

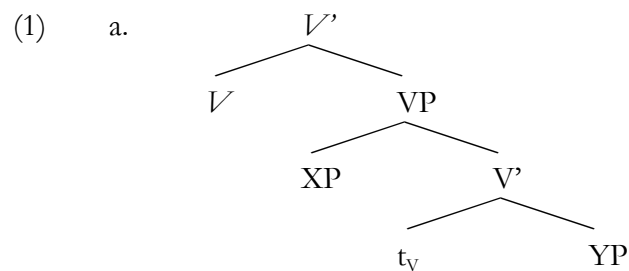
ASCENDING AND DESCENDING VPs IN ENGLISH¹

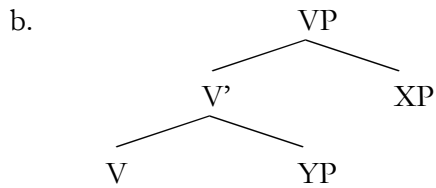
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Abstract: We argue that English allows both rightward descending VP-shell structures and more traditional rightward ascending VPs. The choice between these depends on case theory and economy. Case theory triggers VP-shell formation whenever the verb 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 will be based on contrasts in scope, ellipsis and the distribution of floating quantifiers in VPs projected by verbs selecting two complements. 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

Ever since the debate between Larson (1988a, 1990) and Jackendoff (1990b), the structure of the English VP has been a controversial issue. Larson claimed that if the verb is followed by two arguments, these are typically accommodated by the descending structure in (1a) ('descending' because constituents further to the right are attached lower in the structure). But Jackendoff, arguing that Larson's arguments are inconclusive, suggested the more traditional ascending structure in (1b) ('ascending' because constituents further to the right are attached higher in the structure).





The majority of researchers have accepted (a version of) Larson’s analysis. Further work on adverbials has led to proposals according to which the ascending structure co-exists with the descending structure (Pesetsky 1995) or is related to it derivationally (Phillips 1997, 2003, Lechner 2003, Cinque 2005 and Landau 2007). The rejection of the traditional ascending VP-structure was a prerequisite for certain subsequent developments in syntactic theory, including Kayne’s (1994) thesis of antisymmetry and Hale & Keyser’s (1993, 2002) theory of argument structure. Neither proposal is compatible with (1b).

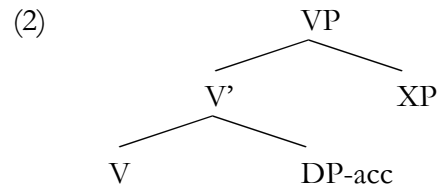
In this paper we argue that English allows both ascending and descending VPs, focusing almost entirely on double-complement constructions (adverbials are discussed briefly in section 4.4. We accept that the structure in (1a) exists, but we deny that it is present in every double-complement construction. 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).

We further argue that the distribution of the two structures is not arbitrary, but driven by case theory. More specifically, 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.

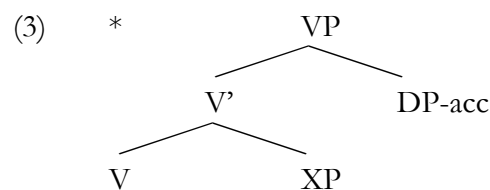
2. Case and VP-Shell Formation

In English, accusative case can only be licensed under adjacency with a preceding verb (or preposition). We propose that which structure a verb projects in English is explained by this condition in conjunction with assumptions about the order in which its internal

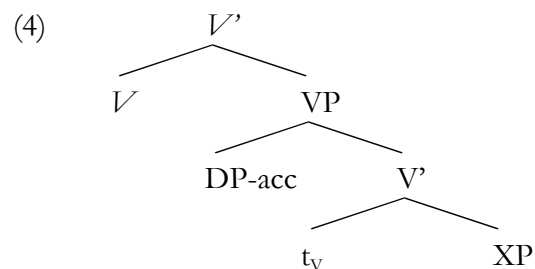
arguments are merged (see also Neeleman & Weerman 1999). If the first constituent to be merged with the verb is an accusative DP, while subsequent VP-internal constituents do not rely on the verb for case, a simple ascending structure suffices. In (2), the accusative DP is adjacent to the verb, which makes it possible for its case to be licensed:



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 (3) cannot be attributed to θ -theory, since assignment of the verb's internal θ -role to spec-VP must be allowed elsewhere; see below.)



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 *italics*):



Our proposal, then, is that a VP-shell is generated whenever an accusative DP is not the first phrase to merge with the verb. As a result, economy considerations dictate that VP-shell formation is blocked under the following circumstances: (i) when the VP contains only one constituent other than the verb, or (ii) when no constituent other than the one

merged first carries accusative. This implies, amongst other things, that a verb which only selects a PP-complement will not project a VP-shell, even if the PP is followed by other material (some motivation for this will be provided as we proceed).

This proposal has implications that differ from alternatives which take VP-shells to be motivated by θ -theory. While it shares with Larson's original approach the assumption that VP-shells are generated only if certain conditions are met, it differs significantly 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, for instance, Haider 2005). Our analysis is different from these proposals 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) and Chomsky (1995) is more dramatic. 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*:

- (5) a. $[_{IP} \text{John } [_{VP} \text{worked-v } [_{VP} t_V]]]$.
 b. $[_{IP} \text{John } [_{VP} \text{painted-v } [_{VP} t_V \text{ the barn}]]]$.

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:

- (6) a. $[_{IP} \text{John } [_{VP} \text{worked}]]$.
 b. $[_{IP} \text{John } [_{VP} \text{painted the barn}]]$.

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 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*. It is often asserted that if an element α is attached to a node β by movement, it is β that projects. But there is no valid independent reason for ruling out projection of α , at least not ruling it out across the board (Van Riemsdijk 1989, Ackema et al. 1993, Koenenman 2000, Bury 2003, among others). In fact, if a verb is attached to a top node of its own projection line and allowed to re-project, a structure is derived which matches that of VP-shells (see (4)). As has been argued in a number of recent publications, self attachment avoids the pitfalls of an adjunction analysis of head movement (Hornstein & Uriagereka 2002, Fanselow 2003, Suranyi 2005, Bayer and Brandner 2007, and the references mentioned above). For example, a moved verb c-commands its trace if it undergoes self attachment, but not if it is adjoined to a higher head.

VP-shell formation by self attachment is possible if case is taken to be triggering the process, because case adjacency is merely concerned with the surface position of the verb vis-à-vis the object. It is also compatible with Larson's proposal. However, if the head of a VP-shell is a head distinct from the verbal root and responsible for external θ -role assignment, as argued by Hale & Keyser and Chomsky, self attachment cannot be used to analyse the necessary verb movement. VP-shell formation must instead rely on

adjunction of the verb to the head of the VP-shell, so that problems inherent to head-to-head adjunction cannot be avoided.

We explore further pay-offs of a case-base theory of VP-shell formation below.

3. Double-Complement Constructions: A First Pass

3.1 Four types of double-complement construction

In the literature on the English VP, double-object constructions like (7a) and dative constructions like (7b) have been discussed frequently. In the latter, the verb selects a DP-complement typically interpreted as theme or patient, and a PP-complement typically interpreted as goal, source or beneficiary). In addition to the double-object and dative constructions, we explore DP-PP structures in which the PP is a patient or theme (see (7c)) and constructions in which the verb selects two PPs. We will refer to the latter two as low-PP constructions and double-PP constructions, respectively.

- (7) a. John gave Mary the newspaper. (double-object construction)
 b. John read the newspaper to Mary. (dative construction)
 c. John asked Mary for the newspaper. (low-PP construction)
 d. John talked about journalism with Mary. (double-PP construction)

The reason it may be informative to look at low-PP constructions is that their counterparts in scrambling languages like Dutch display surprising behaviour. Whereas the order of the DP and PP complements in the dative construction is free, a PP interpreted as theme must follow the DP.² Word order is fixed, as is the case in the double-object construction (we return to double-PP constructions below):

- (8) 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

- c. Jan heeft [Marie [om de krant gevraagd]].

John has Mary for the newspaper asked

- c'. *Jan heeft [om de krant [Marie gevraagd]].

John has for the newspaper Mary asked

It would take us too far afield to account for the different ordering possibilities in (8b,b') and (8c,c'). 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 (8b,b') stem from variation in the order of merger. If so, the order of merger is fixed for verbs that select a PP interpreted as theme, but free if the PP is interpreted as goal or beneficiary.³

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 (7) 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 (9a,a')). VP-shell formation 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 (9b,b')). However, the Dutch data discussed above show that when the PP is a theme, it must be merged prior to the DP. In English, this has the consequence that VP-shell formation is obligatory (see (9c,c')).

- (9) a. John [_{VP} gave [_{VP} Mary [_V *t_V* the newspaper]]].
 a'. *John [_{VP} [_V gave Mary] the newspaper].
 b. John [_{VP} read [_{VP} the newspaper [_V *t_V* to Mary]]].
 b'. John [_{VP} [_V read the newspaper] to Mary].
 c. John [_{VP} asked [_{VP} Mary [_V *t_V* for the newspaper]]].
 c'. *John [_{VP} [_V asked Mary] for the newspaper].

In contrast to the construction in (9), 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 can only have an ascending structure, whatever the order in which the two complements are merged.⁴ In this respect, they are the exact opposite of double-object constructions, whose structure must involve a VP-shell:

- (10) a. *John [_{VP} talked [_{VP} about journalism [_V *t_V* with Mary]]].
 b. John [_{VP} [_V talked about journalism] with Mary].

3.2 Constituency Tests

The structures in (9) and (10) 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 (11), which involve *do so* replacement and regular VP-ellipsis.

- (11) a. *He was determined to [_{VP} give [_{VP} Mary [_V *t_V* something itchy]]]
 and he did *so*_{??} a woollen scarf.
 b. *He was determined to [_{VP} give [_{VP} Mary [_V *t_V* something itchy]]],
 so he did *e*_{??} a woollen scarf.

By contrast, a considerable percentage of native speakers allow ellipsis of the V-DP string in the dative construction. This strongly suggests that such constructions can be ascending: the grammaticality of the examples in (12) requires that the verb and the accu-

sative DP can form a constituent excluding the PP. (We assume that speakers who reject (12a,b) also allow an ascending structure for dative constructions, but have more stringent conditions on what can be stranded under *do so* replacement and VP-ellipsis.)

- (12) a. %He was determined to [_{VP} [_{V'} read a sonnet] to someone famous]
and he did [_{VP} *so*_{V'} to Salman Rushdie].
- b. %He was determined to [_{VP} [_{V'} read a sonnet] to someone famous],
so he did [_{VP} *e*_{V'} to Salman Rushdie].

Crucially, the dative construction contrasts in this respect with low-PP constructions. The latter do *not* allow ellipsis of the V-DP string. This is because in the VP-shell structure that characterises these constructions, verb and object do not form a constituent:

- (13) a. *He was determined to [_{V'} ask [_{VP} Mary [_{V'} *t*_V for a favour]]],
and he did *so*_{??} for a twenty-year loan.
- b. *He was determined to ask [_{VP} Mary [_{V'} *t*_V for a favour]]],
so he did *e*_{??} for a twenty-year loan.

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 construction, but not in the double-object or the low-PP construction:

- (14) a. *He wanted to [_{V'} give [_{VP} someone [_{V'} *t*_V something itchy]]],
so give Mary he did *t*_{??} a woollen scarf.
- b. %He wanted to [_{VP} [_{V'} read his poems] to someone famous],
so [_{V'} read a sonnet] he did [_{VP} *t*_{V'} to Salman Rushdie].
- c. *He needed to [_{V'} ask [_{VP} someone [_{V'} *t*_V for a favour]]],
so ask Mary he did *t*_{??} for a twenty-year loan.

The contrasts in behaviour between the dative construction and the low-PP construction are important. Suppose one wished to maintain that the PP-argument of *read* is always merged before its DP-argument (thus holding on to the idea that the English VP is uni-

formly descending). The fact that *do so* replacement, VP-ellipsis and VP-topicalization may strand the PP-argument of *read* could then be explained through an optional operation of extraposition: stranded PPs are extraposed before the VP is fronted or elided (Lechner 2003 proposes such an account for certain PP-adjuncts). That is, ellipsis and topicalization may operate on the derived structure in (15b). The fact that stranding of the theme argument in the double-object construction is impossible would then follow from the absence of DP-extraposition in English (see (15a)).

Where this account falls short, however, is in capturing the lack of PP-stranding in low-PP constructions. The problem is that the PP-argument of *ask* can be extraposed just as easily as the PP-argument of *read* (see (15c)). This suggests that the behaviour of dative constructions cannot be captured in terms of extraposition.

- (15) a. *He [_{L'} gave [_{VP} Mary [_{V'} *t_V* *t_{DP}*]]] (unexpectedly) [_{DP} a woollen scarf].
 b. He [_{L'} read [_{VP} a sonnet [_{V'} *t_V* *t_{PP}*]]] (unexpectedly) [_{PP} to Salman Rushdie].
 b. He [_{L'} asked [_{VP} Mary [_{V'} *t_V* *t_{PP}*]]] (unexpectedly) [_{PP} for a twenty-year loan].

Low-PP constructions also provide a counterexample to the Potential Complete VP Constraint (PCVPC; see (16)). The PCVPC is fundamental to the analysis of the English VP in both Phillips 2003 and Landau 2007 (for an explanation of why this is so, we refer to these works). What the accounts by Phillips and Landau share is that stranded PPs are merged only after ellipsis and topicalization take place. If this is true, it would cast considerable doubt on the reliability of these standard tests for underlying constituency, and hence for our proposal, which is based on them.

(16) *Potential Complete VP Constraint*

In partial VP-fronting or VP-ellipsis, the fronted or deleted constituent must be large enough to be a potential complete VP, with the consequence that strictly subcategorized VP material cannot be stranded. (Phillips 2003:75)

The dialogues in (17) show that the theme argument in a double-object construction

cannot be omitted, while the goal argument in a dative construction is optional. Thus, the PCVPC captures the contrasts between (11) and (12) and between (14a) and (14b).

- (17) a. Speaker A: John wanted to give someone a woollen scarf.
 Speaker B: *So, who did he give?
 Speaker A: *He gave Mary
- b. Speaker A: John wanted to read something to Salman Rushdie.
 Speaker B: So, what did he read?
 Speaker A: He read a sonnet.

However, the PP-argument of *ask* is omitted just as easily as that of *read*, as shown in (18). Yet, this PP cannot be stranded under ellipsis or topicalization. Thus, what distinguishes (12) and (13), and (14b) and (14c), cannot be the optionality of the PP. We suggest that it is the position in which it is merged.

- (18) Speaker A: John wanted to ask someone for a twenty-year loan.
 Speaker B: So, who did he ask?
 Speaker A: He asked Mary.

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:

- (19) a. He wanted to [_{VP} [_V talk about literature] with a famous writer],
 and he did [_{VP} *so*_{VP} with Salman Rushdie].
- b. He wanted to [_{VP} [_V talk about literature] with a famous writer],
 so he did [_{VP} *e*_{VP} with Salman Rushdie].
- c. He wanted to [_{VP} [_V talk about several topics] with renowned experts];
 so [_V talk about literature] he did [_{VP} *t*_{VP} with Salman Rushdie], [_V talk
 about physics] he did [_{VP} *t*_{VP} with Stephen Hawkins], and so on.

3.3 Scope

The main empirical claim made by our proposal is that those phenomena sensitive to syntactic structure will be sensitive to the structure revealed by standard constituency tests. We can illustrate why this is promising by considering the interaction between syntactic structure and scope in the English VP. The scope data fit very 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 (20a) and default left-to-right scope in descending structures like (20b). 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 (Aoun and Li 1989, Bruening 2001 and Williams 2005).

- (20) a. $[[V Q_1] Q_2]$ $Q_2 > Q_1 \gg Q_1 > Q_2$
 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 (21)). (Of course, since indefinites can be specific, a wide scope reading is always available for them. We will place readings that result from this between parentheses.)

- (21) a. I $[_{VP}$ gave $[_{VP}$ a student $[_V t_V$ every book]]]. $\exists > \forall; * \forall > \exists$
 b. I $[_{VP}$ 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 (22) for the dative construction.

- (22) a. I [_{VP} read [_{VP} a book [_V t_V to every student]]]. $\exists > \forall; * \forall > \exists$
 b. I [_{VP} read [_{VP} every book [_V t_V to a student]]]. $\forall > \exists (\exists > \forall)$

In fact, the string in (22a) 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:

- (23) I [_{VP} [_V read a book] to every student]. $\forall > \exists (\exists > \forall)$

The interpretation of dative constructions contrasts with that of low-PP constructions. In the latter, VP-shell formation is obligatory, so the DP must take scope over the PP:

- (24) a. I [_{VP} asked [_{VP} a student [_V t_V for every book]]]. $\exists > \forall; * \forall > \exists$
 b. I [_{VP} asked [_{VP} every student [_V t_V for a book]]]. $\forall > \exists (\exists > \forall)$

Recall that double-PP constructions must have an ascending VP. Indeed, there is a clear preference in such structures for the rightmost PP to take scope over the leftmost one:⁵

- (25) 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-topicalization.

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 (26a), the existential can very easily depend on the universal. But

in (26b), there is a very clear preference for a wide-scope reading of the existential (as indicated by the \gg -symbol).

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

Lechner (2003) suggests that in structures like (26b) 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.

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

In view of the above, we would also expect scope to be preserved under VP-topicalization in double-PP constructions. This appears to be correct. Although right-to-left scope is preferred, we can construct examples which permit left-to-right scope:

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

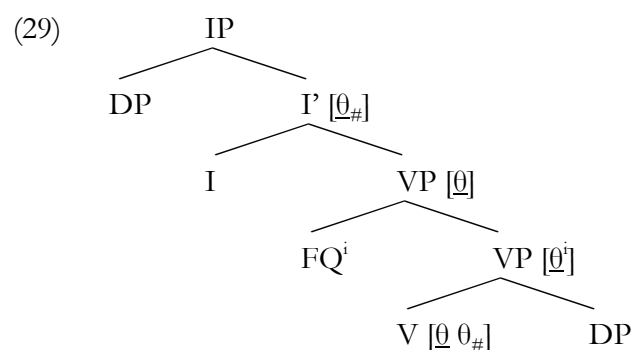
In sum, by using a uniform set of criteria (constituency tests and scope) one can provide evidence that English has both ascending and descending VPs. We will strengthen our case with evidence from the distribution of floating quantifiers (section 4) and particles (section 5), after which we turn to 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 was first made by Baltin (1978, 1982, 1995) and is shared with many other researchers (see, for example, 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).

In an example like *The boys both read the same book*, the floating quantifier *both* is linked to the verb's external θ -role, indicated by co-superscripting in (29). Since this θ -role is assigned to the DP in spec-IP, the latter is interpreted as the antecedent of *both*:



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, 2009.

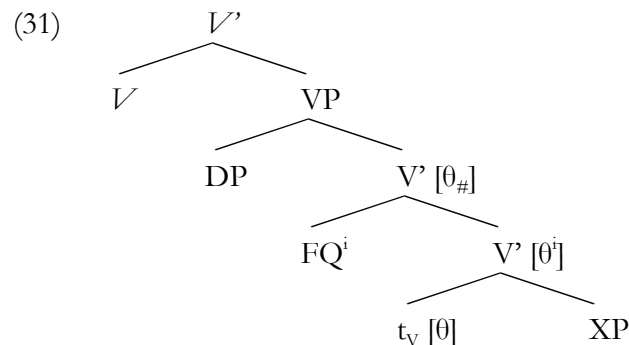
This analysis rules out the examples in (30). Despite being hierarchically identical to (29), (30a) is ungrammatical because *both* follows the category to which it is attached. (30b) is ruled out as interpretively the floating quantifier can only be linked to the verb's

internal θ -role. But since this role is assigned before *both* is merged, it does not percolate to a node that c-commands the floating quantifier.⁶

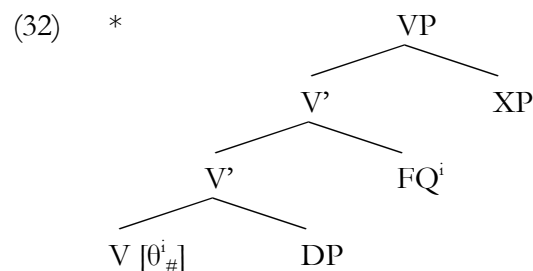
- (30) a. *_[IP] The boys _[VP] _[VP] sat the exam both_].
 b. *_[IP] I _[VP] both _[VP] photographed the boys_{]]}.

In order for (30b) to be ruled out by the system outlined above, we cannot allow the verb to be merged with the floating quantifier before it merges with the object (as in **I [[both photographed] the boys]*). The ungrammaticality of this structure cannot be due to the licensing conditions that hold of floating quantifiers, as these are met. We therefore adopt a linearization rule which states that the verb must be leftmost in V' (a reformulation of the traditional statement that English is a VO language).

The consequence of the conditions introduced above is that an object-oriented floating quantifier will only be ruled in if a VP shell is generated. In (31), FQ precedes the category it is attached to and can be linked to the θ -role assigned to the DP in spec-VP.



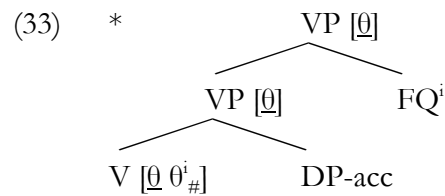
In contrast, an object-oriented floating quantifier cannot appear in an ascending structure like (32). FQ does not precede V' , but follows it. Moreover, the object's θ -role has been assigned before FQ is merged, and hence it will not percolate up to FQ's sister.



Thus, floating quantifiers can be used as a test for the presence or absence of a VP-shell. In particular, we predict that in a number of constructions object-oriented floating quantifiers cannot be included because the VP has an ascending structure.

4.2 Nominal transitives

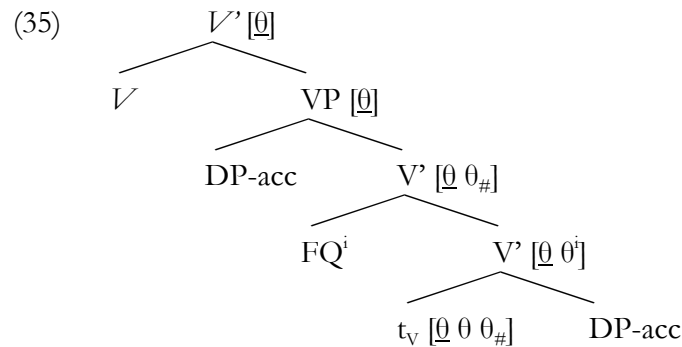
Given the proposal in section 2, a simple transitive verb should not normally project a VP-shell (but see section 4.4 for more discussion). We therefore predict that in sentences headed by such a verb, it should be impossible to associate a floating quantifier with the direct object. Consider the following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



This structure violates both conditions on floating quantifiers. FQ does not precede the category it attaches to, and the θ -role that it is linked to is satisfied prior to merger of FQ. Unsurprisingly, examples like (34) are ungrammatical (Maling 1976).^{7,8}

(34) *I saw the boys both.

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:



In (35), 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 (36), first discussed by Maling (1976).

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

Of course, the floating quantifier cannot be right-adjoined to V':

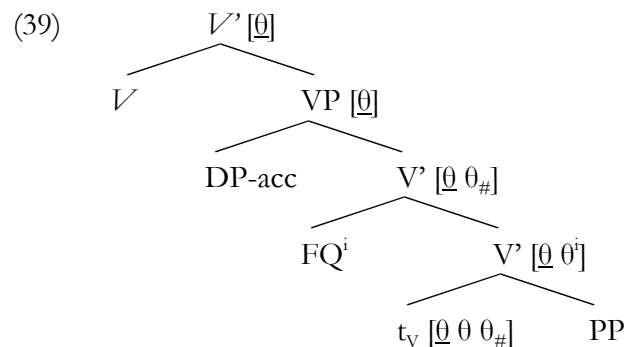
(37) *I [_{V'} gave [_{VP} the boys [_{V'} [_V t_V a good talking to] both]]]].

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 (38) is ungrammatical for the same reasons as (34): the floating quantifier does not precede V', and V' does not contain the θ -role assigned to the direct object.

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

4.3 Prepositional transitives

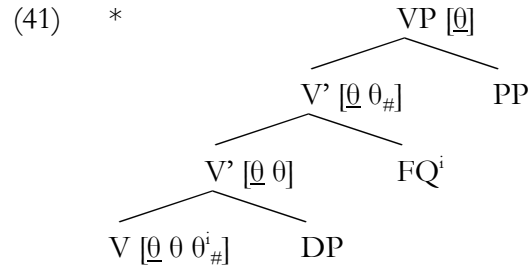
We have argued that verbs which select a DP and a PP come in two types, depending on whether the theme/patient is realized as a DP or a PP. Verbs like *ask for* obligatorily project a VP-shell, while verbs like *read to* can either project a VP-shell or a traditional ascending structure. As before, the VP-shell structure should allow inclusion of a floating quantifier associated with the post-verbal DP:



Therefore, both low-PP and dative constructions are correctly predicted to allow the direct object to be associated with a floating quantifier (the relevant data were first noted by Maling (1976)):

- (40) a. He read the books both to someone famous.
 b. He asked the boys both for a favour.

However, the ascending structure optionally projected by verbs like *read to* does not permit object-oriented floating quantifiers. In (41), FQ neither precedes its sister, nor does its sister contain the θ -role assigned to the DP complement.



So, if an ascending structure is forced, dative constructions should no longer be able to host an object-oriented floating quantifier. We can test this using ellipsis and VP-topicalisation. The examples in (42) should be ungrammatical (for all speakers), which is indeed what we find.

- (42) a. *He wanted to read the poems both to someone famous,
so he did $e_{??}$ to Salman Rushdie.
- b. *He wanted to read the poems to someone famous,
so he did $e_{??}$ both to Salman Rushdie.
- c. * He wanted to read the poems to someone famous,
and read the poems both he did t_{VP} to Salman Rushdie.
- d. * He wanted to read the poems to someone famous,
and read the poems he did $t_{??}$ both to Salman Rushdie.

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 considerably from his. To begin with, consider the construction in (43), which in our view involves the fronting of a verbal constituent.

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

If (43) is derived by movement, it follows that (44a) is ungrammatical: on a VP-shell

analysis of double object constructions, *give Mary* is not a constituent. The acceptability of (44b) confirms our claim that prepositional ditransitives may project an ascending structure, as such a structure would allow fronting of *give the books*.

- (44) a. *Give Mary though we may $t_{??}$ the books, it won't make a difference.
 b. [_{VP} Give the books] though we may [_{VP} t_{VP} to Mary], it won't make a difference.

The crucial prediction is that structures like (44b) 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 (44b).

Baltin observes that examples like (45) are indeed ungrammatical:

- (45) a. *Give the books both though we may $t_{??}$ to Mary, it won't make a difference.
 b. *Give the books though we may both $t_{??}$ to Mary, it won't make a difference.

Finally consider verbs that select two PP-complements. Recall that, on the theory proposed here, one would expect double-PP constructions never to allow VP-shell formation, because this process is driven by the need to license accusative case. Consequently, neither complement can be associated with a floating quantifier:

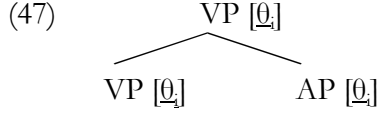
- (46) a. He talked about the men (*both) with a psychologist.
 b. He talked about literature with the men (*both).

4.4 *Adverbs and secondary predicates*

We concluded in section 4.2 that floating quantifiers cannot be associated with objects of monotransitives. This is not quite true. Adding an object-oriented secondary predicate, for example, rescues the sentence.

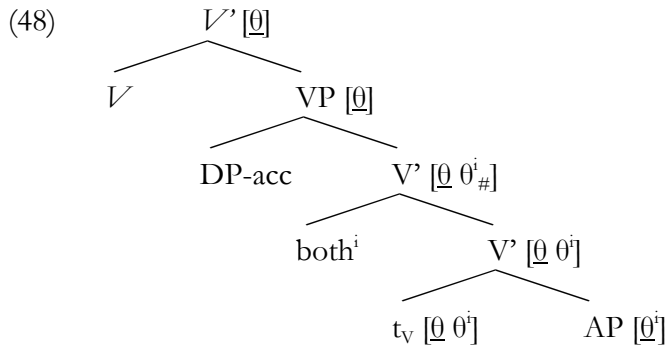
For concreteness' sake, we adopt an analysis of secondary predication based on

the notion of θ -role identification (Higginbotham 1985). The external 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:



One advantage of this analysis is that 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 only one θ -role (for detailed discussion see Neeleman and Van de Koot 2002).

It follows from this view of secondary predicates that they must be c-commanded by the DP to which they are related (see also 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 (48) (for related discussion, see Vanden Wyngaerd 1989 and the references mentioned in connection to (57) below.)



The examples in (49a,c) instantiate the above structure, and as expected, are grammatical. (49b,d) represent hierarchically identical structures, but because the floating quantifier follows the category to which it is attached, these examples are unacceptable.

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

- b. *I [_{VP} photographed [_{VP} the boys [_{VP} [_{VP} t_{VP} dressed in red] both]]].
- c. I [_{VP} painted [_{VP} the doors [_{VP} t_{VP} both bright green]]]].
- d. *I [_{VP} painted [_{VP} the doors [_{VP} [_{VP} t_{VP} bright green] both]]].

Note that we need to make sure that *both* is a floating quantifier in (49a) and (49c).⁹ After all, it could also be analysed as an argument of an adjectival predicate in a structure that parallels (50a) and (51a). However, such structures require a prosodic break following the object, and do not tolerate the adverbial *yesterday* in sentence-final position (see (50b,c) and (51b,c)).

- (50) a. I photographed the boys *(,) both of them dressed in red.
- b. *I photographed the boys, both of them dressed in red (,) yesterday.
- c. I photographed the boys yesterday, both of them dressed in red.
- (51) a. I painted the doors *(,) both of them bright green.
- b. *I painted the doors, both of them bright green (,) yesterday.
- c. I painted the doors yesterday, both of them bright green.

In contrast, (49a,c) do not require a prosodic break following the object, and do permit insertion of *yesterday* in sentence-final position:

- (52) a. I photographed the boys both dressed in red yesterday.
- b. I painted the doors both bright green yesterday.

All the judgments given below are for structures without a comma intonation.

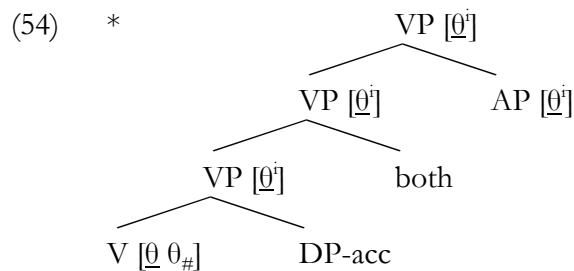
As has been known since Williams (1980), object-oriented secondary predicates have a different structural position to subject-oriented ones. The latter are attached higher, presumably in a position adjoined to VP. This can be seen in structures with two secondary predicates, one linked to a subject and 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:

- (53) 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 these data in term of ‘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 never stand in the way of case assignment. This implies that subject-oriented secondary predicates, as opposed to object-oriented ones, will not trigger VP-shell formation. Consequently, such predicates cannot be used to rescue floating quantifiers associated with the object of a mono-transitive verb:



Structures like (54) are indeed ungrammatical:

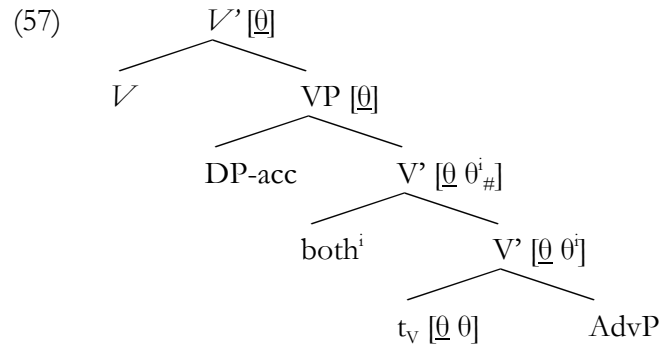
- (55) *Henry [_{VP} [_{VP} [_{VP} sat the exams] both] rather drunk]].

Like object-oriented secondary predicates, clause-final adverbs can rescue object-oriented floating quantifiers:¹⁰

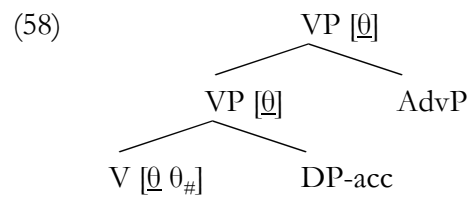
- (56) a. I recognised the boys both *(during the party).
- b. I met the boys both *(unexpectedly).

This is unsurprising, as a VP-shell must be projected if the adverb is merged before the accusative DP. The resulting structure has a suitable attachment site for a floating quantifier (see (57)). (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.)



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



What we predict, then, is that when we force the structure in (58), 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):

- (59)
- a. *He wanted to [_{V'} paint [_{VP} the boys [_{V'} both [_{V'} t_V in a modern style]]]],
so he did *e_{??}* with their eyes on one side of their heads.
 - b. *He wanted to [_{V'} paint [_{VP} the boys [_{V'} t_V in a modern style]]],
so he did *e_{??}* both with their eyes on one side of their heads.
 - c. *He wanted to [_{V'} paint [_{VP} the boys [_{V'} t_V in a modern style]]],
and paint the boys both he did *t_{??}* with their eyes on one side of their heads.
 - d. *He wanted to [_{V'} paint [_{VP} the boys [_{V'} t_V in a modern style]]],

and paint the boys he did $t_{??}$ both with their eyes on one side of their heads.

We finally turn to monotransitives that select a PP-complement. Since PP-complements do not rely on the verb for accusative case, VP-shell formation will be blocked, thereby disallowing the complement to be associated with a floating quantifier. This explains the following judgments (which hold when there is no pause preceding *both*; see the discussion surrounding (50) and (51)):

- (60) a. I looked at the movies (*both) during the party.
b. I ran into the boys (*both) unexpectedly.

In conclusion, the distribution of object-oriented floating quantifiers corroborates our hypothesis that English has both ascending and descending VPs. Object-oriented floating quantifiers are only acceptable where constituency tests detect the presence of a VP-shell.

5. Particles

5.1 Principles of particle placement

Our final argument for the existence of both ascending and descending VPs is based on the distribution of particles.¹¹ The argument is necessarily complex, and it requires some preparatory groundwork before it can be developed. In particular, case adjacency needs to be formulated more explicitly if particles are to be accommodated within the framework sketched above. We propose that intervening maximal projections, but not intervening heads, block case assignment:¹²

(61) *Case Adjacency*

In a string V XP DP, V cannot license accusative case on DP.

There is evidence that a verb and a particle form a complex head in syntax (Booij 1990, Johnson 1991, Roeper & Keyser 1992, Neeleman & Weerman 1993, and others). It can

be argued that, as a consequence, particles project optionally (complex heads, such as compounds, can contain both XP- and X^0 -categories; Ackema & Neeleman 2004). Thus, both structures in (62) are available prior to merger of the object.

- (62) a. $[_V V \text{Prt}]$
 b. $[_V V \text{PrtP}]$

The word order alternation typical of English particle constructions can be explained as a result of the co-existence of these structures. An object merged with (62a) 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.

- (63) John $[_{VP} [_V \text{looked up}_{\text{prt}}] \text{the information}]$.

This is different for an object merged with (62b). Its case cannot be licensed if it is merged to the right of the verb-particle complex. Since the particle projects, the resulting configuration would violate case adjacency:

- (64) *John $[_{VP} [_V \text{looked up}_{\text{prtP}}] \text{the information}]$.

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.¹³

- (65) John $[_{V'} \text{looked} [_{VP} \text{the information} [_V t_V \text{up}_{\text{prtP}}]]]$.

Separation of the verb and the projecting particle is obligatory, because pied-piping the particle does not prevent a violation of case adjacency:

- (66) *John $[_{VP} [_V \text{looked up}_{\text{prtP}}] [_{VP} \text{the information } t_V]]$.

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 (67) (see Den Dikken 1995 and references mentioned there for discussion of these data).

- (67) a. *John [_{VP} [_V looked [_{PP} right up]] the information].
 b. *John [_{V'} [_V looked [_{PP} right up]] [_{VP} the information *t_V*]].
 c. John [_{V'} looked [_{VP} the information [_V *t_V* [_{PP} 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 (68) will not be triggered, irrespective of whether the particle projects.

- (68) 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 (67), 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). The prime example is provided by double object constructions projected from a particle verb (see Den Dikken 1995 for extensive discussion).

Perhaps the simplest structure that both accommodates the particle and allows the case of two objects to be licensed is the one in (69), where the particle is stranded under VP-shell formation. If it does not project, the resulting representation should be grammatical (recall that traces can license case):

- (69) John [_{V'} sent [_{VP} the stockholders [_{V'} [_V *t_V* off_{PP}]] a schedule]]].

Since VP-shell formation in (69) is triggered irrespective 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.

- (70) %John [_{V'} [_V sent off_{PP}]] [_{VP} the stockholders [_{V'} *t_V* a schedule]]].

We take this micro-variation to be indicative of grammars that differ slightly in the extent to which they allow pied-piping. When stranding is not forced by case adjacency, some

speakers permit pied piping (giving rise to optionality). Other speakers require that as little material as possible be moved (making stranding compulsory). We will refer to these as permissive and strict speakers, respectively. The distinction will be important to arguments to be developed below.

Neither pied-piping nor stranding tolerates projection of the particle. In (71a), the verb's trace and the direct object are separated by a maximal projection, violating case adjacency. In (71b), which is unacceptable to even permissive speakers, the projecting particle blocks the licensing of the indirect object's case.

(71) 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 (67c). If so, the verb would move twice giving rise to two VP-shells.

(72) *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, (72) 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.

Of the two grammars identified above, the one requiring stranding is the more informative one for our present purposes: in this grammar the position of the particle indicates whether verb movement has occurred. If the verb and the particle surface as a unit, no VP shell formation can have taken place, whereas separation of the verb and the particle signals movement and hence VP-shell formation. Where in the examples below the %-sign is used, this indicates that the example in question is rejected by strict speak-

ers. The structure given is the one the grammar of such speakers would assign to the relevant string. Other judgments are shared by strict and permissive speakers.

Strict speakers make a very sharp distinction between the position of particles in the double-object construction and the dative construction. As we have seen, they reject verb-adjacent particles in the former, but they allow them in the latter. Thus, (73a) is grammatical alongside (73b). (This is consistent with the findings of Emonds 1976 and Den Dikken 1995). A contrast along these lines is of course entirely expected in view of 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 will 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:

- (73) 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]]].

As expected if VP-shell formation is triggered by case adjacency, modification of the particle in the position between V and DP is impossible:

- (74) 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]]].

Notice that if the English VP had a uniformly descending structure, the contrast in strict speakers between the acceptability of verb-adjacent particles in the double object and dative constructions would be difficult to capture (on the minimal assumptions adopted here). Stranding would be optional in one instance, yet compulsory in the other.

5.2 Cross-check

In order to strengthen our case for variability in the structure of the English VP, we now consider how the placement of particles interacts with secondary predication, the distribution of floating quantifiers and the scope of quantifiers.

If verb and particle are separated, verb movement into a VP-shell has taken place. If verb and particle are adjacent, the verb must be in situ, at least according to the grammar of strict speakers. For such speakers, verb-particle adjacency therefore signals an ascending VP, with the consequence that dependencies which rely on VP-shell formation will be unavailable.

This is true of object-oriented secondary predication. Given that secondary predicates must be c-commanded by the DP to which they are related, VP-shell formation is necessary for a secondary predicate to be associated with an object. In a traditional ascending VP, the secondary predicate would be attached higher than the object (see section 4 for related discussion). Indeed, strict speakers allow object-oriented secondary predication only if particle and verb are separated:

(75) a. I [_{VP} gulped [_{VP} the beer [_{VP} [_V *t_V* down_{PrtP}] warm].

b. %I [_{VP} [_V [_V gulped down_{Prt}] the beer] warm].

(76) a. I [_{VP} ate [_{VP} the meat [_{VP} [_V *t_V* up_{PrtP}] raw].

b. %I [_{VP} [_V [_V ate up_{Prt}] the meat] raw].

Like object-oriented depictives, object-oriented floating quantifiers are licensed only if VP-shell formation takes place (see section 4 for details). We therefore anticipate that strict speakers will reject such floating quantifiers in verb-particle constructions, unless verb and particle are separated. This seems to be correct (see also 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 [_{VP} sent [_{VP} the stockholders [_{VP} 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. These, too, involve VP-shell formation:

(78) John [_{VP} sent [_{VP} the schedules [_V both [_V [_V *t_V* out_{Prt}] to the stockholders]]]].

However, when the particle appears adjacent to the verb, no VP-shell formation can have taken place in the grammar of strict speakers. Consequently, such speakers do not accept examples like (79).¹⁴

(79) %John [_{VP} [_V [_V [_V sent out] the schedules] both] to the stockholders].

The pattern repeats itself in particle constructions containing an adverbial:

- (80) a. %John [_{VP} [_{VP} [_{VP} [_V took out] the boys] both] for their birthdays].
 b. John [_{VP} took [_{VP} [_{VP} the boys [_V both [_V *t_V* out]]]] for their birthdays]

The data discussed above support our claim that there is variation in the structure of the English VP. However, there are many alternative analyses for English verb-particle constructions, and a number of these address some of the same data. In particular, the interaction of particle placement and the licensing of floating quantifiers has been discussed in Svenonius 1994 (section 3.4.6). Svenonius' account is based on assumptions that are very different from ours: (i) particles are lexical heads in an extended small clause structure ([_{PredP} – [_{Pred'} Pred [_{PP} DP *Prt*]]]); (ii) conditions on case marking require that either the small-clause subject moves to Spec-PredP, or the particle moves to Pred; (iii) floating quantifiers are stranded by movement. These assumptions suffice to capture the distribution of floating quantifiers in (80). Only if the DP moves can it strand a floating quantifier, and if it moves, the particle will remain in situ, giving rise to the only admissible order:

- (81) a. John [_{VP} took [_{PredP} – [_{Pred'} out [_{PP} [_{DP} both the boys] [_{P'} *t_P*]]]]]]
 b. John [_{VP} took [_{PredP} the boys [_{Pred'} Pred [_{PP} [_{DP} both *t_{DP}*] [_{P'} out]]]]]]]

Although this proposal successfully captures the judgments of strict speakers, it faces some difficulties with speakers who accept (79) and (80a). In our proposal, the variation in judgments is accommodated through variation in pied-piping of the particle under verb movement: permissive speakers can assign the relevant strings a VP-shell structure

in which the verb-particle combination has moved. Svenonius' analysis, however, does not allow these orders to be generated at all. If the particle precedes the object, the latter must be in situ, but in that case there is no opportunity for the floating quantifier to be stranded.

We finally turn to the interaction between particle placement and the interpretation of quantifiers in dative constructions (in double-object constructions, scope is frozen, as expected). There are two predictions worth discussing here. The first concerns examples in which particle and verb are separated. Separation is only possible under VP-shell formation and, as discussed in section 3, the scope between the specifier and complement of the lower part of the VP-shell structure is frozen. This may suggest that Q_1 should obligatorily take scope over Q_2 in strings like (82). In fact, our analysis leads us to expect that strings like (82) are ambiguous.

(82) John sent Q_1 off to Q_2 .

This is because there are two elements that may trigger VP-shell formation in (82). If the particle does not project, VP-shell formation must have been triggered by early merger of the PP. In the resulting structure in (83a), Q_1 will take scope over Q_2 (except if the latter is a specific existential). If the particle does project, this alone is sufficient to trigger VP-shell formation. Consequently, the order of merger of DP and PP is free. Early merger of the PP, as in (83b), will lead to Q_1 taking wide scope; early merger of the DP, as in (83c), will lead to a partly ascending structure with a preferred wide-scope reading for Q_2 .

- (83) a. John [_{VP} sent [_{VP} Q_1 [_{V'} [_V t_V off_{PP}] to Q_2]]]. $Q_1 > Q_2$
b. John [_{VP} sent [_{VP} Q_1 [_{V'} [_V t_V off_{PP}] to Q_2]]]. $Q_1 > Q_2$
c. John [_{VP} sent [_{VP} [_{VP} Q_1 [_{V'} [_V t_V off_{PP}]]] to Q_2]]. $Q_2 > Q_1 \gg Q_1 > Q_2$

We therefore predict, correctly it seems, that the indefinite can be dependent on the universal in both (84a) and (84b).

- (84) a. John sent every book off to a critic. $\forall > \exists; \exists > \forall$
 b. John sent a book off to every critic. $\forall > \exists; \exists > \forall$

Our second prediction involves dative structures in which the verb surfaces adjacent to the particle. According to the grammar of strict speakers, this order is indicative of a traditional ascending structure. Since there is a preference in such structures for surface scope (see section 3), we expect that strict speakers will tend to interpret (85a) with a wide scope reading of the indefinite, while a dependent reading of the indefinite is more readily available in (85b). Although the effect is relatively weak, the judgments of strict speakers are consistent with this prediction:

- (85) a. John sent off every book to a critic $\exists > \forall \gg \forall > \exists$
 b. John sent off a book to every critic $\forall > \exists (\exists > \forall)$

5.3 Summary

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. The latter is triggered whenever a category dependent on the verb for case is merged after merger of another category. Our argumentation is based on a number of tests that can be used to probe the structure of VP, including (i) scope, (ii) movement, (iii) ellipsis, (iv) the distribution of object-oriented floating quantifiers, and (v) the distribution of particles (according to the grammar of strict speakers). Where possible, we have considered predicted interactions between these phenomena (scope in movement structures, the distribution of floating quantifiers in structures where the verb surfaces adjacent to the particle, and so on). It is important to note that these interactions corroborate our hypothesis. That is, the various 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, but that has played a significant role in the literature on the English VP: binding. We turn to this in the next section.

6. Binding

6.1 *A Linear Condition on Anaphoric Dependence*

The data of the type reported in Barss and Lasnik 1986 are widely taken to show that the structure of the English VP is uniformly descending. The overwhelming generalization that has emerged in the literature is that binding in the English VP is possible only if the antecedent precedes the category dependent on it. If binding is subject to c-command, this implies that constituents appearing further to the right must be more deeply embedded. (This, of course, is the basis for Larson's (1988a) analysis and much subsequent work.)

In view of the argumentation in the previous sections, 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's (1990) reply to Larson: 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, might be 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 (86d), *term paper* is stressed in order to avoid accommodation. If destressed, it could itself be anaphoric on an earlier mention of *term paper* in a previous sentence.)

- (86) 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 (86a,d), it is the antecedent that is subordinated and hence this category must precede the possessive pronoun, a requirement met in (86a), but not in (86d). Similarly, when the antecedent and dependent are contained in different sentences (so that neither is subordinate to the other), the dependency is correctly predicted to require precedence of the antecedent:

- (87) 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.

6.1 Anaphoric Binding

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.¹⁵

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. (88b) violates the c-command condition as well as the GPAD. The same is true of the low-PP construction in (88d).

- (88) a. I [_{VP} showed [_{VP} the boys [_V *t_V* each other]]] (in the mirror).
 b. *I [_{VP} showed [_{VP} each other [_V *t_V* the boys]]] (in the mirror).
 c. I [_{VP} asked [_{VP} the boys [_V *t_V* for each other]]] (as training partner).
 d. *I [_{VP} asked [_{VP} each other [_V *t_V* for the boys]]] (as training partner).

The ambiguity of the dative construction requires that we consider two representations. The descending structure in (89a,b) parallels the double-object construction in the binding relations it permits. The ascending structure allows neither forward nor backward anaphoric binding: (89c) violates the c-command condition and (89b) the GPAD. Taken together, these considerations account for the pattern of anaphoric binding found in dative constructions.

- (89) a. I [_{VP} introduced [_{VP} the boys [_V *t_V* to each other]]].
 b. *I [_{VP} 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].

The data discussed so far all follow from the GPAD alone. Because of this, they cannot be used to test the representations we have assigned to the various double-complement constructions. For this reason, we will now look in some more detail at restrictions on anaphoric binding in such constructions.

We should begin by acknowledging an important confounding factor when it comes to the use of reflexives and reciprocals as a probe into syntactic structure. Such elements permit a logophoric interpretation in certain contexts, and logophors are exempt from Principle A of the binding theory: they do not require a local c-commanding antecedent (Pollard and Sag 1992, Reinhart and Reuland 1993, and references mentioned there). It follows that no claim about the structure of the English VP can be based on the distribution of anaphors unless an explicit theory of logophoricity is provided.

Pollard and Sag (1992) argue that the notion of co-argumenthood is relevant to

logophoricity. If a reflexive or reciprocal is c-commanded by a co-argument, it qualifies as an anaphor.¹⁶ In other circumstances, it can be interpreted logophorically. The contrast is illustrated below. In (91a), *each other* is c-commanded by a co-argument, the local subject. This means that it is a true anaphor, to be bound in accordance with principle A. In (91b), *each other* is a possessor. Therefore the c-commanding local subject is no longer a co-argument. The reciprocal can thus be associated logophorically with the non-local subject *John and Mary*. We will not illustrate this here, but the same contrast can be observed with reflexives.

- (90) a. *John and Mary hoped that the psychologist would explain their weaknesses to each other.
 b. John and Mary hoped that the psychologist would explain each other's weaknesses to them.

By this criterion, the reciprocals in (88) and (89) are true anaphors, and hence the grammaticality of (88b), (88d) and (89a) supports the existence of descending VP-structures in English.

By far the most interesting case is the dative construction. Given that a reciprocal in the complement position of the preposition *to* must be a true anaphor, binding as in (89a) should be incompatible with phenomena that force VP to have an ascending structure. Thus, the fronting operation in (91a) should make anaphoric binding impossible, which is exactly what we find. If the reciprocal is embedded as a possessor, as in (91b), it permits a logophoric interpretation, leading to a marked improvement in the acceptability of VP-fronting. (We add some context to facilitate a logophoric reading of *each other*. As mentioned before, not all native speakers allow stranding of dative PPs under VP-fronting. However, speakers that do allow PP-stranding, whose judgments we report here, still experience a sharp contrast between (91a) and (91b).)

- (91) The boys seemed bored...

- a. *I promised to introduce them to someone fun,
so introduce them I did to each other.
- b. ?I promised to introduce them to someone fun,
so introduce them I did to each other's drama teacher.

The fact that possessive reciprocals permit logophoric readings is important. Where the structural paradoxes in Pesetsky 1995 involve reciprocals, these are possessive reciprocals. A representative example is given in (92). If we can discount such examples, the evidence for structures that are simultaneously ascending and descending is weakened considerably, suggesting that no more than simple structural ambiguity may be required.

- (92) 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.

Reinhart and Reuland (1993) argue that reflexives are exempt from principle A under the same conditions as reciprocals. However, in addition they can escape the effects of principle A if they are focused. This is true even when they are c-commanded by a co-argument. Thus (93a), where *himself* bears contrastive focus, is acceptable, but (93b), where *himself* has undergone anaphoric destressing, is not.

- (93) a. ?John was furious. He claimed that at the party I introduced Mary
reluctantly [only to HIMSELF].
- b. *John was furious. He claimed that at the party I introduced Mary to
himself [only RELUCTANTLY].

In view of this, we make the following predictions concerning reflexives in the dative construction. In the absence of focus, we should find the pattern observed before with reciprocals. A stranded 'dative' PP cannot contain an anaphor, unless that anaphor is embedded in a larger category. In the magical world of Harry Potter it is no problem to introduce people to themselves, but even so there seems to be a difference between (94a) and (94b) (both examples are intended to be read without stress on *himself*).

- (94) a. Harry Potter seemed bored. I decided to introduce him to himself, just for fun. ??I went to get a mirror, and introduce him I did to himself after magically bringing his reflection to life.
- b. Harry Potter seemed bored. I decided to introduce him to a reflection of himself, just for fun. I went to get a mirror, and introduce him I did to a reflection of himself after magically bringing it to life.

We further expect that the example in (94a) improves when we set up the context in such a way that *himself* is naturally interpreted as bearing contrastive focus:

- (95) Harry Potter needed someone suitable to talk to. I decided to introduce him to an orphan with magical powers. However, there was only one magician I knew that was also an orphan. So I went to get a mirror and, after bringing his reflection to life, introduce him I did to HIMSELF.

We finally consider double-PP constructions. There is good reason to discard anaphoric relations in such constructions as irrelevant to the debate on the structure of the English VP. A simple argument for this comes from Dutch. In this language, true reflexives and their logophoric counterparts have different forms in the third person. 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 (92a). In the dative construction in (92b) and the low-PP construction in (92c), the anaphoric form is clearly preferred (unless the logophor bears contrastive stress). But in double-PP constructions like (92d), the logophoric form *must* be used: insertion of the true reflexive leads to ungrammaticality (see also Reinhart and Reuland 1993).

- (96) 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 Jan om zichzelf/*hemzelf gevraagd (als trainingsmaat).

I have John for SE-self/him-self asked (as training partner)

- d. Ik heb over Jan met hemzelf /*zichzelf gesproken.

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

On the null hypothesis that the distribution of logophors in English mirrors that in Dutch, the acceptability of examples like (97b) therefore does not provide us with evidence about whether VP is ascending or descending (in the light of this we feel justified in ignoring the debate on the contrast in (97); see Jackendoff 1990b and Larson 1990).

- (97) a. ?I [_{VP} [_V talked about John] with himself].

- b. I [_{VP} [_V talked with John] about himself].

Of course, the claim that reflexives and reciprocals can be used logophorically in certain contexts does not imply that they are immune from the GPAD:

- (98) a. *I [_{VP} [_V talked about pictures of himself] with JOHN].

- b. *I [_{VP} [_V talked about each other's parents] with THE CHILDREN].

In sum, the distribution of true anaphors confirms the existence of ascending VPs in English. The false impression that anaphoric binding supports uniformly descending structures originates in the GPAD, in conjunction with the availability of logophors in certain context.

6.2 Variable Binding

We now turn to variable binding. Our starting point is the assumption 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 (98a), *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 (98b)). The example in (98c) is ambiguous as a consequence of the possibility of quantifier lowering. However, when the indefinite binds a pronoun, as in (98d), 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 [_{t₁} to dance
 with every senator]. $\exists > \forall; \forall > \exists$
 d. [Some young lady]₁ seems to her friends [_{t₁} to be likely to dance
 with every senator]. $\exists > \forall; * \forall > \exists$

We assume that variable binding is also subject to the GPAD. In fact, this has already been argued for by Williams, who offers data like the following in evidence:

- (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.

It turns out that that 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 (21)). Therefore, (100a) is ruled in: it meets both the scope condition and the GPAD, as opposed to (100b), 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 (22)). Therefore, variable binding parallels what

can be observed in the double-object constructions: (101b) violates both the scope condition and the GPAD.

- (102) a. I [_{VP} returned [_{VP} every book [_{V'} *t*_V to its owner]]].
 b. *I [_{VP} 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 (23)). This implies that (102a) should be acceptable. 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 (102b) 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].
 b. *I [_{VP} [_{V'} returned his book] to every boy].

Together, (101) and (102) account for the Barss and Lasnik effects in dative constructions as far as variable binding is concerned. But our analysis gives rise to two further expectations.

The first is based on the fact that the GPAD does not insist on precedence if the dependent is contained in a clause subordinate to the antecedent. Therefore, backward variable binding is predicted to be acceptable in constructions like (103a). 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, (103a) is acceptable and contrasts very sharply with (102b), which violates the GPAD, as well as with the double-object and low-PP constructions in (103b,c), which satisfy the GPAD, but violate the scope condition. (The acceptability of examples like (103a) was already noted in Bruening 2001; we consider double-PP constructions below.)

- (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]]].

- c. *I [_{V'} asked [_{VP} a girl [who Peter said would give it

[_{V'} *t_V* for every answer to today's coursework]]]

Examples parallel to (103a) 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].

None of these data is within reach of theories that assume uniformly descending VPs.

Our second expectation regarding dative constructions is that even when an ascending structure is forced, variable binding into the PP should be possible. This is because we take this dependency to be conditioned by scope (plus the GPAD), rather than by c-command. Indeed, examples like (105) are surprisingly good, and much better than those in (102). (Two caveats are in order. First, recall that not all speakers allow PP-stranding in contexts like these. Here, we report the judgments of speakers that do. Second, the scope required in (105) is the marked one for this structure, which makes the bound-variable reading harder to get; compare the discussion surrounding (26b).)

- (106) I wanted to [_{VP} [_{V'} introduce every boy] to someone older and wiser],
and [_{V'} introduce every boy] I did [_{VP} *t_{V'}* to his local church warden].

Finally, we consider 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 (26)). This rules in the 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).

- (107) 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].

Notice that variable binding remains possible even if the second PP is stranded under VP-topicalization:

- (108) ?I wanted to talk about every boy with someone who knew him well,
so [_V talk about every boy] I did [_{VP} *t*_V with his philosophy teacher]

To summarize, the patterns of variable binding found in double complement constructions are captured by the scope condition, in conjunction with the GPAD. Crucially, the resulting analysis of the Barss and Lasnik effects is consonant with our analysis of English: it does not rely on the assumption that English VPs are uniformly descending. In fact, a better empirical coverage is achieved if some structures are taken to be ascending.

6.3 Coreference

We finally consider coreference between a pronoun and a referential argument. This relationship is usually assumed to be subject to Principle C (the condition that a pronoun may not be co-referential with a DP that it c-commands.) However, the effects of GPAD overlap to a considerable degree with those of Principle C, since a pronoun c-commanding an argument tends to precede that argument and cannot be subordinate to it. So, if the GPAD is correct, the effects of Principle C need to be re-evaluated.

The anticipated effects of the GPAD and Principle C cease to overlap in situations where the referential argument and pronoun refer back to the same referential ex-

pression 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 (86d) was stressed.) In contexts in which the GPAD is made void in this way, we expect to find Principle C operative in descending, but not ascending, structures. Our impression is that the data are largely line with this, although there seems to be considerable variation among native speaker judgments.

In the example in (108a), a subject pronoun uncontroversially c-commands the name it is coreferential with. The example 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). Speakers report a sharp contrast between the low-PP construction in (108b) and the dative construction in (108c) – intuitions in support of the structural analyses offered above. Only in the low-PP construction does the pronoun obligatorily c-command the coreferential DP. As expected, the double-PP construction in (108d) patterns with the dative construction.

- (109) a. John wanted to talk with someone special.
 *And he did: he talked with John's YOGA TEACHER.
- b. She wanted to ask John for some reading material on movement theory.
 *And she did: she asked him for John's copy of BARRIERS.
- c. She wanted to introduce John to someone famous.
 And she did: she introduced him to John's favourite ROCKSTAR.
- d. She wanted to talk about John with someone who knows him really well.
 And she did: she talked about him with John's MOTHER.

There is one important surprise in the data: Principle-C effects appear to be rather weak in (109). This is unexpected, because the indirect object is assumed to c-command the

direct object, not only on our theory, but on almost all contemporary approaches to the double-object construction.

(110) She wanted to show John something amusing.

?And she did: she showed him John's BABY PICTURES.

It would take us far beyond the scope of this paper to explore Principle C in any depth. In closing, we simply note that the following formulation is compatible with the data in (108) and (109) ('Oblique DP' refers to DPs embedded in a PP). Notice that even on this reformulation, the contrast between (108b) and (108c,d) confirms the hypothesis that we set out to test, namely that there are both ascending and descending VPs in English.

(111) *Principle C*

A pronoun may not c-command a coreferential R-expression if the R-expression is contained in a constituent subordinate to the pronoun on the hierarchy

Subject >> Object >> Oblique DP

7. Conclusion

As discussed at length in Pesetsky 1995, the post-verbal domain in English displays ambivalent behaviour, in that it must be descending according to some standard tests and ascending according to others. This paper can be seen as an attempt to solve this paradox, or at least some of its instantiations. The solution has two parts.

First, according to several tests that probe constituency and scope, there are both ascending and descending VPs in English. But crucially, no structure we have looked at using these tests is simultaneously ascending and descending. In other words, the ambivalent behaviour with respect to these diagnostics appears to be a simple case of variation in structure (which includes some instances of structural ambiguity).

Second, anaphoric dependencies are claimed to be sensitive to linear order (in addition to other constraints), thereby implying that the ungrammaticality of backward

binding is not necessarily indicative of a descending structure. This conclusion granted, binding never provides evidence for a constituent structure which differs from that suggested by tests such as movement and ellipsis.

Of course, we have considered only a few instantiations of Pesetsky's paradox. Whether our approach can be applied more generally remains to be seen.

23 April 2009

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Footnotes

1. During its long gestation, this paper has benefitted from the input of a large number of individuals. We would like to thank audiences at the University of Tromsø (2005), the University of Istanbul (IDEA 1, 2006), the LOT Summerschool in Amsterdam (2003) and the EGG Summerschools in Wrocław (2005) and Olomouc (2006). We would also like to thank the students who took Current Issues in Syntax at UCL in 2005, 2006 and 2007. There are several people who have made particularly significant contributions, either through discussion or by patiently supplying judgments on an endless stream of examples. These include Klaus Abels, Peter Ackema, Nick Allot, Annabel Cormack, Alison Hall, Øystein Nilsen, Mary Pearce, Matthew Reeve, Tanya Reinhart, Neil Smith, Peter Svenonius, Robert Truswell, Hans van de Koot, Fred Weerman and Edwin Williams.

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

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

4. 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.

5. The scope data fall out differently when the *with*-PP precedes the *about*-PP. In that case, both orders are scopally ambiguous. 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_{t₁} did he [_{VP} [_{V'} talk [about t₁]] with Mary]?
 b. Who_{t₁} did he [_{VP} [_{V'} talk about literature with t₁]?
 c. What_{t₁} did he [_{VP} [_{VP} [_{V'} talk t₂] with Mary] [about t₁]₂]?
 d. ??Who_{t₁} did he [_{VP} [_{VP} [_{V'} talk t₂] [with t₁]] [about literature]₂]?

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

7. 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.

8. 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*).

9. 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 along the lines of (49a) is of course not available.

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

10. 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.

11. In this section we do not include discussion of low-PP constructions, simply because these never host particles in English.

12. This condition is a convenient shortcut. It can be derived from certain assumptions

about the PF interface (Neeleman and Reinhart 1997, Neeleman and Weerman 1999 and Ackema and Neeleman 2004).

13. 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.

14. As before, there is an alternative parse of (78a), in which *both for their birthdays* acts as some kind of modifier (witness the grammaticality of *John took out the boys, both of them for their birthdays*). This structure requires a prosodic break following the object and cannot be followed by sentence-final *yesterday* (see (i)). Insertion of *yesterday* is possible in (78c) (see (ii)). This contrast in the grammar of strict speakers confirms our analysis.

(i) *John took out the boys(,) both for their birthdays (,) yesterday.

(ii) John took the boys both out for their birthdays yesterday.

15. 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 *John* and the trace of the anaphor, rather than the anaphor itself.

(i) [_{DP} Himself], John likes *t*_{DP}

16. 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.