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Categorial Duality of Particles★

TANAKA Hideharu

1. Introduction

This paper analyzes the word-order optionality in Verb-Particle (V-Prt) Construction in English. In particular, we question what mechanism can allow the object DP to either precede or follow the Prt:

(1) *Word-Order Optionality in V-Part Construction*

- a. DP-Prt: Mikey looked the reference **up**.
- b. Prt-DP: Mikey looked **up** the reference. (Johnson 1991: 593)

This paper is organized as follows. Section 2 discusses some syntactic properties of V-Prt Construction. Section 3 reviews three previous analyses (Johnson 1991, den Dikken 1995 and Svenonius 1996), and highlights their empirical and conceptual problems. Section 4 gives a new analysis that poses two different structures for both orders. Section 5 shows further predictions, taking up Stowell's (1981) *Case-Adjacency* effects. Section 6 concludes.

2. Preliminaries: Syntactic Properties of V-Prt Construction

We examine what syntactic properties V-Prt construction shows in each of the possible order patterns. Firstly, DP and Prt do not form an *immediate* constituent in either order.¹ For example, *wh*-movement of DP cannot pied-pipe Prt.

(2) *Immediate Constituency*

- a. *[Which number **up**] did you look?
- b. *[**Up** which number] did you look? (Johnson 1991: 597)

Secondly, DP and Prt can form a *non-immediate* constituent in the DP-Prt order, but not in the Prt-DP order (cf. fn.1), as shown below:

(3) ***Non-Immediate Constituency***

- a. Chris turned [the oxygen **on**] and [the acetylene **off**].
- b. *Chris turned [**on** the oxygen] and [**off** the acetylene].

(Harley and Noyer 1997: 6)

The third property is the applicability of gapping. Given that DP and Prt form a constituent in the DP-Prt order, its non-appearance in the gapping construction is perplexing:

(4) ***Applicability of Gapping***

- a. Gary looked **up** Sam's number, and Mittie, my number.
- b. *Gary looked **up** Sam's number, and Mittie, **up** my number.
- c. *Gary looked Sam's number **up**, and Mittie, my number **up**.

(Johnson 1991: 591)

Fourthly, intensive adverbs such as *right/straight* can modify Prt in the DP-Prt order, but not in the Prt-DP order.²

(5) ***Modification by Intensive Adverbs***

- a. John threw the ball *right/straight* **back**.
- b. *John threw *right/straight* **back** the ball.

(cf. den Dikken 1995: 39-40)

Finally, the DP-Prt order blocks extraction out of DP, while the Prt-DP order does not. This fact is exemplified by *wh*-extraction:

(6) ***Extraction out of DP*** (Johnson 1991: 607 fn.20)

- a. *What_i did Chris look stories about t_i **up**?
- b. What_i did Chris look **up** stories about t_i?

(Johnson 1991: 607 fn.20)

To summarize, V-Prt Construction has the properties in (7):

(7) *Syntactic Properties of V-Prt Construction*

	DP-Prt	Prt-DP
a. Immediate Constituency	No	No
b. Non-Immediate Constituency	Yes	No
c. Applicability of Gapping	No	No
d. Modification by Intensive Adv	Yes	No
e. Extraction out of DP	No	Yes

Considering these properties of V-Prt Construction, the structural schemas for both orders are discussed. Firstly, (7a) indicates that there is at least one XP boundary between DP and Prt in both orders; otherwise, *wh*-movement of DP could pied-pipe Prt. Secondly, from (7b) we summarize that the Prt-DP order has no XP that dominates Prt and DP (while the DP-Prt order has at least one). The best way to ensure the absence of such an XP is to assume that Prt is in the same XP as V. In this case, it is impossible to make a conjunct that contains Prt but excludes V. Thus, the simplest assumption is as illustrated below:

- (8) a. DP-Prt: [_{XP} V [_{YP} DP [_{ZP} **Prt**]]]
 b. Prt-DP: [_{XP} V **Prt** [_{YP} DP]]

Further, articulation of (8) is forced by (7c-e). Essentially, (7c) shows that YP in (8a) as a whole cannot appear in the gapping construction, suggesting that YP cannot reach the CP domain, given Gengel's (2005) analysis of gapping, where surviving elements are moved to the Specs of CP, with the complement TP deleted at PF. A possible consequence from (7d) is that V and Prt form a complex head in (8b), restricting the intervention of intensive adverbs between them. Basically, (7e) indicates that DP in (8a) is an island. The syntactic schemas for both orders, hence, should have the following properties:

- (9) a. DP-Prt: [_{XP} V [[_{YP} DP_{Island} [_{ZP} **Prt**]]]] (cannot move.)

- b. P_{rt}-DP: [_{XP} [V **P_{rt}**]_{Complex} [_{YP} DP]]

We summarize this into two points: (i) any analysis of the V-P_{rt} Construction must capture at least the properties in (9) and (ii) it must derive word optionality in a principled way.

3. Previous Analyses

This section reviews three previous analyses of V-P_{rt} Construction (Johnson 1991, den Dikken 1995 and Svenonius 1996), explicitly explaining their empirical and conceptual problems.

3.1. Johnson (1991)

Johnson (1991) establishes a complex-predicate analysis for V-P_{rt} construction: he poses the base structure (10), where V and P_{rt} combine into a complex V head (hence, both keeping X⁰-status).

- (10) [_{μP} μ [_{VP} [_V [V V **P_{rt}**] DP]]]

Here, the object DP moves to [Spec, VP] to obtain Case, because the position is properly governed by a functional head μ, which Johnson assumes to be the Accusative-Case assigner.

How does Johnson ensure word-order optionality? He reduces it to two options for head movement: whether movement of V to μ involves P_{rt}. This optionality can derive two structures from (10):

- (11) a. DP-P_{rt}: [_{μP} [_μ V μ] [_{VP} DP [_V [_V t_V **P_{rt}**] t_{DP}]]]
 b. P_{rt}-DP: [_{μP} [_μ [V **P_{rt}**]-μ] [_{VP} DP [_V t_V t_{DP}]]]

In (11a), only V moves to μ, leading to the DP-P_{rt} order, while, in (11b), V carries P_{rt} to μ, giving rise to the P_{rt}-DP order.

There is, however, one limitation with Johnson (1991): it fails to explain the difference in (12):

(12) ***Modification by Intensive Adverbs***

- a. John threw the ball *right/straight back*.

- b. *John threw *right/straight* **back** the ball.

We assume that intensive adverbs can directly modify P_{rt}, as illustrated in (13a), or else, (12a) could not be generated.

- (13) a. [_{μP} [_μ V **μ**] [_{VP} DP [_V [_V t_V *Adv* **Prt**] t_{DP}]]]
 b. [_{μP} [_μ [V *Adv* **Prt**]-**μ**] [_{VP} DP [_V t_V t_{DP}]]]

Given this assumption, it remains unclear why the adverb cannot modify P_{rt} in (13b), which underlies the P_{rt}-DP order.

3.2. den Dikken (1995)

den Dikken's (1995) small-clause (SC) analysis considers the base structure as (14), where P_{rt} takes a complement DP and forms SC.

- (14) [_{VP} V [_{SC} [_{PP} **Prt** DP]]]

Here, DP must receive Accusative Case from V, since P_{rt} is an 'ergative' preposition and lacks the ability to assign Case.

The question is how den Dikken derives word-order optionality. He argues that it arises from the optionality with regard to whether P_{rt} incorporates into V in LF.

- (15) a. P_{rt}-DP = SS: [_{VP} V [_{SC} [_{PP} **Prt** DP]]]
 LF: [_{VP} [_V V **Prt**] [_{SC} [_{PP} t_{Prt} DP]]]
 b. DP-P_{rt} = SS: [_{VP} V [_{SC} DP [_{PP} **Prt** t_{DP}]]]
 LF: [_{VP} V [_{SC} DP [_{PP} **Prt** t_{DP}]]]

In (15a), LF-incorporation takes place and extends V's governing domain to cover DP under Baker's (1988) *Government Transparency Corollary*: extending V's governing domain results in no displacement of DP at the S-structure (SS), since there is no reason for it to do so. In (15b), on the other hand, LF incorporation does not occur, keeping the government domain of V intact. This drives DP to get into a position that V can govern, which under den Dikken's assumption is [Spec, SC].

However, a limitation of den Dikken's (1995) study is that it fails to incorporate (16):

(16) **Non-Immediate Constituency**

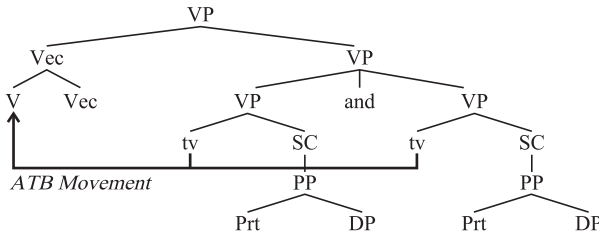
- a. Chris turned [the oxygen **on**] and [the acetylene **off**].
- b. *Chris turned [**on** the oxygen] and [**off** the acetylene].

Assume that every VP consists of the empty category V_{ec} and the lexical V, and transposes V to V_{ec} (Larson 1988).³ With this layered VP, the derivations depicted in (15) should be modified as in (17).⁴

- (17) a. $\text{Prt-DP} = \text{SS}: [\text{VP} [\text{Vec} \text{ } V_{ec} \text{ } V] [\text{VP} \text{ } t_V [\text{SC} [\text{PP} \text{ } \mathbf{Prt} \text{ } \text{DP}]]]]$
 $\text{LF}: [\text{VP} [\text{Vec} \text{ } V_{ec} \text{ } V] [\text{VP} [\text{V} \text{ } t_V \text{ } \mathbf{Prt}] [\text{SC} [\text{PP} \text{ } t_{\text{Prt}} \text{ } \text{DP}]]]]$
- b. $\text{DP-Prt} = \text{SS}: [\text{VP} [\text{Vec} \text{ } V_{ec} \text{ } V] [\text{VP} \text{ } t_V [\text{SC} \text{ } \text{DP} [\text{PP} \text{ } \mathbf{Prt} \text{ } t_{\text{DP}}]]]]$
 $\text{LF}: [\text{VP} [\text{Vec} \text{ } V_{ec} \text{ } V] [\text{VP} \text{ } t_V [\text{SC} \text{ } \text{DP} [\text{PP} \text{ } \mathbf{Prt} \text{ } t_{\text{DP}}]]]]$

Under (17a), we assume that (16b) has the following SS, in which *Across-the-Board* (ATB) movement is involved.

(18)



To implement Case-assignment, LF-incorporation takes place to raise Prt to t_V in both conjuncts. This derivation does not seem to violate any condition, thus predicting that (16b) is grammatical, which is contrary to the fact.

3.3. Svenonius (1996)

We finally review Svenonius (1996), who makes proposals under *the*

Feature-Checking Theory (Chomsky 1995). The base structure for V-Prt Construction is as follows:

- (19) $[_{VP} V [_{PredP} Pred_{[strong-N]} [_{PP} DP [_P Prt pro_{[+N]}]]]]$

In (19), the object DP is base-generated in the PP specifier, which Prt projects, taking an abstract nominal complement *pro*. This interior of PP reflects the fact that DP in this construction is interpreted as the Figure whose location is specified by Prt regarding the discourse-given Ground, denoted by the complement *pro*. This PP merges with the Pred(icator) head. Pred has a strong N-feature and must attract $[+N]$ elements into its *Checking Domain* (i.e., Spec/adjunct positions).

Analyzing how Svenonius can derive word-order optionality, we infer the following. He reduces it to two options so as to satisfy the checking requirement: (i) the object DP moves to [Spec, PredP] or (ii) Prt adjoins to the Pred head. For this mechanism, two assumptions are considered. (i) DP and Prt are in the same *Minimal Domain* under a version of Chomsky's (1995) theory, so that they are equidistant from the Checking Domain of PredP. (ii) Prt bears an N-feature when it incorporates the complement *pro*, and can check Pred's N-feature. These assumptions lead to two derivations from (19).

- (20) a. DP-Prt:

$$[_{VP} V [_{PredP} DP [_{Pred'} Pred_{[strong-N]} [_{PP} t_{DP} [_P Prt+pro_{[+N]}]]]]]$$

- b. Prt-DP:

$$[_{VP} V [_{PredP} [_{Pred} Pred_{[strong-N]} Prt+pro_{[+N]}] [_{PP} DP [_P t_{Prt}]]]]$$

In (20a), the object DP moves to the Checking Domain of Pred, which leads to the DP-Prt order, while (20b) constitutes the complex head Prt, which gives rise to the Prt-DP order. Note that Prt's movement across the DP in (20b) does not violate Chomsky's (1995) *Minimal Link Condition*, because the DP and Prt are part of the same Minimal Domain, as mentioned above, which makes them equally close to the Checking Domain of Pred (i.e., Chomsky's *Equidistance Principle*).

Svenonius's (1996) analysis suffers the same limitation as that of den Dikken's (1995): it cannot accommodate the difference in (21).

(21) ***Non-Immediate Constituency***

- a. Chris turned [the oxygen **on**] and [the acetylene **off**].
- b. *Chris turned [**on** the oxygen] and [**off** the acetylene].

With the proposed structures (20) in mind, assuming that PredP can undergo coordination in (20a), it leads to the coordinated structure in (21a). In this account, however, it is not clear why PredP cannot be coordinated in (21b), though it properly contains Prt and DP, as indicated in (20b).

3.4. Conceptual Problem

In this subsection, we discuss the conceptual problem that these three analyses share.

In the Minimalist Program (Chomsky 1995), derivations in syntax are directed and restricted in terms of economy. One salient manifestation of this concept is already seen in this paper:

(22) ***Minimal Link Condition*** (MLC)

- K attracts α only if there is no β , β closer to K than α , such that K attracts β .
(Chomsky 1995: 311)

I agree that MLC (22) is an advantage to theorizing the syntax, as it produces *unambiguous* instructions to the syntactic computation. If the syntax is given several options for operation *Attract*, it can proceed thorough MLC's instructions to choose the closest one. However, proposals that result in *ambiguous* instructions have also emerged. An instance is given below:

(23) ***Equidistance Principle*** (EDP)

- If α , β are in the same minimal domain, they are equidistant from K.

(cf. Chomsky 1995: 184)

The essence of EDP (23) is to limit the range of options for the syntax; EDP permits some options to survive, but it does not make any more instructions, leaving the remaining options intact.

The problem with EDP, in contrast to Chomsky (1995), is that under EDP, MLC cannot work sufficiently. Interpreting MLC strictly, in this case, it fails to instruct the syntax to choose among the options which EDP permits, because they are “equally close” to K. Adoption of EDP requires more mechanisms to set out the derivations that EDP suspends. Adding assumptions, however, is evidently against the discipline of Occam’s razor. It is then obvious that the only economy principles that the Minimalist Program should adopt are the ones resulting in *unambiguous* instructions.⁵

With the above discussion, we now require the *unambiguous* syntax. It is important to question what syntax is advocated by the previous analyses. Their ideas are shared below:

(24) ***Computational Optionality***

The optionality that gives the syntax some options with regard to *what it selects as the target of an operation*

I claim that (24) comprises the ambiguous syntax (which should be avoided), because it does not guide derivations monotonically; it prevents decisive instructions about what the syntax should select as the target of an operation. We summarize the methods in which the previous analyses derive word-order optionality.

(25) ***Ways to the Word-order Optionality***

- a. Johnson: Move (i) only V to μ , or (ii) [_V V Prt] to μ .
- b. den Dikken: Move (i) DP to [Spec, SC], or (ii) Prt to V.
- c. Svenonius: Move (i) DP to [Spec, PredP], or (ii) Prt to Pred.

Evidently, the above methods adopt the Computational Optionality,

because they assume that, at a derivational point, the syntax is free to select between two options as the target of Move. Note that each of (25a-c) requires mechanisms that are not feasible under the Minimalist Program. (25a, b) would be implementable, but under the GB model featuring *Move α* , and (25c) would be so, but under EDP.

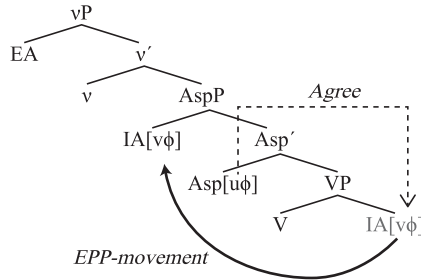
The conclusion is obvious: the analyses reviewed cannot be supported on both empirical and conceptual grounds. Thus, we are led to develop an empirically and conceptually valid alternative analysis.

4. Assumption, Proposal and Analysis

4.1. Assumption

A novel analysis of V-Prt Construction is developed under the following theoretical assumption (Hiraiwa 2005, Travis 2010):

(26) *Object Shift in Articulated vP Structure*



Travis (2010) proposes a functional category between *vP* and *VP*, which she dubs *Inner Aspect* (*Asp*). In addition, Hiraiwa (2005) proposes that *Asp* triggers operation *Agree* (cf. Chomsky 2008) with the internal argument (*IA*) for ϕ -features, assumed to be associated with the EPP effect; this instance of *Agree* results in the movement of *IA* to [Spec, *AspP*] (as well as the assignment of Accusative Case to *IA*). In general terminology, this movement is called *Object Shift* (*OS*), which is often assumed to be Case-driven (e.g., Johnson 1991).

The second assumption is (27) below, under which *OS* is forced to

occur after the introduction of the phase head v , because OS is the result of operation Agree in ϕ -features.

(27) ***Phase-Cyclic Derivation***

Derivations develop phase by phase: it is not until phase heads (i.e., C, v) are introduced that the operation Agree starts.

(cf. Chomsky 2008: 147)

Assume that movement consists of *Merge* and *Copy*, which Chomsky (2008) calls *Internal Merge* (IM) and distinguishes from *External Merge* (EM), which involves no Copy. With this distinction of Merge, the consequence from (26) and (27) is expressed as follows:

(28) ***Derivational Restriction on Object Shift***

OS follows all instances of EM that occur by the introduction of v .

4.2. Proposal

Keeping in mind the above assumptions, we first propose the notion that replaces Computational Optionality:

(29) ***Material Optionality***

The optionality that gives the syntax options with regard to *how it exploits lexical items*

What (29) means is that “speakers” are free to decide what property of lexical items they wish to introduce into the syntax. For example, the lexical item *that* is ambiguous in category: *that* = (i) Noun / (ii) Comp. Under (29), “speakers” select between (i) and (ii) when introducing *that* into the syntax. Note that (29) does not appear as novel: it says that the structure the syntax derives depends on its selection of lexical items. However, (29) is the only possibility to root differences in one identical construction under the *unambiguous* syntax; it rejects the computational principles that do *not* reduce several options to just one.

The second proposal is that Prt has categorial duality, that is, it

the facts listed in (33).

(33) *Syntactic Properties of V-Prt Construction*

	DP-Prt	Prt-DP
a. Immediate Constituency	No	No
b. Non-Immediate Constituency	Yes	No
c. Applicability of Gapping	No	No
d. Modification by Intensive Adv	Yes	No
e. Extraction out of DP	No	Yes

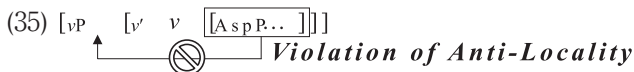
Firstly, (31) predicts the fact (33a), because the base structures in (31) pose an XP boundary between DP and Prt: it is the PP projected by Prt[P] for the DP-Prt order, whereas it is VP for the Prt-DP order. Secondly, (31b) explains the fact (33b) that the Prt-DP order prohibits DP and Prt from forming a constituent that exclusively contains them, because (31b) assumes V and Prt to be combined as a complex head. In addition, this complex head analysis accounts for the fact (33d) that the Prt-DP order blocks intensive adverbs from modifying Prt: no modification can enter the internal structure of the complex head.

Recall that the fact (33c) is puzzling given that in the DP-Prt order, DP and Prt can be put together as a constituent. Under the structure derived from (31a), repeated as (34), we question why the unit of AspP fails to emerge in the gapping construction.

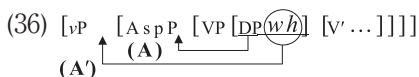
(34) DP-Prt: $[_{vP} [_{vP} \text{V-Asp}]_v \boxed{[_{AspP} \text{DP } t_{Asp} [_{VP} t_{DP} [_v t_V \textbf{Prt}]]]}]$

This puzzle, however, is straightforwardly resolved in addition of some reasonable assumptions: (i) in gapping, the surviving elements are moved to the Specs of CP, with TP deleted at PF (e.g., Gengel 2005); (ii) movement across phase boundaries occurs via the phase edges (due to *the Phase Impenetrability Condition* (cf. Chomsky 2008)); (iii) movement must cross at least one projection (e.g., Abels's 2003 *Anti-Locality*). With these assumptions, (34) makes it impossible for

AspP to reach the domain of CP, since it cannot move to the edge of the phase head v under Anti-Locality:



Considering the fact (33e), we question why DP has an island status in the DP-Prt order. With structure (34), we offer a traditional account based on Huang's (1982) *Condition on Extraction Domain* (CED), which blocks extraction out of Specs. Note the following: (i) DP is base-generated in [Spec, VP] in (34) and (ii) under Chomsky (2008), A- and A'-movement is triggered simultaneously at phase levels. Thus, *wh*-extraction out of DP proceeds as follows:



As is evident, A'-movement in (36) violates CED, which results in the impossibility of extraction out of DP in the DP-Prt order.⁶

5. Further Prediction

This section reveals one interesting prediction of this study's analysis, which involves Stowell's (1981) Case-Adjacency effects.

In a typical case of the Adjacency effects in English, nothing can intervene between transitive V and its object DP, as shown in (37), which we explain with our assumption (28), repeated as (38).

(37) Paul $[_{vP}$ open (**quickly*) the door (*quickly*)] (Stowell 1981: 113)

(38) **Derivational Restriction on Object Shift**

OS follows all instances of EM that occur by the introduction of v .

Assuming that VP-adverbs are introduced by EM, (38) guides the derivation of vP in (37) as follows:

- (39) a. [_{vP} v [_{AspP} (*Adv*) Asp [_{vP} (*Adv*) V DP]]]
 b. [_{vP} [V-Asp]-v [_{AspP} DP (*Adv*) t_{Asp} [_{vP} (*Adv*) t_v t_{DP}]]]
-

It is then evident that OS of DP cannot tuck in beneath *Adv* in *AspP*, with a weak version of Chomsky's (2008) *No Tampering Condition*. This structure necessarily leads to the adjacency ordering of V and DP.⁷

Moving to the case of the Adjacency effects in V-Prt Construction, no items can be introduced between *Prt* and DP in the *Prt*-DP order.

- (40) Betsy [_{vP} figured **out** (**carefully*) the problem (*carefully*)]
 (Johnson 1991: 594-595)

Note that (40) indicates that we cannot adopt Stowell's (1981) original definition of the Adjacency Condition, because the *Prt*-DP order always has *Prt* as an intervener between V and DP. But the analysis developed here accounts well for fact (40). Given that the *Prt*-DP order has the base structure in (41a) below, the *vP* in (40) is derived as in (41b):

- (41) a. [_{vP} v [_{AspP} (*Adv*) **Prt** [_{Asp}] [_{vP} (*Adv*) V DP]]]
 b. [_{vP} [V-**Prt**]-v [_{AspP} DP (*Adv*) t_{Prt} [_{vP} (*Adv*) t_v t_{DP}]]]
-

This derivation, as is evident, always results in the adjacency relation between *Prt* and DP in the *Prt*-DP order.

6. Conclusion

This study argues that *Prt*'s categorial duality leads us to posit two base structures for V-*Prt* Construction. This analysis is motivated under the *unambiguous* syntax, and natural under the notion of Material Optionality. Crucially, this analysis carries empirical advantages for

deriving the Adjacency effects observed in V-Prt construction as well as some of its syntactic properties.

However, a number of issues can be discussed in future research. For example, the motivation of categorial duality of Prt is not discussed. This study emphasizes that it is often the case that the presence of Prt forces telic interpretations. If Travis (2010) is correct in claiming that telic markers form their own projections (i.e., Inner AspP), the duality in question may arise from the telic-marker property of Prt. Further investigations of V-Prt Construction are required to support the analysis developed here.

Notes

- ★ I am grateful to Koji Shimamura, Yuta Tatsumi and, especially, Yukio Oba for their critical and helpful comments. All unsatisfactory discussions are, of course, attributed to me.
- The definitions of relevant structural relations are given below:
 - α and β form an *immediate constituent* X if X is the first maximal projection dominating α and β .
 - α and β form a *non-immediate constituent* X if X dominates α and β .
 - Note that intensive adverbs can only modify prepositional elements, and hence cannot be VP-adverbs. This nature is illustrated below:
 - John threw the ball *right/straight* through the window.
 - *John *right/straight* throw the ball through the window.

(den Dikken 1995: 38)
 - The layered VP is needed for the distribution of bound pronouns in (i):
 - John talked to every boy_i about his_i mother.
 - *John talked to his_i mother about every boy_i. (Koizumi 1995: 24)

Given that binding is based on c-command and that c-command out of PP is possible, the relevant VP structure should be as in (ii), under which binding fails in (ib) because the quantifier cannot c-command the pronoun.
 - $[_{VP} [_{V_{ec}} V] [_{VP} PP_{to} [_{V'} t_V PP_{about}]]]$
 - Suppose that the trace of the lexical V is still responsible for assignment of Accusative Case: if the null V were so, Prt would skip over t_V to V_{ec} , violating the *Head Movement Constraint* (Travis 1984).

5. Yukio Oba pointed out that the fact in (i) challenges the unambiguous syntax, under which it is not evident at first sight how to derive the optionality with regard to the target of *Wh*-movement.
 - (i) a. What_i did you give t_i to whom?
 b. [To whom]_i did you give what t_i?
 It is interesting to inquire what analysis is feasible for the above paradigm under the unambiguous syntax, though I leave this question pending here.
6. As Yukio Oba pointed out, this analysis may fail to predict the fact in (i), which has the almost same structure as (34).
 - (i) ?Who_i did John show [a picture of t_i] to Bill? (Takano 1998: 866)
 The grammaticality, though, is marginal, and is worth further confirmation to draw any conclusion for the analysis here.
7. Another way to derive the Adjacency effects is to simply assume that AspP is not available to adjunction of VP-adverbs, as suggested by Yukio Oba. This is indeed a possibility, which suggests that justification of the analysis here requires more empirical and theoretical arguments.

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