions containing an adverbial:

(80) a. John [$_{V'}$ took [$_{VP}$ [$_{VP}$ the boys [$_{V'}$ both [$_{V}$ t_{v} out] for their birthdays]]]] (yesterday).

b. %John [$_{V'}$ [$_{V}$ took out] [$_{VP}$ [$_{VP}$ the boys [$_{V'}$ both t_{v} for their birthdays]]]] (yesterday).

6.3 Collapsing Shells

adjacency is linear condition. Elements that are adjacent may be sisters in syntax, but each of them may also be located at the edge of a larger constituent that excludes the other. For this reason, it seems unlikely that case adjacency should be a syntactic condition. Rather, we take it to be a PF condition, given that PF is where issues of linearization are resolved.

If so, one would expect case adjacency to be sensitive only to categories that have a phonological realization. After all, only such categories need to be linearized.

(81) *Case Adjacency*: *<$_{CD}$ XP DP-acc >, where XP and DP-acc are overt.

If case adjacency is insensitive to covert material, movement of either the case-marked category or any potential intervener will destroy the trigger for VP-shell formation, simply because movement leaves the base position of the displaced category without phonological content. Consider a structure in which some XP is merged with the verb before merger of an accusative argument. If the XP and the accusative DP remain in situ, case adjacency is implicated, and VP-shell formation is necessary. If, however, either XP or DP undergoes movement, case adjacency is satisfied vacuously, irrespective of VP-shell formation. But without a trigger the structures in (83b) and (84b) are ruled out by the economy condition in (6).

(82) a. *[$_{VP}$ [$_{V'}$ V XP] DP]

b. [$_{V'}$ V [$_{VP}$ DP [$_{V'}$ t_{V} XP]]]

(83) a. XP ... [$_{VP}$ [$_{V'}$ V t_{XP}] DP]

b. *XP .... [$_{V'}$ V [$_{VP}$ DP [$_{V'}$ t_{V} t_{XP}]]]

(84) a. DP ... [$_{VP}$ [$_{V'}$ V XP] t_{DP}]

b. *DP .... [$_{V'}$ V [$_{VP}$ t_{DP} [$_{V'}$ t_V XP]]]

This analysis predicts an interesting pattern in the distribution of object-oriented floating quantifiers. Constructions that admit such elements should exclude them when either the associate of the floating quantifier or the constituent following it has moved. Object-oriented floating quantifiers are only licensed in VP shells, and the movements in (85b,c) destroy the trigger for VP-shell formation.

(85) a. V DP FQ XP

b. *XP ... V DP FQ t_{XP}

c. *DP ... V t_{DP} FQ XP

This pattern is indeed found:

(86) a. I gave the boys both a good talking to.

b. *What did you give the boys both?

c. *Who did you give both a good talking to?[20]

(87) a. He read the books both to someone famous.

b. *To whom did you read the books both?

c. *What did you read both to someone famous?

(88) a. I painted the doors both green.

b. *What colour did you paint the doors both?

c. *What did you paint both green?

(89) a. John read the books both at breakneck speed.

b. *How quickly did you read the books both?

c. *What did you read both at breakneck speed?

For independent reasons, the constituent following the floating quantifier cannot be promoted to subject under passivization. However, the post-verbal DP can normally undergo A-movement. If it does, floating quantifiers associated with it must be merged externally to the VP, as predicted given the pattern in (85):

(90) a. *The boys were given both a good talking to.

b. The boys were both given a good talking to.

(91) a. *The books were read both to someone famous.

b. The books were both read to someone famous.

(92) a. *The doors were painted both green.

b. The doors were both painted green.

(93) a. *The books were read both at breakneck speed.

b. The books were both read at breakneck speed.

The pattern is surprising, because the associate of a floating quantifier can normally undergo both A- and A'-movement, and floating quantifiers usually do not block A'-movement across them:

(94) a. The politicians seem t_{DP} to have both left in a hurry

b. Who did you say t_{WH} will both arrive tomorrow?

c. What did the politicians both claim t_{WH}?

7. Binding

In the previous sections we have presented a series of arguments that support the claim that the English VP has a variable structure. In some instances, traditional theories seem right in assuming a simple ascending projection; in others, a Larsonian shell structure seems correct. Our argumentation is based on a number of tests, including (i) scope, (ii) movement, (iii) ellipsis, (iv) the distribution of object-oriented floating quantifiers, and (v) the distribution of particles. Importantly, these tests yield consistent, rather than contradictory results. Thus, there seems to be a solid empirical foundation for the theory outlined in section 2. Except, of course, when it comes to a phenomenon that we have ignored so far: binding. We turn to this next.

7.1 Barss and Lasnik Effects

In an influential squib, Barss and Lasnik 1986 observe that binding and related phenomena in the English VP require precedence of the antecedent. Thus, anaphors must be preceded by their antecedents, negative polarity items by their licensers and pronouns interpreted as variables by the quantifiers they are linked to. If binding is conditioned by c-command, these observations appear to show that the structure of the English VP is uniformly descending (as argued first by Larson (1988a).

In our view, at least some VPs in English have an ascending structure. Hence, we face the problem as to why in those cases a dependent category cannot find an antecedent to its right. After all, it would be c-commanded by such an antecedent. A solution to this problem was already suggested in Jackendoff 1990 and Ernst 1994: binding is not only subject to structural conditions like c-command, but also to a condition requiring linear precedence of the antecedent (at least in certain circumstances).

The relevant condition, we think, is Williams' (1997) General Pattern of Anaphoric Dependence (GPAD). Williams argues that in an anaphoric dependency the dependent category must either follow its antecedent or be located in a clause subordinate to that antecedent. The following data, taken from Williams' paper, illustrate this. (In (95d), *term paper* is stressed in order to avoid accommodation. If destressed, it could itself be anaphoric on an earlier mention of *term paper*.)

(95) a. Anyone [who has written his term paper] can turn it in to me now.

b. Anyone [who has written it] can turn his term paper in to me now.

c. Anyone can turn his term paper in to me now [who has written it].

d. *Anyone can turn it in to me now [who has written his TERM PAPER].

The GPAD implies that in the absence of subordination of the dependent category, the latter must follow its antecedent. In (95a,d), it is the antecedent that is subordinated and hence this category must precede the pronoun *it*, a requirement met in (95a), but not in

(95d). Similarly, when the antecedent and dependent are contained in different sentences (so that neither is subordinate to the other), coreference is correctly predicted to require precedence of the antecedent:

(96) a. John walked in. He wore a hat.

b. *He walked in. John wore a hat.

When the antecedent and the dependent category are clause mates, the GPAD again entails precedence of the former. This suggests an alternative account of the Barss and Lasnik effects, as we will now explain.

We start with anaphors. We assume that anaphoric binding is subject to the usual c-command requirement, but *also* to the GPAD. Because anaphors are bound strictly locally, the case of superordinate antecedents is irrelevant – such antecedents are independently ruled out by principle A. Therefore, the antecedent is predicted to precede the anaphor, exactly the pattern observed by Barss and Lasnik.[21]

A more detailed look at the various constructions will help. For double-object constructions, our predictions are identical to those of Larson and others: the indirect object can bind the direct object, but not vice versa. (97b) violates the c-command condition on binding, as well as the GPAD.

(97) a. I [$_{V'}$ showed [$_{VP}$ the boys [$_{V'}$ t_V each other]]] (in the mirror).

b. *I [$_{V'}$ showed [$_{VP}$ each other [$_{V'}$ t_V the boys]]] (in the mirror).

The structural ambiguity of the dative construction requires that we consider two representations. The descending structure in (98a,b) parallels the double-object construction in the binding relations it permits. The ascending structure allows neither forward nor backward anaphoric binding: (98c) violates the c-command condition and (98b) the GPAD (but see the discussion of logophors below). Taken together, these considerations account for the pattern of anaphoric binding found in dative constructions.

(98) a. I [$_{V'}$ introduced [$_{VP}$ the boys [$_{V'}$ t_V to each other]]].

b. *I [$_{V'}$ introduced [$_{VP}$ each other [$_{V'}$ t_V to the boys]]].

c. *I [$_{VP}$ [$_{V'}$ introduced the boys] to each other].

d. *I [$_{VP}$ [$_{V'}$ showed each other] to the boys].

We now turn to variable binding, postponing discussion of anaphoric binding in double-PP constructions until the next section. We assume that variable binding is possible only if the dependent category is in the scope of the antecedent. Of course, scope often coincides with c-command, but there are well-known cases where the two diverge. It seems that in such instances, scope is the crucial factor. In (99a), *every boy* takes scope over, but does not c-command, *him*. The grammaticality of the example suggests that c-command is not necessary for variable binding (notice the sharp contrast with (99b)). The example in (99c) is ambiguous as a consequence of the possibility of quantifier lowering. However, when the indefinite binds a pronoun, as in (99d), lowering is impossible, suggesting that c-command is not sufficient for variable binding.

(99) a. [Every boy's mother] loves him

b. *[Every boy's mother] loves himself.

c. [Some young lady]$_1$ seems likely [t_1 to dance with every senator]. ∃>∀; ∀>∃

d. [Some young lady]$_1$ seems to her friends [t_1 to be likely to dance with every senator]. ∃>∀; *∀>∃

Like anaphoric binding, variable binding is subject to the GPAD. This has already been argued by Williams, who offers data like the following in evidence (notice that the pronoun can precede the quantifier if embedded in a subordinate clause):

(100) a. *His girlfriend loves every British soldier.

b. [That he might someday meet the queen] inspires every British soldier.

c. [That an enemy sniper shot him] bothered every soldier in the hospital.

The GPAD, in conjunction with the scope condition, can account for most of the

asymmetries in variable binding in the English VP.

Our first stop is the double-object construction. As we have seen in section 3, scope is fixed in such constructions: the indirect object obligatorily outscopes the direct object (see (18)). Therefore, (101a) is ruled in: it meets both the scope condition and the GPAD, as opposed to (101b), which fails to meet either (these examples are taken from Barss & Lasnik 1986: 348).

(101) a. I [$_{V'}$ denied [$_{VP}$ each worker [$_{V'}$ t_V his paycheck]]].

b. *I [$_{V'}$ denied [$_{VP}$ its owner [$_{V'}$ t_V each paycheck]]].

In dative constructions, the situation is more complex because the scopal relation between the DP and the PP is not fixed. If these arguments are part of a VP-shell structure, the DP must take scope over the PP (see (19)). Therefore, variable binding parallels what can be observed in the double-object constructions: (102b) violates both the scope condition and the GPAD.

(102) a. I [$_{V'}$ returned [$_{VP}$ every book [$_{V'}$ t_V to its owner]]].

b. * I [$_{V'}$ returned [$_{VP}$ his book [$_{V'}$ t_V to every boy]]]

If the DP and PP are part of an ascending VP, the PP tends to take scope over the DP, although inverse scope is available as a marked option (see (20)). This implies that (103a) should be acceptable, though perhaps not perfect. The scope condition is met (if the DP takes scope over the PP) as is the GPAD (because the universal quantifier precedes the possessive pronoun). But (103b) is ruled out. Although the pronoun is preferentially interpreted in the scope of the universal quantifier, its linear position violates the GPAD.

(103) a. I [$_{VP}$ [$_{V'}$ returned every book] to its owner]. predicted: ?

b. *I [$_{VP}$ [$_{V'}$ returned his book] to every boy].

Together, (102) and (103) account for the Barss and Lasnik effects in dative constructions as far as variable binding is concerned. But our analysis gives rise to a further prediction.

Recall that the GPAD does not insist on precedence if the dependent is contained in a clause subordinate to the antecedent. Therefore, backward variable binding should be acceptable in constructions like (104a). In this example, *she* is in the scope of *every girl* (if the VP is ascending). In addition, because the pronoun is contained in a relative clause, it is subordinate to its antecedent, thereby conforming to the GPAD. Indeed, (104a) is acceptable and contrasts very sharply with (103b), which violates the GPAD, as well as with the double-object construction in (104b), which satisfies the GPAD, but violates the scope condition. (The acceptability of examples like (104a) was already noted in Bruening 2001.)

(104) a. I [$_{VP}$ [$_{V'}$ gave a flower [that Peter said she would like]]
to every girl in my class].

b. *I [$_{V'}$ showed [$_{VP}$ the boy [who wrote it last summer]
[$_{V'}$ t_V every essay I corrected]]].

Examples parallel to (104a) can also be constructed with complement clauses:

(105) I [$_{VP}$ [$_{V'}$ explained [how an enemy sniper had shot him]] to every soldier in the hospital].

The pattern repeats itself with double-PP constructions. As demonstrated in section 3, the preferred scopal interpretation of such structures is one in which the right-most PP takes scope over the PP to its left. However, as a marked option, the inverse reading is available as well (see (22)). This allows variable binding in (106a): not only can the pronoun be interpreted in the scope of the antecedent (as a marked option), but it also precedes it, as required by the GPAD. (106b) violates the GPAD, because the pronoun precedes but is not subordinate to the universal. (106c,d) are grammatical, as these examples satisfy both the GPAD and the scope condition (on a default reading).

(106) a. ?I [$_{VP}$ [$_{V'}$ talked about every boy] with his philosophy teacher].

b. *I [$_{VP}$ [$_{V'}$ talked about his philosophy teacher] with every boy].

c. I [$_{VP}$ [$_{V'}$ talked about a girl [that I knew he liked]]
with every soldier in the hospital].

d. I [$_{VP}$ [$_{V'}$ talked about [how an enemy sniper shot him]]
with every soldier in the hospital].

We have omitted discussion of NPI-licensing, but we assume that the data observed by Barss and Lasnik can be captured by the GPAD as well. This leaves us with an apparent Principle C effect: a pronominal object cannot take an R-expression further to its right as its antecedent (cf. **I introduced him to John's new yoga teacher*). Again, GPAD predict this pattern, since the pronoun precedes the R-expression and is not subordinate to it.[22]

In sum, Barss and Lasnik effects appear fully consistent with our proposal.

7.2 Pesetsky Paradoxes

Thus far, the data we have discussed never require the coexistence of more than one structure. In this section we explore so-called Pesetsky paradoxes (see Pesetsky 1995): examples in which standard constituency tests point to an ascending structure, while patterns of binding suggest a descending one. An example is given in (107) below. Since the fronting operation strands the PP containing *each other*, the bracketed constituent must exclude this PP. But in order for *them* to bind *each other*, the PP would have to be included in the bracketed constituent. The contradictory nature of these conclusions is what constitutes the problem.

(107) John said that he would give the book to them in the garden
and [give the book to them in the garden] he did on each other's birthdays.

For speakers that allow stranding of dative PPs under VP-fronting, the paradox can replicated internally to the VP:[23]

(108) The boys seemed bored. ?I promised to introduce them to someone fun,
so [introduce them] I did to each other's drama teacher.

Resolution of the paradox requires that one of the following statements be rejected:

(109) (i) Strings have a single consistent syntactic structure.

(ii) VP-fronting is a reliable diagnostic for constituency.

(iii) Variable binding and association with a reflexive or reciprocal are a reliable diagnostics for c-command.

In addressing the issue, it is important to recognize that at least some other phenomena considered to be conditioned by c-command cannot be used to create Pesetsky paradoxes. The distribution of floating quantifiers as discussed in previous sections already shows this: a Pesetsky paradox constructed using an object-oriented floating quantifier would require stranding of this element. But such floating quantifiers cannot be stranded. (see (44d), (47b) and (58d)). Similarly, no Pesetsky paradoxes can be constructed using secondary predicates. Secondary predication requires c-command. Therefore, as already pointed out, object-oriented depictives must be accommodated through VP-shell formation, as opposed to subject-oriented depictives, which can simply be adjoined to VP. As is the case with other VP-internal material, some speakers do not allow stranding of any depictives under VP-fronting (see Déchaine 1993 and references given there). However, more liberal speakers experience a sharp difference between stranding of object-oriented depictives, as in (110a), and subject-oriented depictives, as in (110b):

(110) a. *John wanted to eat the carrots cooked, but eat them he did raw.

b. John wanted to eat the carrots sober, but eat them he did drunk

The same contrast can be observed with *do so* ellipsis:

(111) a. *If John ate the carrots at all, he did so raw.

b. If John ate the carrots at all, he did so drunk

In view of these data, attempts at resolving Pesetsky paradoxes should not be too general. This means that solutions that reject either (109i) or (109ii) must be regarded with some suspicion. Consider Pesetsky's own proposal, which is based on a rejection of

(109i). Pesetsky argues that sentences have coexisting layered (ascending) and cascade (descending) structures. The paradoxical data in (107) and (108) can be explained if binding is regulated by c-command in cascade structures, while movement requires constituency in layered structures. The absence of paradoxes with secondary predication and floating quantifiers would require these dependencies (as opposed to binding) to be sensitive to 'layered syntax'. But that creates a problem of demarcation, and hence arbitrariness.

This issue does not arise if we address the issue by rejecting (109iii). The reason for this is that reflexives and reciprocals do not always need to be c-commanded by their antecedent, while secondary predication does (as does association with a floating quantifier). We can demonstrate this by considering double-PP constructions:

(112) a. John talked with the boys about themselves/each other.

b. John met (*with) Mary drunk.

The partial exemption of reflexives and reciprocals from the c-command condition on binding is not a new observation. The usual explanation is that such elements permit a logophoric interpretation in certain contexts, and logophors are exempt from Principle A (see Pollard and Sag 1992 and Reinhart and Reuland 1993, among others). In English, it is hard to distinguish between reflexives in their two guises, as these are homophones. But in Dutch, third-person logophors and anaphors differ in form. In the examples below, the anaphoric form is *zichzelf*, while the logophoric form is *hemzelf*. Only the anaphoric form is possible in the double-object construction in (113a). In the dative construction in (113b), the anaphoric form is clearly preferred (see below for discussion). But in double-PP constructions like (113d), the logophoric form *must* be used: insertion of the true reflexive leads to ungrammaticality (see also Reinhart and Reuland 1993).[24]

(113) a. Ik heb Jan zichzelf/*hemzelf getoond (in de spiegel).

I have John SE-self/him-self shown (in the mirror)

b. Ik heb Jan aan zichzelf/??hemzelf getoond (in de spiegel).

I have John to SE-self/ him-self shown (in the mirror)

c. Ik heb over Jan met hemzelf /*zichzelf gesproken.

I have about John with him-self/ SE-self spoken

Given that logophors exist, we can only decide on the implications of examples like (107) and (108) if we can be sure that the reciprocals involved are truly anaphoric. This requires an explicit theory of the contexts in which logophors are licensed. There is general agreement that a reflexive or reciprocal in direct object position cannot be logophoric. Pollard and Sag (1992) capture this fact in terms of the notion of co-argumenthood. If a reflexive or reciprocal is c-commanded by a co-argument, it qualifies as an anaphor.[25] In other circumstances, it is or may be interpreted logophorically, as in (114) below (Pollard and Sag 1992:264). We will not illustrate this here, but similar contrasts hold with reflexives.

(114) The agreement that Iran and Iraq reached guaranteed each other's trading rights in the disputed waters until the year 2010.

As the reciprocals in (107) and (108) are embedded as possessors and hence not c-commanded by a co-argument, they can be logophors. But this means that neither example confronts us with a paradox. The fronting operation requires an ascending structure, but this does not preclude association of *them* and *each other*, if the latter receives a logophoric interpretation.

The crucial question at this point is whether anaphors and reciprocals not embedded in a DP can be used to create genuine Pesetsky paradoxes. There can be little doubt that examples like (115) are acceptable, at least to some speakers. But it is not a priori clear that such examples must be analysed as involving anaphoric binding, rather than logophoricity.

(115) The boys seemed bored. I promised to introduce them to someone fun,
so introduce them I did to THEMSELVES/EACH OTHER.

If the preposition *to* in (115) is merely an expression of case, its complement position is c-commanded by a co-argument, namely the subject *I*, and hence would not permit insertion of a logophor. If *to* assigns a θ-role to its complement, the c-commanding subject would not be a co-argument, and hence the preposition's complement position could host a logophor.

There is reason to think that dative PPs *can* host logophors, as long as these are contrastively focussed. (The necessity of focus is hardly surprising, given that focus facilitates logophoric interpretion in general; see Kuno 1987 and Zribi-Hertz 1989.) The evidence comes in two parts. First, the focussed reflexive and reciprocal in (116) can take non-local antecedents, as is typical of logophors. Notice that the example cannot be analyzed as involving long-distance binding. The infinitival clause behaves like a binding domain when the reflexive/reciprocal appears in object position and hence is subject to Principle A (see (116b)).

(116) a. The boys arranged [for William to give the best presents of the lot to THEMSELVES/EACH OTHER/THEM].

b. The boys arranged [for William to give them/*themselves/*each other the best presents of the lot].

Second, in the right context a reciprocal or reflexive complement of *to* may be linked to a non-commanding antecedent:

(117) Every child at the school brought a present to the Christmas party. It was William's task to distribute these presents, making sure that every child received a present from a household other than their own. But he made a mistake: he gave the twins' presents to THEMSELVES/EACH OTHER/THEM.

Interestingly, the structure in (117) permits stranding of the dative PP under VP-fronting:

(118) He should have given John and Bill's presents to anyone but John and Bill, but [give John and Bill's presents] he did to THEMSELVES/EACH OTHER/THEM.

In other words, the complement of dative *to* can be a logophor, even if stranded under VP-fronting. This is not surprising, as VP-fronting tends to pied-pipe given material and strand material that is in focus:

(119) I wanted to give the book to Mary...

a. #and give the book I did to Mary.

b. and give the book to Mary I did.

(120) I wanted to give a book to someone interesting...

a. and give the book I did to MARY.

b. #and give the book to MARY I did.

Given this constellation of facts, we have reason to believe that in (115), too, we are dealing with logophors. There is one condition that must be fulfilled in order for such an analysis to be viable: dative *to* must be able to take a pronoun as complement, even if this pronoun is coreferential with the verb's DP-complement. The standard judgment is that this is not possible (in line with the Dutch example in (113b)). However, it is not necessary that this is possible in general; it should be possible under contrastive focus. As it turns out, contrastive focus has a clear ameliorating effect. B's answer below is fully acceptable.[26]

(121) A: My PhD students lack confidence. What shall I do?

B: Tell them that you want to introduce them to the most talented young researchers in the field. Then invite them into your office and introduce them to THEM.

This is enough to establish that a logophoric interpretation of the reflexive/reciprocal in (115) is a distinct possibility, which in turn means that the example need not give rise to a phrase-structural paradox.

Notice that the ameliorating effect of focus observed in (121) is not found with DP-objects. The examples in (122) and (123) are clearly degraded compared with (121).

(122) B: Tell them that you want them to congratulate the most talented young researchers in the field. *Then invite them into your office and get them to congratulate THEM.

(123) B: Tell them that you want to show them to the most talented young researchers in the field. ??Then invite them into your office and show them THEM.

This means that it is not necessary to assume that logophors are always licensed under contrastive focus. DP-arguments still behave as predicted by the binding theory.[27]

8. Concluding remarks: Alternatives

There is a multitude of proposals concerning the structure of the English VP. These have been developed in reaction to observations in two key publications: Barss and Lasnik (1986) observed a number of binding asymmetries in constructions with multiple complements, and Pesetsky (1995) observed structural paradoxes with post-verbal adverbials that were later replicated VP-internally.

In our opinion, reactions to these observations have put too much emphasis on the value or otherwise of binding and related phenomena as tests for syntactic structure. Those opposing VP-shell structures argued that if conditions on binding were relaxed in certain ways, VP-structures could be taken to be uniformly ternary-branching or ascending (see Barss and Lasnik 1986, Jackendoff 1990 and Ernst 1994). But in fact the evidence for descending structures goes well beyond binding. As we have argued, it includes scope, the distribution of floating quantifiers, particle placement, secondary predication and their interactions.

On the other hand, those that accepted the evidence from binding as conclusive

were forced by the observations in Pesetsky 1995 to accept that the post-verbal domain in English had to be characterized by two different trees, one capturing the binding data and the other capturing restrictions on movement and ellipsis. Pesetsky proposed that these trees were generated separately; subsequent work has aimed to show that they are related transformationally (see Phillips 2003, Lechner 2003 and Landau 2007; see also Cinque 2006, discussion of which is omitted here for reasons of space).

The proposals by Phillips and Landau come at a considerable cost, as they lead to a weakening of the import of standard constituency tests. In particular, both allow constituents that head a movement chain to be associated with corresponding c-commanded material that does not form a constituent. Movement therefore does not diagnose underlying constituents. In Phillips' proposal this is the result of incremental left-to-right merger, while in Landau's it follows from the availability of late merger of optional material.

In both cases, the resulting theory of movement is so powerful that it would in principle even allow stranding of the direct object in examples like (15a). In order to address this problem of overgeneration, Phillips proposes the Potential Complete VP Constraint (PCVPC), which states that in partial VP-fronting or VP-ellipsis, the fronted or deleted constituent must be a potential complete VP. The PCVPC is adopted by Landau, and the debate between these researchers is mainly about how the PCVPC can be derived.

A fundamental problem with the PCVPC is that optional direct objects cannot be stranded under VP ellipsis (as shown in (124)). But if the PCVPC is abandoned, the proposals by Phillips and Landau no longer capture even basic contrasts like the one in (15).

(124) a. I was very hungry and wanted to eat. *So eat I did the haggis.

b. *I wanted to run this weekend, and run I did my Nikes threadbare.

Lechner (2003) develops an elegant alternative proposal that also connects descending

and ascending structures transformationally. The idea is that ascending structures are generated through extraposition (say, movement landing in a position right-adjoined to VP/vP). Lechner focuses on examples like (107), where the stranded material is contained in an adjunct, but his analysis can easily be extended to arguments. For example, the contrastive behaviour in (15) would follow from the fact that dative PPs can be extraposed, while direct objects cannot (unless they are heavy, see below):

(125) a. *He [$_{V'}$ gave [$_{VP}$ Mary [$_{V'}$ t_V t_{DP}]]] (unexpectedly) [$_{DP}$ a woollen scarf].

b. He [$_{V'}$ read [$_{VP}$ a sonnet [$_{V'}$ t_V t_{PP}]]] (unexpectedly) [$_{PP}$ to Salman Rushdie].

We do not object to the idea that rightward movement can create a configuration that allows material to be stranded that cannot be stranded otherwise. Indeed, VP-fronting can strand a direct object that has undergone heavy XP shift, exactly because heavy XP shift creates an ascending structure (see 126a). However, Lechner's solution is not general enough to explain all the crucial data. As we have shown, dative PPs can be stranded under *do so* ellipsis. This is important, as there is evidence that the constituent replaced by *so* cannot contain a trace bound by a category external to the ellipsis site (see Haddican 2007 and references mentioned there). We demonstrate this restriction in (126b) for WH-movement and in (126c) for heavy XP shift. But if *so* cannot contain a trace, the dative PP in (14a) and similar examples cannot have escaped the ellipsis site through movement – it must have been base-generated in an ascending structure.

(126) a. ?John wanted to read carefully some part of the bible,

so [$_{VP}$ read t_{DP} carefully] he did [$_{VP}$ t_{VP} [$_{DP}$ the entire Book of Revelation]].

b. A: I read a novel every week without fail.

B: Really? *So, which novel did you do so last week?

c. *John read carefully most of the Song of Solomon

and Bill did so [$_{DP}$ the entire Book of Revelation].

Once we abandon the assumption that reflexives and reciprocals always require a c-

commanding antecedent, a fairly simple picture emerges. English has both ascending and descending VPs, but crucially no structure needs to be simultaneously ascending and descending (sequential descending and ascending structures exist where there is independent evidence for extraposition; see (126a)). Any ambivalent behaviour with respect to tests that probe syntactic structure can be explained in terms of straightforward variation in constituency (which includes some instances of structural ambiguity).

Admitting that there is more to binding than c-command is not the same as abandoning binding theory. In order to reconcile our conclusions about phrase structure with the data observed by Barss and Lasnik (1986) and Pesetsky (1995), we need to acknowledge that anaphoric dependencies are sensitive to linear order (as stated in the GPAD) and that dative PPs can contain logophors. Both claims are independently motivated, and both are additions to binding theory; they do not contradict its central tenets.

26 February 2011

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Footnotes

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1. We cannot provide evidence that m-command is the right structural notion to mention in the definition of case domain. See Neeleman 2002 for related discussion.

2. The definitions of reference set in Reinhart (1995, 2006) and of candidate set in Grimshaw (1997) have a semantic component that we omit here. This is because the semantic effects that allow apparent violations of economy are limited to phrasal movement. An alternative formulation of economy might be phrase-structural, as VP-shell structures contain more nodes than corresponding ascending VPs.

3. There is considerable variation in native-speaker judgments when it comes to the syntax of the English VP. The judgments we report are based on intensive work with a core group of eight native speakers of British English. In addition, we have carried out an informal study with about thirty native speakers to double-check whether correlations we were interested in indeed exist. This has led to the omission of several claims made in earlier versions of this paper.

In indicating grammaticality, we abstract away from speakers that do not allow stranding of any VP-internal material under VP-fronting or VP-ellipsis, as well as from speakers that do not allow any object-oriented floating quantifiers. This is because these restrictions imply that many crucial predictions cannot be tested in such speakers. Where examples are marked %, this therefore reflects variation in judgments of speakers that fall outside these excluded categories.

4. There is some evidence that word order is freer in languages with morphological case, something that does not concern us here.

5. There are ways of implementing our analysis that do not rely on base generation of these structures. Nothing much hinges on this, but pursuing these alternatives would lead to a variety of presentational complications.

6. In English as well as Dutch, the two PPs can occur in either order. The neutral order in both languages is the one in which the *about*-PP is closer to the verb than the *with*-PP.

7. We treat scope freezing as a purely structural phenomenon here. This may be too simple-minded. In Dutch, a linearization of the dative construction as DP-PP-V is scopally ambiguous. The contrast with the Dutch double object construction, where scope is fixed, may indicate that there is a thematic dimension to scope freezing (as suggested in Williams 2006). If so, it is still true that scope freezing provides evidence for a descending structure in the English double object construction, and that this evidence is absent in the English dative construction.

8. The scope data fall out differently when the *with*-PP precedes the *about*-PP. In that case, there is scopal ambiguity. We assume that this is because the relevant order is derived by extraposition of the *about*-PP. One argument for this can be based on the data in (i). Extraposition often hampers extraction from material it crosses.

(i) a. What$_1$ did he [$_{VP}$ [$_{V'}$ talk [about t$_1$]] with Mary]?

b. Who$_1$ did he [$_{VP}$ [$_{V'}$ talk about literature with t$_1$?

c. What$_1$ did he [$_{VP}$ [$_{VP}$ [$_{V'}$ talk t$_2$] with Mary] [about t$_1$]$_2$]?

d. ??Who$_1$ did he [$_{VP}$ [$_{VP}$ [$_{V'}$ talk t$_2$] [with t$_1$]] [about literature]$_2$]?

9. Pesetsky 1989 presents an argument based on adverbial scope in favour of movement of verbs that take a PP complement and against movement of verbs that take a DP-complement. The crucial observation is that a string of two adverbs sandwiched between a verb and an extraposed PP can show left-to-right scope. If correct, these data do not fit our proposal. A possible alternative account, developed in Rohrbacher 1994, could be based on the possibility that the left-most adverb is adjoined to the right-most one (see also Ackema & Neeleman).

10. Floating quantifiers can be licensed in structures projected by unaccusative and raising verbs (compare *The boys both arrived* t$_{DP}$ *in Birmingham yesterday*). This fact can be reconciled with our proposal if A-movement is a case of predicate formation (the trace of A-movement introduces a θ-role). For details, see Williams 1987, 1994 and Neeleman & Van de Koot 2002, 2010.

11. For ease of exposition, we will restrict our attention to *both*, which is taken to be representative of other floating quantifiers.

12. We return to this fact in section 6.1.

13. Maling observes that examples like *I met them all* and *I spoke to them all* are grammatical. She suggests that in examples of this type *them all* is a constituent derived from *all them* by a rule called Q-Pro Flip. We believe that this analysis is on the right track. *It was them all that I met*, for example, is grammatical. For reasons of space, we cannot provide further motivation for Maling's analysis.

14. Neil Smith (p.c.) points out that examples such as *I met your brother and your sister both* are grammatical. We speculate that in such structures *both* is not a floating quantifier, but

a marker of coordination that appears in an exceptional position to the right of the coordinate structure. There are several arguments for this. First, sentence-final *both* cannot be replaced by *all* (cf. **I met your brothers and your sisters all*). Second, sentence-final *both* is restricted to coordinate structures (cf. **I met your brothers both*). Third, *both* can be clefted with the coordinate structure (cf. *It was your brother and your sister both that I met*).

15. It is, of course, awkward to repeat the full object, rather than use a pronoun, but the possibility of Q-Pro Flip (see footnote 13) makes sentences with pronominal objects unsuitable to test whether object-oriented floating quantifiers are licensed.

16. Where a resultative is necessary to license the object (because the verb is intransitive), inclusion of a floating quantifier is still allowed (see (i)). In this case an alternative analysis in terms of an absolutive modifier is not available.

(i) $[_{IP}$ I $[_{VP}$ ran $[_{VP}$ my nikes $[_{V'}$ t_V both treadbare]]]].

17. Maling (1976) observes that not all adverbs can be used to rescue object-oriented floating quantifiers. For example, **I met the boys both yesterday* is bad. We speculate that these kinds of adverbs resist incorporation into a VP-shell, because they need to be attached higher in the clause.

18. As is well known, the pattern described here does not extend to pronominal objects. Pronouns must be adjacent to the verb (cf. *We looked it up* versus **We looked up it*). An explanation for this could be based on the fact that the pragmatics of the pre-particle and post-particle positions are different. As argued in Svenonius 1996 and Dehé 2002, the former typically contains discourse-linked material (old information), while the later contains material not previously mentioned (new information). By their very nature, pronouns are discourse-linked and will therefore tend to surface in the pre-particle position.

19. Phillips (2003) suggests that a distributive reading is available in examples like (74a), but not in examples like (74b,c). We are not sure of this judgment. A distributive reading

appears to be available in the right context:

(i) John and Bill are reviewers for the NYT and have to read a lot of books. There are books that they can go through at high speed, but some other books take more time. This month Bill was much luckier than John. John noticed that Bill read each and every book on his reading list quickly, while John did (so) much more slowly.

20. This example is of course ruled out independently for the many speakers that do not permit wh-movement of indirect objects.

21. We do not expect the GPAD to be surface-true. It holds of the positions involved in anaphoric dependencies, rather than the positions in which anaphoric elements surface. Thus, the example in (i) does *not* violate the GPAD, as the binding dependency involves *he* and the trace of the anaphor, rather than the anaphor itself.

(i) $[_{DP}$ Himself], <u>he</u> likes t_{DP}

22. The effects of the GPAD and Principle C cease to overlap in situations where the referential argument and pronoun refer back to the same referential expression in a previous utterance. In such contexts, the pronoun is no longer dependent on the coreferential DP to its right. As a result, the relation between these two elements is only subject to Principle C. (It was precisely to circumvent this complication that *term paper* in (95d) was stressed.) In contexts where the GPAD is made void in this way, we expect to find Principle C effects in descending, but not ascending, structures. Our impression is that the data are largely line with this, although there is variation in native speaker judgments.

The example in (i) below serves as a control, showing that where the GPAD is irrelevant, Principle-C effects can still be observed (*John's* is anaphorically destressed, indicated by a reduced font size; *yoga teacher* is focussed, indicated by small capitals). There appears to be a sharp contrast between (i) on the one hand and the dative construction in

(ii) and the double-PP construction in (iii) on the other.

(i) John wanted to talk with someone wise.

*And he did: he talked with John's GRANDMOTHER.

(ii) She wanted to introduce John to someone famous.

And she did: she introduced him to John's favourite JOURNALIST.

(iii) She wanted to talk about John with someone who knows him really well.

And she did: she talked about him with John's MOTHER.

23. It is possible to construct Pesetsky paradoxes using variable binding, but as argued in the previous section variable binding requires scope rather than c-command. This means that the relevant data may not be truly paradoxical. We would speculate that this explanation extends to Pesetsky paradoxes constructed using NPI licensing (to the extent that these are good at all).

24. Of course, logophors are subject to GPAD, which implies that they cannot take a local antecedent to their right, ruling out cases like **John talked about themselves with the boys*.

25. Pollard and Sag assume that, rather than c-command, the non-structural notion of o-command is relevant to the binding theory. If so, even regular anaphoric binding cannot provide evidence for constituency, and the binding theory cannot have any bearing on the debate about the structure of the English VP.

26. Similar effects can be observed in the dative construction in Dutch, and in double-PP constructions in both English and Dutch.

27. The same is true of DPs selected by idiomatically selected prepositions, such as *in* in *believe in*. For reasons of space we will not demonstrate this here.