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## Deriving PS-Paradoxes by Conditions on Merge

Item Type	article;article
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Download date	2025-02-07 11:10:44
Link to Item	<a href="https://hdl.handle.net/20.500.14394/37073">https://hdl.handle.net/20.500.14394/37073</a>

## Deriving PS-Paradoxes by Conditions on Merge

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### 1. Introduction

#### 1.1. Goals and Outline

The present paper<sup>1</sup> intersects two issues central to the study of movement, ellipsis and economy. First, in current theorizing, empty nodes in movement chains and in contexts of ellipsis are both conceptualized as copies with internal structure, which need to be licensed by a linguistic antecedent under (an appropriate version of) parallelism. But there are also systematic differences between traces and ellipsis copies, which manifest themselves for instance in their varying ability to host reconstruction sites for movement. The first goal of this paper consists in providing evidence that this specific disparity, which will be dealt with in depth below, does not reveal intrinsic properties of the two different exponents of copies, but can be derived from general principles of economy.

The second question to be addressed regards an imbalance which can be perceived in the sensitivity of the two structure building operations Move and Merge to principles minimizing computational cost. In particular, whereas movement processes are widely held to be regulated by economy conditions, no such metric has been identified so far which would choose among competing applications of (root) Merge.<sup>2</sup> This is due to the fact that

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<sup>1</sup>An extended version of this paper will be published as Lechner (to appear).

<sup>2</sup>Competition between movement and Merge represents the third combinatory option, which has been argued to be resolved in favor of Merge ('Merge over Move'; *vd. Chomsky 1995: 348; 1999*).

Move characteristically enjoys a certain degree of freedom (e.g. in the choice of the landing site), while Merge generally introduces categories only in designated positions in the tree, roughly those which support the correct theta and predication relations. Thus, in most cases, competition among derivations which possibly differ only in the position at which a category is merged will simply not arise. Behind this background, I will present evidence drawn from ellipsis and movement phenomena that (i) there are indeed derivations in which a category can be potentially merged into two distinct locations and that (ii) the choice between the competing candidates is determined by economy.

This conception entails an interesting consequence for the debate whether economy is computed strictly locally (Collins 1996), or needs to incorporate transderivational constraints. To explicate, suppose that in a given derivation, there is the choice of merging a category  $\alpha$  low or high, yielding the two subderivations D1 and D2 schematized in (1). Assume moreover that low attachment of  $\alpha$ , as in derivation D1, entails further movement of  $\alpha$  at a later point in the derivation (step m), which would not have been necessary if  $\alpha$  had been merged high, as in D2:

(1)	$\times$ DERIVATION D1	$\checkmark$ DERIVATION D2
Step k:	Merge $\alpha$ low	.....
Step l:	.....	Merge $\alpha$ high
Step m:	Move $\alpha$	..... (k < l < m)

Finally, suppose that D2 wins over D1 for the reason that D2 employs fewer movement operations than D1. On these assumptions, the grammar must decide at step k whether to introduce  $\alpha$  low at step k, as in D1, or whether to delay merging  $\alpha$  until step l, as in D2. However, the critical information that early merger at k leads to additional cost at m, which is indispensable in order to discriminate between D1 and D2, is not yet accessible at k, but only becomes available once the derivation reaches step m. Thus, transderivational rule interactions as in (1) indicate that the economy metric does not operate on a strictly local, step-by-step basis (Collins 1996), but must have access to larger units of information.

Empirically, the discussion revolves around the proper analysis of two types of constructions in which a phonetically silent VP is followed by an overt remnant: so-called PHRASE STRUCTURE PARADOXA involving VP-fronting, as in (2) (Pesetsky 1995; Phillips 1996, to appear), and instances of VP-Ellipsis or PSEUDOGAPPING, exemplified by (3) (Jayaseelan 1990; Johnson 1996; Lasnik 1995; Levin 1986; (2) adapted from Pesetsky 1995: 230; (570)c):

- (2) John intended to give the book to the children, and  
 [<sub>VP</sub> give the books to *them*]<sub>i</sub> he did on *each other*<sub>i</sub>'s birthdays
- (3) John gave the book to the children on Monday, and Mary did on Friday.

The paper is structured as follows: Subsequent to some expository remarks on the nature of the paradox in (2), section 2 reviews a recent proposal for its resolution (Phillips 1996), which will be seen to require rather radical changes in the grammar and which will be discarded on empirical grounds. Section 3 presents an alternative, conservative analysis which likens (2) to the extensively studied group of remnant movement phenomena in

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Western Germanic. Section 4, which contains the main theoretical contribution, turns to disparities between Pseudogapping and VP-fronting, focusing on the reconstruction behavior of adjunct remnants. These differences will be attributed to the interaction between economy conditions and the assumption that adjuncts may be merged with the root at different stages of the derivation.

### 1.2. Pesetsky's Paradox

Syntactic constituency tests are hypotheses about the structural organization of surface strings, which ideally converge at a single structural description for a given string in a given interpretation. If two or more diagnostics lead to contradicting evidence for the constituency of a string, the hypotheses are at conflict, resulting in a phrase structure (PS-) paradox.

Pesetsky (1995) observes that English ditransitives represent one instance of such a PS-paradox. On the one side, movement tests indicate that the VP is left-branching, as illustrated by the fact that any contiguous string of categories including the left edge of the VP may be fronted:

- (4)
- a. ...<sub>[VP</sub> give candy to children in libraries on weekends], he did.
  - b. ...<sub>[VP</sub> give candy to children in libraries], he did on weekends.
  - c. ...<sub>[VP</sub> give candy to children], he did in libraries on weekends.

On the other side, c-command sensitive tests, which register the distribution of negative polarity items (NPI), anaphoric dependencies and pronominal variable binding attest to the fact that the VP-shell is right-branching.<sup>3</sup> For instance, the scope domain of downward entailing NPs includes NPIs to their right, but does not extend over NPIs to their left (Bars and Lasnik 1986; Larson 1988; Phillips 1996):

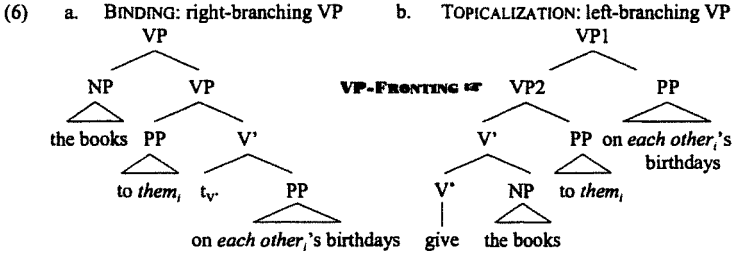
- (5)
- a. John gave **nothing** to *any of the children* in the library on his birthday.
  - b. John gave candy to **none of the children** in *any library* on his s birthday.
  - c. John gave candy to children in **no library** on *any public holiday*.
  - d. \*John gave *anything* to **none of the children**.
  - e. \*John gave candy to *any of the children* in **no library**.

Thus, different criteria for structure and constituency yield conflicting evidence for the organization of the English VP. At first sight, this finding might be taken as evidence that movement and binding relations can be read off two structurally distinct trees. However, as observed by Pesetsky (1995: 230), it is also possible to find examples like (2), repeated below, which simultaneously exhibit properties of right- and left-branching phrase markers, resulting in what will be referred to as PESETSKY'S PARADOX. In (2), the well-formed anaphoric dependency between *them* and *each other* indicates that the VP is assigned a right-branching tree, as illustrated by (6)a. But the topicalized string *give the books to them* can strand the adjunct *on each other's birthday* only if it is parsed into a left-branching VP, as

<sup>3</sup>The same result can be reproduced by using conjunction tests (see Pesetsky 1995).

in (6)b:<sup>4</sup>

- (2) John intended to give the book to the children, and  
 [<sub>VP</sub> give the books to *them<sub>i</sub>*] he did on *each other<sub>i</sub>*'s birthdays



Pesetsky (1995) resolves the paradox by adopting a dual system, which relates a single surface string to two distinct phrase-markers, a right-branching CASCADE and left-branching trees generated by LAYERED SYNTAX. On this view, the conflicting structural requirements of (2) can be distributed between two distinct representations: binding is verified on the basis of Cascades, and the satisfaction of principles governing movement relations is delegated to Layered Syntax.

Although empirically adequate and successful in accounting for a wide variety of facts in addition to constituency conflicts<sup>5</sup>, the dual system faces two problems. First, it is not obvious *why* in the dual system the phenomena are distributed the way they are. Why for instance is Binding Theory evaluated on the basis of Cascades, and not on the basis of Layered Syntax? Second, the dual system rejects the standard assumption that (unambiguous) surface strings are bi-uniquely mapped onto graph representations in favor of a weaker, less restricted hypothesis about the relation between terminals and structure. As will be shown in section 3 and 4, though, PS-paradoxes like (2) also lend themselves to an analysis which relies on orthodox assumptions about the factorization of surface strings, and therefore fail to elicit evidence against the standard view.

## 2. The Parsing Solution

A different approach toward Pesetsky's Paradox, which rests on a new conception of how trees are assembled by the grammar, is advocated by Phillips (1996, to appear). Section 2 outlines this solution (2.1), discusses an extension to contrasts between VP-Fronting (VP-F) and VP-Ellipsis (VP-E; Pseudogapping), which will be relevant for the further discussion (2.2), and presents three empirical generalizations that pose a serious challenge for Phillips' account (2.3).

<sup>4</sup>Pesetsky's Paradox generalizes to contexts involving VP-fronting and other c-command sensitive tests, as e.g. pronominal variable binding (see Phillips 1996: 61, ex. (86b)).

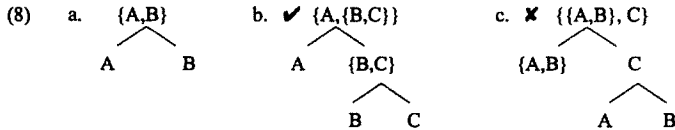
<sup>5</sup>It captures for instance the generalization that (most) PPs are invisible for the computation of c-command (Reinhart 1983).

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### 2.1. Incremental Merger

Phillips (1996) suggests that structure is built incrementally from left to right by a top-down parser. The parser proceeds according to the two principles of the INCREMENTAL MERGER in (7):

- (7) INCREMENTAL MERGER  
 I. MERGE RIGHT: New items must be introduced at the right edge of a structure.  
 II. BRANCH RIGHT: Merge as low as possible.



The schematic derivation of the string *ABC* in (8) illustrates the algorithm at work. When the parser reaches *C*, it reads the instructions to attach *C* at the right edge of *AB* (MERGE RIGHT) and to merge *C* as low as possible (BRANCH RIGHT), and accordingly proceeds as in (8)b, discarding the representation (8)c. Crucially, *A* and *B* form a constituent at an early point of the derivation ((8)a), whereas in the final output, *B* is grouped together with *C*, such that *C* is located within the *c*-command domain of both *A* and *B* ((8)b).

The Incremental Merger provides now the key to the solution to Pesetsky's Paradox, because a string of symbols can meet seemingly contradictory constituency requirements by satisfying the individual conditions at different stages of the derivation. As shown by (9), which tracks the derivation of (2), the fronted VP is assembled first ((9)a). Then, an identical copy of the topicalized VP is inserted into the base position ((9)b), satisfying the parallelism requirement on movement chains. In (9)c, the temporal adjunct is finally merged low at the right edge, supplying the correct configuration for the anaphoric dependency:

- (9) John intended to give the book to the children, and... (= (2))  
 a. [<sub>VP</sub> give [the books [to [them]]]] he did  
 b. [<sub>VP</sub> give [the books [to [them]]]] he did [<sub>VP</sub> give [the books [to [them]]]]  
 c. [<sub>VP</sub> give [the books [to [them]]]] he did  
    [<sub>VP</sub> give [the books [to [them, [on [each other,'s birthdays]]]]]]

The theory generates a number of interesting predictions (see Phillips 1996 for details). Among them, there is one which is of specific interest for present purposes, as it relates to a contrast between movement copies in VP-F and ellipsis copies in VP-E. I briefly comment on this prediction in the next subsection, turning from there to critical discussion in 2.3.

### 2.2. VP-Fronting and VP-Ellipsis

Phillips notices a further curious property of Pesetsky's Paradox. Whereas VP-internal

categories can bind into the remnant if the VP has been topicalized ((2)), such a relation cannot be established if the VP has been removed by ellipsis, and not by movement, as in (10).

- (10) \*John [<sub>VP</sub> gave the books to them on each other's birthdays] and  
Mary did  $\Delta$  on *each other's* first day of school ( $\Delta =$  [<sub>VP</sub> gave the books to *them*])

On the Incremental Merger account, the contrast between VP-Fronting in (2) and VP-Ellipsis in (10) follows from two assumptions: First, the parser may alter the constituent structure in course of the derivation only if the changes are compatible with other, global constraints of the grammar. Second, VP-Ellipsis is subject to the global constraint of syntactic parallelism<sup>6</sup>. If parallelism is observed, as in (11), the adjunct in the elliptical clause resides outside the c-command domain of its antecedent. If, on the other hand, (10) is parsed into a right-branching VP, as in (12), the structural requirements for binding are met, but a violation of syntactic parallelism ensues. Since the conditions on ellipsis and binding cannot be reconciled in a single structure, the output is ill-formed.

- (11)
- 
- (12)
- 

Thus, Incremental Merger successfully accounts for the observation that contradictory constituency effects (Pesetsky's Paradox) are not attested in contexts of VP-E. The analysis faces problems in other empirical domains, though.

<sup>6</sup>This assumption contrasts with the widely accepted view that VP-ellipsis is sanctioned by semantic identity modulo focus (see e.g. Rooth 1992, Fox 1999 and section 4.1).

## 2.3. Criticism

The present section lists three problems for the parsing analysis of PS-paradoxes. First, the Incremental Merger account entails a further prediction for the hierarchical position of remnants in VP-E. Not only should binding from within the *elliptical* VP into the remnant be blocked ((10)), but it should equally be impossible to establish an anaphoric link between an NP inside the *antecedent* VP and remnant-internal anaphors. This prediction is contradicted by the data, though. NPs which are part of the first conjunct may antecede anaphors inside remnants, indicating that the antecedent VP is right- and not left-branching:

- (13) John gave the books to *them* on *each other's* birthdays and  
 Mary did  $\Delta$  on their first day of school ( $\Delta = [_{VP} \text{gave the books to them}]$ )

Notice on the side that the syntactic parallelism condition excludes an alternative derivation in which the remnant is merged low in the antecedent VP but high in the elliptical VP.

The conjecture that adjuncts are attached low within the VP in the first, but high in the second conjunct of VP-E is corroborated by data from disjoint reference effects. Phillips (1996: p. 62, fn. 41) notices that a name inside an adjunct remnant induces a Principle C violation only if it is part of the antecedent clause:

- (14) a. \*?John gave the books to *her*, on *Mary's* birthday and Jill did  $\Delta$  at Christmas.  
 b. (?John gave the books to her at Christmas and Jill did  $\Delta$  on *Mary's* birthday.  
 ( $\Delta = \text{give books to } her_i$ )

Similar first vs. second conjunct asymmetries can be observed with pronominal variable binding ((15)b from Phillips 1996; p. 61, (87b)):

- (15) a. \*Mary congratulated every boy at his graduation and Sue did  $\Delta$  at *his*, 21<sup>st</sup> birthday party  
 ( $\Delta = \text{congratulated every boy}_i$ )  
 b. Mary congratulated *every boy*, at *his*, graduation and Sue did at her 21<sup>st</sup> birthday party.

Thus, adjuncts are - contrary to Phillips (1996) - merged *low* if they originate inside the antecedent conjunct of VP-E.

Second, on the assumption that the sequential expansion of the tree is regulated by Branch Right, one is led to expect that categories further to the right should also be more deeply embedded. Although this generalization (by and large) captures the binding theoretic properties of remnants, it fails to provide an accurate description of the scope behavior of quantificational remnants in VP-F. To begin with, it is well-known that in VP-F, quantificational subjects cannot be assigned narrow scope w.r.t. other VP-internal quantifiers (vd. (16)b), their scope domain is 'frozen' (see Barss 1986 and Huang 1993, among others):

- (16) a. Noone will teach every student  $\neg \exists > \forall / \forall > \neg \exists$   
 b. ...and teach every student, noone will  $\neg \exists > \forall / * \forall > \neg \exists$

The same observation holds for object remnants stranded by VP-topicalization, which have



to take scope above quantifiers inside the fronted predicate (Sauerland 1998a: 591):

- (17) a. David planned to give every handout to one of the students...  $\forall > \exists / \exists > \forall$   
 b. ...and [<sub>VP</sub> give every handout] David did to one of the students \* $\forall > \exists / \exists > \forall$

The proper analysis of Scope Freezing is immaterial for present purposes.<sup>7</sup> All that matters is that the Incremental Merger account implies that the remnant (*one of the students*) in (17)b is merged low in its surface position, as in (18):

- (18) ... and [<sub>CP</sub> [<sub>VP</sub> ...] [<sub>IP</sub> David did [<sub>VP</sub> give every handout [to \*one of the students]]]]

But on this assumption, it should be possible to construe the indefinite within the scope of the fronted universal *every handout*. The absence of a narrow scope reading for the indirect object therefore constitutes first hand evidence against the parsing analysis.

The third and final problem for Incremental Merger to be addressed here pertains to the syntactic principles which determine possible configurations for the application of Branch Right. As documented by the contrast in (19), the remnant in VP-F must not be separated from the position in which it is interpreted by an island:

- (19) She attempted to refute the allegation that *they<sub>i</sub>* met on *each other<sub>i</sub>*'s birthdays  
 a. ...and [<sub>VP</sub> refute the allegation that *they<sub>i</sub>* met on *each other<sub>i</sub>*'s birthdays] she did  
 b. \*...and [<sub>VP</sub> refute the allegation that *they<sub>i</sub>* met] she did [on *each other<sub>i</sub>*'s birthdays]

Phillips (to appear) recognizes this problem and accounts for it by the restriction in (20). However, (20) rather amounts to a restatement of the facts than to a principled analysis of the phenomenon.

- (20) In the sequence [...Aux [<sub>VP</sub> null] adverbial...] the adverbial is interpreted as a clausemate of the Aux.

To recapitulate, the parsing approach towards PS-paradoxes fails to capture three empirical generalizations: (i) first vs. second conjunct asymmetries in VP-E, (ii) Scope Freezing and related effects from ACD, indicating that remnants may be merged high in VP-F, and (iii) locality restrictions on the distance between the remnant and its interpretive position. Section 3 presents an alternative analysis which straightforwardly captures the generalizations (ii) and (iii). In section 4, I will elaborate on property (i).

### 3. Remnant Movement

The alternative account of Pesetsky's Paradox to be pursued here builds on the strategy of remnant topicalization. Remnant topicalization is a phenomenon widely found in Western Germanic (among other languages), which shifts contiguous strings including the right edge of the VP to SpecCP (see e.g. Haider 1993; den Besten and Webelhuth 1990; Müller 1998):

<sup>7</sup>Any account of Scope Freezing must (i) exclude QR out of the lower VP-copy and (ii) prevent reconstruction of overtly moved QPs into the VP-copy (on the latter see Lechner 1998; Sauerland and Elbourne 2000).

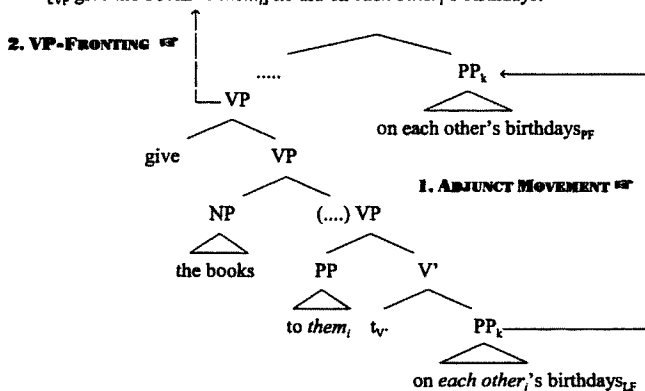
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- (21) a. Sie wollte [<sub>VP</sub> einem Freund ein Kamel schenken]  
 she wanted a friend a camel give  
 b. [<sub>CP</sub> [<sub>VP</sub> Einem Freund ein Kamel schenken] wollte sie] gabe  
 a friend a camel give wanted she  
 c. [<sub>CP</sub> [<sub>VP</sub> t<sub>i</sub> Ein Kamel schenken] wollte sie einem Freund,]  
 a camel give wanted she a friend  
 d. [<sub>CP</sub> [<sub>VP</sub> t<sub>i</sub> t<sub>k</sub> Schenken] wollte sie einem Freund, ein Kamel,]  
 give wanted she a friend a camel  
 'She wanted to give a friend a camel (as a present).'

According to an influential line of thought, initiated by Thiersch (1985) and den Besten and Webelhuth (1987), remnant topicalization is the product of extracting the remnant out of the VP prior to fronting of the highest VP-projection, as in (21).<sup>8</sup>

Applying the remnant movement algorithm to Pesetsky's Paradox yields the derivation in (22), which is strongly reminiscent of the Pseudogapping analysis developed by Jayaseelan (1990), Lasnik (1995) and Johnson (1996). The PP adjunct originates VP-internally and adjoins to node above VP prior to VP-topicalization.<sup>9</sup>

- (22) John intended to [<sub>VP</sub> give the books to the children], and (= (2))  
 [<sub>VP</sub> give the books to them<sub>i</sub>] he did on each other<sub>j</sub>'s birthdays.



At LF, the adjunct remnant reconstructs into its base position. Since the pronoun *them* c-commands the VP-internal copy of the PP, Principle A is observed, and c-command and constituency are no longer at conflict.

The remnant movement account needs to meet two criteria in order to qualify as a

<sup>8</sup>On an alternative conception, the category that moves is smaller than the topmost VP-shell and does not contain traces of the remnants (see e.g. Fanselow 1983). At the moment, the debate surrounding this issue has not been resolved yet conclusively, both options have arguments in their favor (but see Lechner, to appear).

<sup>9</sup>Nothing bears on the question whether the adjunct moves to the right or to the left.

plausible alternative to the parsing solution. First, it has to be clarified which type of dislocation process is involved in the remnant movement step which precedes VP-fronting. For some speculative remarks on this issue, I refer to appendix I. Second, it has to be demonstrated that the analysis has a wider empirical coverage than the Incremental Merger account. As it turns out, the remnant movement analysis immediately removes two of the three problems for the Incremental Merger which were identified in the previous section. To begin with, one is now correctly lead to expect that the remnant and its trace must not be separated by islands, as movement has to proceed locally:

- (23) She attempted to refute the allegation that *they*<sub>i</sub> met on *each other*<sub>j</sub>'s birthdays  
 a. ...and [<sub>VP</sub> refute the allegation that *they*<sub>i</sub> met on *each other*<sub>j</sub>'s birthdays] she did  
 b. \*...and [<sub>VP</sub> refute the allegation that *they*<sub>i</sub> met]<sub>i</sub> she did [on *each other*<sub>j</sub>'s birthdays]

Moreover, the assumption that remnants reach their surface position by overt movement implies that quantificational remnants need to take scope above VP-internal operators (Scope Freezing):

- (17)b David planned to give every handout to one of the students  
 and [<sub>VP</sub> give every handout] David did to one of the students \*A<E>E>A

This follows from the assumption that quantifiers which have been overtly moved out of fronted predicates are - for whatever reason - frozen in scope.

The third problem which the Incremental Merger hypothesis encountered related to a two-way contrast between adjunct remnants in VP-F and VP-E. Recall that remnants appear to be within the binding scope of VP-internal categories if they are generated in the antecedent conjunct of VP-E and in contexts of VP-F, but not if they are part of the elliptical clause of VP-E. Transposing this observation to the remnant movement analysis, one is led to conclude that adjunct remnants reconstruct in VP-F and in the first conjunct of VP-E, but not in the second conjunct of VP-E. So far, the remnant movement account fails to provide an insight into this curious property of adjunct remnants.<sup>10</sup> The analysis will for this reason be modified in the following section.

#### 4. Adjunct Remnants

Before proceeding to the proposal for the reconstruction asymmetries in VP-F and VP-E

<sup>10</sup>Reconstruction of argument remnants is regulated by the same principles governing reconstruction of wh-moved NPs (Freidin 1986; Lebeaux 1988, 1990). For one, remnants reconstruct for Principle C even in the elliptical conjunct of VP-E, but only if the name resides within an argument (Sauerland 1998b: 114; (78)):

- (i) a. \*While some believed him, everything, others did only the story that John<sub>i</sub> had met aliens.  
 b. While some believed him, everything, others did only the story that John<sub>i</sub> had evidence for.

Moreover, arguments which embed anaphors or bound variable pronouns appear to reconstruct indiscriminately in Pseudogapping (i.e. VP-E) as well as in VP-F. The proper binding relations can be repaired in all contexts because the remnant strands a copy in object position. (On copies of adjunct remnants see section 4.)

- (ii) We will introduce *every girl*<sub>i</sub> to *her*<sub>i</sub> Spanish teacher, and you will to *her*<sub>i</sub> driving instructor.  
 (iii) (?)We will introduce *the girls*<sub>i</sub> to *each other*<sub>j</sub>'s supervisors, and you will to *each other*<sub>j</sub>'s parents.

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(§4.2), I will lay out some background assumptions about the licensing mechanism of VP-E and about clause structure and the position of VP-adjuncts (§4.1).

#### 4.1. Assumptions: VP-Ellipsis and the Position of Adjuncts

Unlike Phillips (1996), I adopt a hypothesis more in line with recent research on ellipsis, according to which VP-E is sufficiently licensed by semantic parallelism, and does not require strict LF-identity between the ellipsis and its antecedent. Without going into the details, semantic theories of ellipsis converge on the assumption that in VP-E, the semantic value of the antecedent clause has to be an element of the focus semantic value of ellipsis (see e.g. Fox 1999; Rooth 1992). This conception has the favorable effect that focused constituents are ignored for the computation of parallelism (Sauerland 1998b).

In addition, VP-E is subject to a syntactic requirement that the elided category (*gave the books to them*) has to form a constituent to the exclusion of the remnants in overt syntax. Hence, remnants in the ellipsis clause cannot be contained inside the ellipsis. This aspect will be taken up again in the discussion of the predictions the system entails for the analysis of remnants in VP-E and VP-F.

Turning to the background on clause structure, it is a widely held belief - first advanced in Larson (1988), and more recently articulated in Haider (1993) and Kayne (1994) - that postnominal adverbials in English are parsed into a low position within a right-branching VP which is c-commanded by the verbal arguments (see also McConnell-Ginet 1982). Strong evidence in favor of the structural organization of English VPs along these lines comes from the observation that precedence within the VP directly translates into c-command (Barss and Lasnik 1986; Ernst 2000 and references therein):

- (24) a. She [<sub>VP</sub> met<sub>k</sub> [<sub>VP</sub> no boy, t<sub>k</sub> [on his<sub>i</sub> birthday]]]  
 b. I [<sub>VP</sub> visited<sub>k</sub> [<sub>VP</sub> the boys<sub>i</sub>, t<sub>k</sub> [on each other<sub>j</sub>'s birthdays]]]  
 c. \*We [<sub>VP</sub> visited<sub>k</sub> [<sub>VP</sub> him, t<sub>k</sub> [in Sam<sub>i</sub>'s house]]]

Surface word order in (24) results from overt verb movement into the head of a higher VP-shell to the left of the internal arguments. As verbs are invariably interpreted in their base position (vd. e.g. Bittner 1994), the verb forms a constituent in semantics with postnominal adjuncts which excludes the internal arguments, though.<sup>11</sup> In semantics, the verb therefore has to combine with postnominal adjuncts first, before it can be joined with its internal arguments. But this conception is incompatible with the conjunction of two basic assumptions about the mapping from overt syntax to semantics: (i) the 'ordered argument approach' towards argument association (to use the terminology of Dowty 1989), which maintains that the arity of a predicate is reflected in its semantic type, and (ii) the hypothesis that arguments - or, to be precise, at least the internal arguments (see Kratzer 1996 and below) - semantically combine with their predicates by functional application. To illustrate, assume the standard view that verbs extensionally denote relations between individuals (ignoring event arguments for ease of exposition; nothing hinges on this, though). Transitive

<sup>11</sup>In a variant of the low-adjunct theory, postnominal adverbs are generated inbetween arguments and the verb, and the verb overtly climbs to a position above the highest adverb (Alexiadou 1997; Cinque 1999).

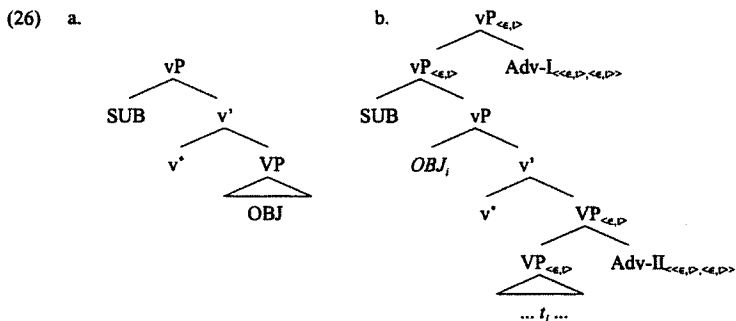
verbs are then of type  $\langle e, \langle e, t \rangle \rangle$ . Suppose moreover that VP-adverbs such as *in Sam's house* in (24)c are modeled as predicate modifiers of type  $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ :

(25) [visit in Sam's house] = [visit] <sub>$\langle e, \langle e, t \rangle \rangle$</sub>  [in Sam's house] <sub>$\langle \langle e, t \rangle, \langle e, t \rangle \rangle$</sub>  (Type mismatch)

It follows that due to type mismatch, the minimal node containing *meet* and *in Sam's house* in (24)c cannot be assigned a meaning.

The literature provides two strategies to avoid this complication: On the one side one could give up the assumption that transitive verbs denote two-place relations between individuals in favor of a Neo-Davidsonian semantics (Castañeda 1967; Parsons 1990). On this perspective, verbs and their arguments as well as adverbs denote predicates of eventualities, which can directly combine with each other in any order. The Neo-Davidsonian approach comes however at the cost of losing the means to encode the arity of a predicate, and thereby the distinction between intransitive, transitive and ditransitive verbs. I will for this reason pursue an alternative solution instead, which uses a more orthodox syntax for VP-adverbs by parsing them in a position where they are directly interpretable and which at the same time preserves the insights of the ordered argument approach.<sup>12</sup>

More specifically, the proposal rests upon the following assumptions: In transitive and ditransitive constructions, the lower (VP) projection of an articulated shell structure embeds the verb and its internal arguments, while the higher projection (vP) hosts the subject and the Case positions for objects (Chomsky 1995, 1998), as shown in (26)a:



Objects move from inside VP to layered specifiers of vP in course of the derivation to check their Case features. Thus, SpecvP qualifies as an 'A-position', which licenses binding relations. Following Kratzer (1996), I assume that this bifurcation in the projection of internal and external arguments is also reflected in the semantics of verbs. For Kratzer, the lexical entry of the verb specifies the number of internal arguments but does not select for the external argument, which is added by the v\* ('Voice') head above VP. In addition to argument slots for direct and indirect objects, verbal predicates contain event argument

<sup>12</sup>Two further options come to mind: First, it would be possible to treat adjuncts as arguments, as in McConnell-Ginet (1982). Second, adjuncts could be assumed to move to a position where they are interpretable.

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positions (Davidson 1967; Higginbotham 1985). On this view, both VP and vP denote predicates of events (type  $\langle e, t \rangle$ ), as illustrated by the typed tree (26)b. Finally, VP-modifiers denote modifiers of predicates of events ( $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ ).

Given these rather standard syntactic and semantic assumptions, it follows that the lowest position into which VP-modifiers can be merged is the VP-adjunction site Adv-II in (26)b. However, this is not the only position in which VP-adverbs can be generated, they may also originate in a second designated slot, the vP-adjoined position Adv-I. The next section explores the consequences of the two-adjunct hypothesis for the analysis of reconstruction asymmetries in VP-F and VP-E.

#### 4.2. Adjunct Reconstruction in VP-E and VP-F

##### 4.2.1. VP-Ellipsis

Turning to VP-ellipsis first, recall that the diagnostics from Principle A, variable binding and disjoint reference effects indicated that adjunct remnants reside in the scope of objects if they are part of the antecedent clause, but not if they modify the ellipsis clause. One of the relevant paradigms (involving Principle C) is repeated from above:

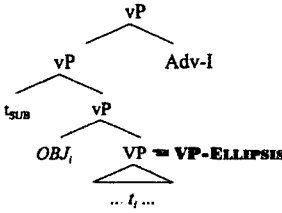
- (14) a. \*?John gave the books to her<sub>i</sub> on Mary<sub>j</sub>'s birthday and Jill did at Christmas.  
 b. (?John gave the books to her<sub>i</sub> at Christmas and Jill did on Mary<sub>j</sub>'s birthday.

The present system accounts for this disparity without any further substantial additions.

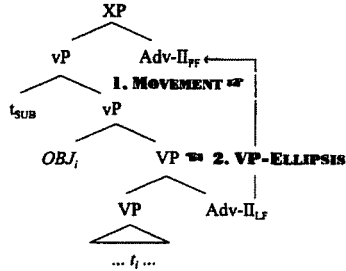
On the null-hypothesis to be adopted here, VP-E may target any maximal projection in the VP-shell - i.e. either the lower VP or the higher vP - given that semantic parallelism is met. For reasons of concreteness, suppose that syntactically, the ellipsis operation is encoded as a feature which is assigned to a maximal projection and is interpreted as an instruction to forego phonetic spell-out of this node. Moreover, recall that there are two positions in which adjuncts can be merged. This yields four combinatorial options to derive a string in which an adjunct remnant follows an elided VP, as documented in (27). To begin with, the desired configuration can be arrived at by merging the adjunct high in Adv-I and phonological suppression of the lower VP-shell, as in (27)a. Note that in (27)a, the adjunct does not reside within the c-command domain of objects, which move to SpecvP. Next, the same surface string can be derived by merging the adjunct low, in Adv-II, followed by movement of the remnant prior to the application of ellipsis. Ellipsis may target VP, as in (27)b, or vP, as in (27)c. Since adjunct movement strands a copy in Adv-II, objects in SpecvP may now take scope over low adjuncts. Finally, the fourth possible derivation (27)d combines high merger with ellipsis of vP, and also involves adjunct movement.

(27) \*... and Mary [<sub>Ellipsis</sub> gave the books to *them*<sub>i</sub>] on *each other's* first day of school

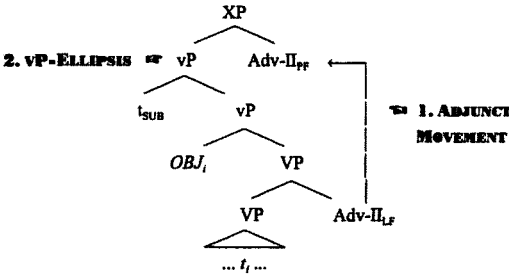
a. ✓ High Merger with vP (Adv-I)  
+ VP-Ellipsis



b. ✗ Low Merger with VP (Adv-II)  
+ VP-Ellipsis  
+ Adjunct Movement



c. ✗ Low Merger with VP (Adv-II)  
+ vP-Ellipsis  
+ Adjunct Movement



d. ✗ High Merger with vP (Adv-I)  
+ vP-Ellipsis  
+ Adjunct Movement

Observe at this point that the four strategies do not harmonize equally well with the general economy metric on movement. In particular, the derivations (27)b and (27)c in terms of low attachment necessitates an additional movement operation which is not required if the adjunct is merged high, as in (27)a (these considerations carry over to (27)d). Low attachment at Adv-II in (27)b and (27)c will for this reason be blocked in favor of high Merger in Adv-I, as in (27)a. Thus, economy ensures that whenever the VP elides, adjuncts are introduced in a position which resides *outside* the scope of objects. The absence of adjunct reconstruction within the elliptical conjunct is thereby reduced to the interaction between two factors: (i) the hypothesis that VP-adjuncts may be inserted wherever they are

interpretable and (ii) general economy conditions on movement.<sup>13</sup>

As already foreshadowed in the introduction, the analysis has an interesting consequence for the definition of the domains within which economy competition is calculated. Observe that in the derivation of the ellipsis clause, movement is triggered by the need of the adjunct to escape the ellipsis site. But for low adjuncts in Adv-II, this need emerges only once the whole vP has been assembled and elided (vd. (27)b). The economy metric can therefore identify the optimal candidate only once the derivation has reached the higher adjunct position vP. It follows as a corollary that economy cannot be computed in a strictly local fashion, but needs to have access to larger information units (such as phrases).

Next, consider why adjuncts necessarily reconstruct into the antecedent VP, i.e. why they have to be merged into the lower adjunct position Adv-II (as can be seen from the Principle C effect in (14)b). The answer to this question has two parts to it. First, remnants in the antecedent clause *can* be merged low because they do not need to move to a higher position in course of the derivation (the VP is not elided). Furthermore, since adjunct remnants bear focus, and focused categories are ignored for the computation of semantic parallelism (vd. 4.1), elliptical conjuncts in which the adjunct is parsed low inside the antecedent VP also observe the licensing condition on VP-E.

As a second ingredient, the analysis has to be supplemented by a principle which ensures that in the absence of ellipsis, low attachment of adjuncts at Adv-II is preferred over high merger into Adv-I. This principle could be related to two independent factors. First, it can be interpreted as an instance of the Earliness Principle (Pesetsky 1989), which holds that operations should be executed as early as possible. Assuming that Earliness also demands that elements in a subarray are merged as early as possible, thereby leading to a rapid exhaustion of the subarray, early - i.e. low - attachment is preferred over late merger. Alternatively, low attachment follows from theories of phrase structure on which precedence is mapped onto c-command (Haider 1993; Kayne 1994<sup>14</sup>). Thus, independent factors will ensure that adjunct remnants in the antecedent clause not only *can* but also *have to* be merged low into the antecedent clause, accounting for the disjoint reference effect observed in (14)b. (See appendix II for a speculation along another line.)

To recapitulate, adjunct remnants inside the ellipsis clause are merged high (Adv-I), because otherwise, they would have to move overtly to a position above the ellipsis site. It follows that adjuncts are located outside the c-command domain of objects. In the antecedent clause - as well as in regular VPs - adjuncts are generated low and therefore appear to reconstruct for the verification of interpretive principles.

#### 4.2.2. VP-Fronting

Proceeding to remnant reconstruction in VP-F next, recall that VP-F differs from VP-E in

<sup>13</sup>Note that a further derivation, in which the adjunct is merged into Adv-II, followed by ellipsis of the lower segment of VP, can be excluded by the plausible condition that VP-E may only affect maximal projections and not just segments. This fifth parse, which does not imply adjunct movement, would illegitimately lead to a configuration in which objects obtain scope over the adjunct. The prohibition against deletion of segments can furthermore be derived from the assumption that adjuncts are (special kinds of) specifiers (Kayne 1994). On this conception, ellipsis must not target a lower segment to the exclusion of adjuncts (i.e. specifiers), because no operation may affect a node to the exclusion of its specifiers.

<sup>14</sup>In (27), adjuncts are right-adjoined in order to be able to abstract away from the effects of verb movement. Nothing bears on this issue, though. Adjuncts could also be left-adjoined, in line with Kayne (1994).



that adjuncts reconstruct into the binding scope of VP-internal NPs:

- (2) John intended to give the book to the children, and  
 [<sub>VP</sub> give the books to *them*]<sub>i</sub> he did on *each other*<sub>i</sub>'s birthdays

Moreover, the fact that a remnant-internal name may corefer with a pronoun inside the topicalized VP attests to the fact that adjunct reconstruction in VP-F is optional:

- (28) John promised to give the books to her next year, and  
 give the books to *her*<sub>i</sub> he did on *Mary*<sub>i</sub>'s birthday.

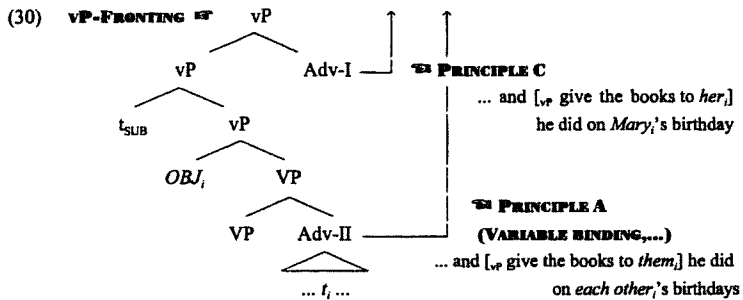
Thus, the behavior of adjunct remnants stranded by VP-F matches neither that of adjuncts inside the first nor that of adjuncts in the second conjunct of VP-E.

This peculiar imbalance in the behavior of adjuncts can be linked to an independent property characteristic of VP-F. VP-F may - in contrast to VP-E - not apply freely to any maximal projection, but has to target the highest verbal projection (i.e. vP). Evidence to this effect comes from Huang's (1993) interpretation of Barss's (1986) observation that fronted predicates fail to display Multiple Binding Domain Effects:

- (29) a. [Which book about herself] does she think he is reading  
 b. \*...and [<sub>VP</sub> *t<sub>i</sub>* reading a book about herself] she thinks he<sub>k</sub> is

Huang suggests that the reflexive *herself* in (29)b cannot be licensed by the matrix subject *she*, because the fronted predicate pied-pipes the trace of the subject (*t<sub>i</sub>*), which accordingly serves as a closer potential binder. Since subjects originate in vP (Chomsky 1995; Kratzer 1996), it follows that VP-fronting must target the higher projection vP, and not VP.<sup>13</sup>

This additional restriction on VP-F provides a straightforward explanation for the optionality of adjunct reconstruction. As shown by (30), the prohibition on topicalization of VP entails that the adjunct remnant has to escape the ellipsis site by overt movement, irrespective whether it is merged high or low.



<sup>13</sup>The prohibition on movement of VP can be made to follow from the Minimal Link Condition, because vP is closer to the attracting head than VP.

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Crucially, since the derivation involves one movement operation in any case, the adjunct remnant can be merged either high or low, resulting in the appearance of optional reconstruction. If the adjunct is merged low, it reconstructs for the assessment of Principle A (see (2)). High attachment leads on the other side to Principle C obviation in (28).

A potential problem has to be addressed at this point. Evidently, the two movement operations in (30) are not of equal length, and one might object that the MLC should prefer high over low attachment. There is however independent evidence that Adv-I and Adv-II count as equidistant from higher attractors, licensing low merger. A first indication supporting this view comes from the observation that adjuncts fail to trigger Superiority violations among each other, signaling that adjuncts can be generated in positions which are equidistant from higher attractors.

- (31) a. Where did you sleep when  
b. When did you sleep where

However, (31) does not yet conclusively demonstrate that Adv-I and Adv-II are equidistant from higher attractors, as *where* and *when* could either be both generated in Adv-I or both originate in Adv-II. A more reliable test can be based on examples of VP-F with two adjunct remnants. The remnants have to be chosen in such a way that one of them is merged in Adv-I, whereas the other is generated in Adv-II. This can be achieved by (i) embedding a name inside one of the remnants which is to be construed coreferential with a pronoun inside the fronted VP (the remnant therefore needs to originate high in Adv-I) and by (ii) embedding an anaphor inside the other remnant which is to be bound by the pronoun inside the fronted VP (ensuring that the remnant is merged low in Adv-II). On the assumption that Adv-I and Adv-II are equidistant from higher attractors, the remnants should now be able to undergo movement in any order. Thus, one is led to expect that the two remnants may surface in either order (on the relation between surface order and order of movement see e.g. Richards 1997).

Turning to the data, the control in (32) exemplifies VP-F with two adverbial remnants (Pesetsky 1995: 230):

- (32) John said he would give the books to them in one of the gardens,  
... and [<sub>VP</sub> give the books to *them<sub>i</sub>*] he did [<sub>Remnant-II</sub> in the garden]<sub>[Remnant-I</sub> on each other<sub>i</sub>'s birthday] Pesetsky (1995: 230, (570c))

As illustrated by the examples in (33), a high and a low remnant may surface in the order Remnant-I - Remnant-II ('Remnant-I' is mnemonic for 'generated in Adv-I'):

- (33) ... and [<sub>VP</sub> give the books to *them<sub>i</sub>*] he did  
[<sub>Remnant-I</sub> in the children<sub>i</sub>'s garden]<sub>[Remnant-II</sub> on each other<sub>i</sub>'s birthday]

But the two remnants may also reach their surface position by crossing paths, leading to the order preserving linearization (low) Remnant-II - (high) Remnant-I, as in (34):

- (34) ... and [<sub>VP</sub> give the books to *them<sub>i</sub>*] he did  
[<sub>Remnant-II</sub> on each other<sub>i</sub>'s birthday] [<sub>Remnant-I</sub> in the children<sub>i</sub>'s garden]

What is important for present purposes is that (33) and (34) can be given a consistent analysis only on the assumption that Adv-I and Adv-II are equidistant.<sup>16</sup> It can be concluded that there is no inherent preference for merging adjunct remnants high, as maintained by the account of optional adjunct reconstruction presented above.

## 5. Conclusion

The present paper pursued the goal of providing evidence in support of three conclusions pertaining to the analysis of PS-paradoxa and related constructions of Pseudogapping.

First, the parsing account of Pesetsky's Paradox and Pseudogapping developed in Phillips (1996) fails to account for three essential properties of the two constructions (Scope Freezing, binding scope of adjuncts and locality effects). Second, Pesetsky's Paradox lends itself to a remnant movement approach, which eliminated two of the three problems for the parsing analysis. It lacks however the means to express the complex distribution of adjunct reconstruction in VP-F and VP-E. Thirdly, the behavior of adjunct remnants falls out from an analysis which combines a flexible syntax for adjuncts with general principles of economy and interpretation. More specifically, I advanced the hypothesis that (temporal and local) VP-adjuncts can originate in at least two discrete positions in the tree. The actual choice of the position into which an adjunct is merged is determined by two factors: (i) independent conditions on VP-F and VP-E and (ii) economy principles, which minimize movement operations.

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<sup>16</sup>Note that the same conclusion applies if the remnants are assumed to be generated to the left, or if they were to move left-wards.

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