

Interactions between Constructions and Constraints in VP Ellipsis and VP Fronting*

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0. Introduction

English VP Ellipsis (VPE) has been traditionally regarded as a process that maps a ‘syntactically complete’ sentence like (1a) onto a ‘syntactically incomplete’ one, like (1b), that is semantically equivalent to it (cf. Sag 1976).

- (1) a. John could leave before I could leave.
b. John could leave before I could.

As pointed out in many places, one of the striking properties of VPE is that unlike phenomena such as gapping and comparative deletion, VPE does not obey sentence grammar rules (see Chao 1987, Johnson 2001, Lobeck 1995, Williams 1977, among others). Following are some of the main properties of VPE:

- VPE can appear across utterance boundaries:

- (2) A: Tom won’t leave Seoul soon.
B: I don’t think Mary will __ either.

- VPE can occur in either a subordinate or coordinate clause separate from the clause containing its antecedent:

- (3) a. Mary met Bill at Stanford although Sue didn’t __ .
b. Tom thinks that Mary met Bill at Stanford, but Sarah knows that Sue didn’t __ .

- VPE obeys the Backwards Anaphora Constraint. As in (4), the ellipsis can precede, but not command, its antecedent (cf. Langacker 1966):

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- (4) a. *Sue didn't [e] but John ate meat.
b. Because Sue didn't [e], John ate meat.
- VPE operates only on phrasal categories, as in (5).
- (5) a. *Mary will meet Bill at Stanford because she didn't __ John.
b. Mary will meet Bill at Stanford because she didn't __ at Harvard.
- VPE violates island constraints (cf. Napoli 1985):
- (6) a. John didn't hit a home run, but I know a woman who did __. (CNPC)
b. That Betsy won the batting crown is not surprising, but that Peter didn't know she did __ is indeed surprising. (SSC)
c. Peter never hit a home run, but Betsy did and she was very happy about it. (CSC)
- VPE can induce ambiguity, implying that in determining the antecedent of an elided VP we must take into account its context.
- (7) Although Mary could have __, John decided to open the door. (*could have decided/could have opened*).
- VPE allows split antecedents, as illustrated in (8).
- (8) John was going to write a letter and Sue was going to send flowers, but one of them didn't __. (*write a letter and send flowers*).

Such properties have led Williams (1977) and others to treat VPE within Discourse Grammar differently from Sentence Grammar. Among several research issues in the analysis of VPE, this paper deals with the syntactic environment of VPE licensing within the framework of Head-Driven Phrase Structure Grammar (HPSG). In particular, it argues that language constraints on argument realization for auxiliary verbs and relevant constructions can provide a clean analysis of puzzling VPE and VP fronting phenomena.

1. VP Ellipsis

1.1. VPE in General Cases

The standard generalization of VPE is that it is possible only after an auxiliary verb, as shown in the contrast between (9) and (10).

- (9) a. Kim can dance, and Sandy can __, too.
b. Kim has danced, and Sandy has __, too.
c. Kim was dancing, and Sandy was __, too.

VP Ellipsis and VP Fronting

- (10) a. *Kim considered joining the navy, but I never considered __ .
b. *Kim got arrested by the CIA, and Sandy got __ , also.
c. *Kim wanted to go and Sandy wanted __ , too.

The first issue in the analysis of VPE is the status of the elided VP. Following Lobeck (1995), López (2000), and Hardt (1999), among others, I take the elided VP phrase to be a *pro* element. The properties of the VPE we have seen in the beginning can be also found in pronouns. First of all, pronouns are phrases and can appear across utterance boundaries, as in (11). In addition, they can occur in coordinate or subordinate clauses, as in (12), are subject to the Backwards Anaphora Constraint, as in (13), can violate island constraints, as in (14), and can even have split antecedents, as in (15).

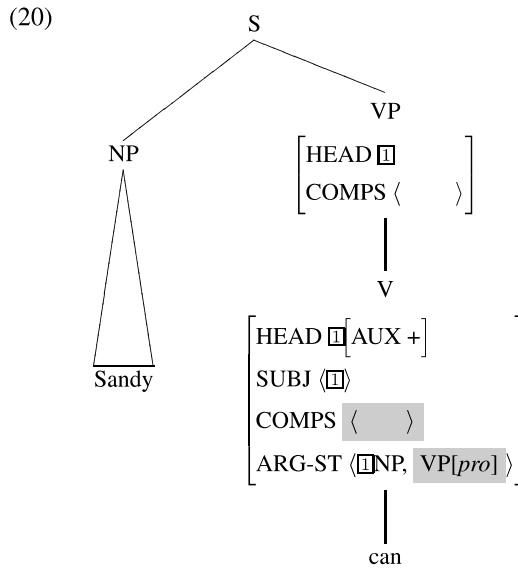
- (11) A: Does John eat fish?
B: Yes, but **he** hates it.
- (12) John eats fish because/and **he** hates meat.
- (13) a. Because **he** doesn't like meat, John ate fish.
b. ***He** doesn't like meat because John hates killing animals.
- (14) Bill really likes his new car. I think that the fact that **it** is an antique was a big selling point.
- (15) John arrived and later Susan arrived. **They** left together.

In accounting for the *pro*-drop phenomenon exemplified by Korean sentences like (16), we do not need to posit a phonologically empty pronoun if a level of argument structure is available (cf. Bresnan 1982, Bender 2000):

- (16) John-i *pro* *poassta*.
John-NOM saw
'John saw (him).'

We can simply encode the pronominal properties in the argument structure. For example, as represented within the feature structure of HPSG, illustrated in (17), the transitive verb *poassta* 'saw' takes a *pro* object NP as its argument, but the *pro* NP is not instantiated as the syntactic complement of the verb (as marked by the shaded area):

VP Ellipsis and VP Fronting



In the structure of (20), the head daughter's COMPS list (VP[*pro*]) is elided and is not realized in the syntax. The sentences in (9b) and (9c) are also such cases: verbs such as *has* and *was* are auxiliary verbs ([+AUX]) and subcategorize for a VP complement. Thus, their VP complement can be elided but not that of the main verbs in (10). In the same manner, this analysis will easily generate examples like (21).

- (21) Kim must have been dancing and $\left\{ \begin{array}{l} \text{a. Sandy must have been __, too.} \\ \text{b. Sandy must have __, too.} \\ \text{c. Sandy must __, too.} \end{array} \right\}$

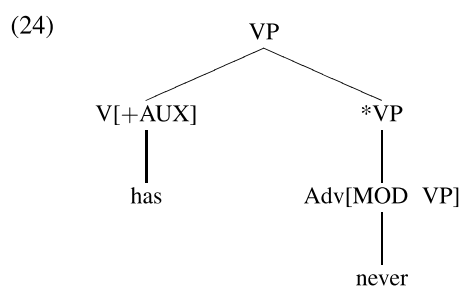
One important constraint on VPE is that it cannot apply immediately after an adverb, as illustrated in (22):

- (22) a. Tom has written a novel, but Peter never has __.
 b. *Tom has written a novel, but Peter has never __.

One simple fact we can observe from (22) is that adverbs cannot modify an empty VP. In the framework of HPSG, VP modifying adverbs carry at least the lexical information given in (23).

- (23) $\left[\begin{array}{l} \text{HEAD } \left[\begin{array}{l} \textit{adv} \\ \text{MOD VP:} \boxed{2} \end{array} \right] \\ \text{CONTENT } \left[\begin{array}{l} \textit{adv-rel} \\ \text{ARG } \boxed{2} \end{array} \right] \end{array} \right]$

The lexical entry in (23) simply states that the adverb with this lexical information modifies a VP. The head feature MOD guarantees the fact that the adverb selects the head VP it modifies. This then entails that when the VP that an adverb modifies is not syntactically realized as in (22b), there is no VP for the adverb to modify. Given Sag and Fodor's (1994) traceless theory,¹ an ungrammatical example like (22b) then would have the structure given in (24).²



This explains the unacceptability of VPE after an adverb (cf. Kim 2000).

This analysis also can provide a simple analysis for the puzzling property with respect to the negator *not*: it is possible to strand the negator *not* in VPE when it follows a finite auxiliary, but not when it follows a nonfinite auxiliary verb.

- (25) a. Kim said he could have heard the news, but Lee said that he could not
 __ .
 b. *Kim said he could have heard the news, but Lee said that he could have
 not __ .

Following the analysis of Warner (2000), Kim (2000), and Kim and Sag (2001), I adopt the idea that the English negator *not* leads a double life: one as a nonfinite VP modifier when it is constituent negation and the other as a complement of a finite

¹ See Sag and Fodor (1994) for the critical reviews of positing phonetically empty categories.

² But notice that we have a different prediction for modifiers in VP final position:

- (i) a. Tom will not finish his book on Monday, but Kim [[will __] on Tuesday].
 b. Kim will not eat the fish with knife, but Kim [[will __] with chopsticks].

The adverbial elements here are right-adjoined to the VP headed by the auxiliary *will*. This means that there is a VP head daughter the adverbials *on Tuesday* and *with chopsticks* can modify. A similar observation can be found in the contrast between VP final adverbs and VP initial adverbs:

- (ii) a. Kim has been driving the car carelessly, but Mary [[has __] carefully].
 b. *Lee is simply being a student, but Kim is not [simply [__]].

Though the adverb *carefully* modifies the VP headed by *has*, *simply* has nothing to modify. See Kim (2000) for further discussion.

Jong-Bok Kim

However, an issue arises from the VPE in rationale clauses or in purpose clauses. As noted by Lobeck (1987) and others, in such clauses the auxiliary infinitive marker *to* does not license VPE:

- (29) a. *Mag Wildwood came to read Fred's story, and I also came to __ .
b. *John selected Bill to talk to the reporters yesterday, but today he chose Ralph to __ .

The generalization we can draw from such a contrast is that VPE is licensed in an infinitive when the infinitive clause is lexically selected (see Lobeck (1987) for a similar generalization). This could be further supported by the contrast in (30).

- (30) a. Even though he doesn't like to __ , Ron jogs every day.
b. *Even though he could jog to __ , Rob doesn't do anything to stay in shape.

This restriction can be interpreted as a constructional constraint on *ellipsis-ph* in (31).

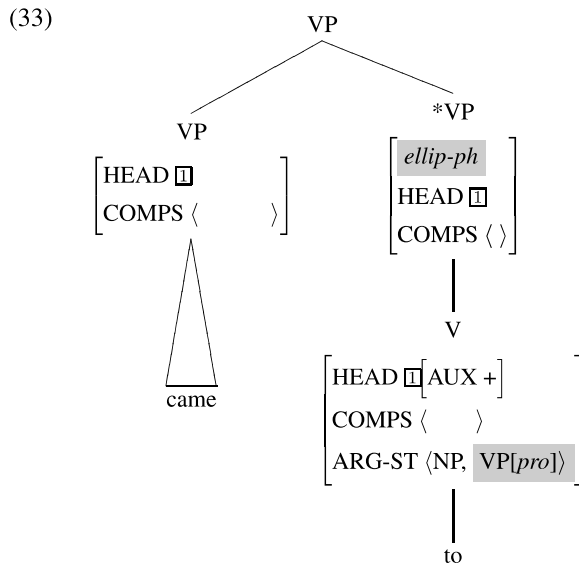
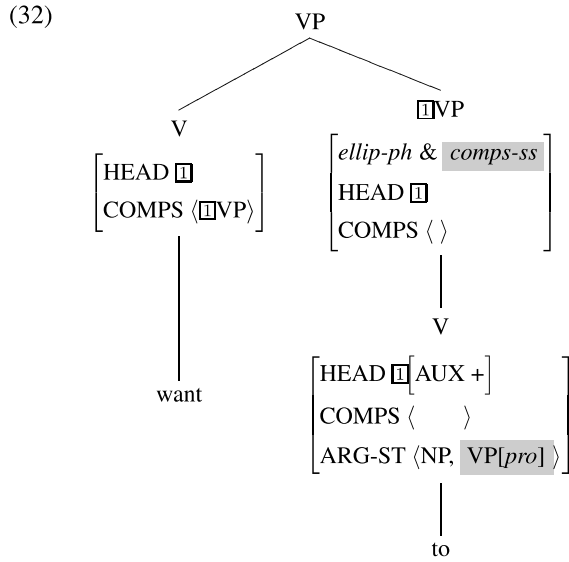
- (31) *ellipsis-ph*

$$\left[\textit{fin-vp} \vee \textit{comps-ss} \right] \rightarrow \mathbf{H[AUX +]}, \dots$$

What the constraint in (31) ensures is that the *ellipsis-ph* itself should be either a finite clause or an element of the COMPS list. This in turn means that only a complement infinitival VP clause could serve as a VP ellipsis phrase, but not a purpose or rationale clause which is not lexically selected.

This analysis would generate the structure (32) for (28a) and (33) for the sentence (29a):

VP Ellipsis and VP Fronting



As marked by the shaded area in (32) and (33), the marker *to* in both cases selects a base VP as its complement, and hence it can be unrealized in syntax in accordance with the Argument Realization Constraint on auxiliary verbs. But the constraint on *ellipsis-ph* requires the phrase to be *comps-synsem*: Only the VP structure in (32) observes this.

One immediate consequence of this analysis is a clean account of so-called extraposed cases like (34), which have often been treated as a movement process.

- (34) a. You shouldn't talk to reporters because it is dangerous to __.
 b. It doesn't bother Mary to tour art galleries, but it certainly annoys Bill to __.

In a lexicalist perspective, the adjective *dangerous* and the verb *annoys* in such cases will have at least the lexical information given in (35).

- (35) a. *dangerous*: [COMPS ⟨VP[inf]⟩] b. *annoys*: [COMPS ⟨NP, VP[inf]⟩]

Since the infinitival VP is within the list of COMPS, it could serve as an *ellipsis-ph*. But the ellipsis is blocked in the preverbal infinitival subject position as represented in (36):⁴

- (36) a. *You shouldn't talk to reporters because [to __] is dangerous.
 b. *It doesn't bother Mary to tour art galleries, but [to __] certainly annoys Bill.

The reason for the ungrammaticality of these examples comes from the constructional constraint in (31). No *subject-ss* can serve as an ellipsis phrase. The predicates *dangerous* and *annoys* in (36) would have the lexical information given in (37a) and (37b).

- (37) a. *dangerous* in (36)a: b. *annoys* in (36)b:
 [SUBJ ⟨VP[inf]⟩] [SUBJ ⟨VP[inf]⟩]
 [COMPS ⟨ ⟩] [COMPS ⟨NP⟩]

The infinitival VP here is not a *comps-ss* but a *subj-ss* which must be realized in syntax.

⁴ VPE in infinitives is grammatical when the negative marker *not* precedes *to* in infinitival subjects and adjuncts.

- (i) a. Mary wants to try to get a raise, because [not [to __]] would be silly.
 b. Mary wants to get a raise, and for her [not [to __]], she'd have to refuse to be evaluated.
 (ii) a. Mag came to introduce the barkeep but I came [not to __].
 b. John recounted a story to remember because Bill had recounted a story [not to __].

The data suggest that the infinitival phrase modified by an adverbial element can also serve as an *ellipsis-ph*. But when *not* follows *to*, no VPE is allowed, as our analysis predicts:

- (iii) *John prefers to talk to Mary, but Bill would like to not __ can help it.

2. VP Fronting

Now, let us consider the phenomenon often referred to as VP fronting, given in (38a).

- (38) Mary claimed that
- a. eat bananas, John would __
 - b. *eating bananas, John started __.
 - c. *eat bananas, John made me __.

The first thing we notice is that VPF cannot be identified with VPE because of ungrammatical cases like those given in (39b) and (39c).

- (39) They swore that Lee might have been using heroin, and
- a. using heroin he might have **been** __ !
 - b. *been using heroin he might **have** __ !
 - c. *have been using heroin he **might** __ ! (Akamajian et al. 1979)

If any constituent that can undergo VPE can also be VP-fronted, we would expect that VPs headed by *been* or *have* would not be able to be elided. A simple generalization we can obtain from such data is that a fronted VP cannot be headed by an auxiliary element. This will block examples like (39b) and (39c).

However, this simple approximation is counterevidenced by examples like (40) (data from Gazdar et al. 1982):

- (40) a. *... and [to go] he is __ .
- b. *... and [be going] he will __ .
 - c. *... and [have gone] he will __ .
 - d. ... and [being evasive] he was __ .

Notice here that though the fronted VP in (40a-c) carries the [+AUX] value inherited from the head (*to*, *be* and *have*), they are all unacceptable. To overcome this issue, we assume that the progressive *be* and perfective *have* are aspect verbs ([+ASP(ECT)]) (cf. Gazdar et al. 1982) together with the constructional constraint in (41).

- (41) *vp-filler-ph*

$$[] \rightarrow \left[\begin{array}{l} \textit{filler} \\ \text{ASPECT} \quad - \\ \text{VFORM} \quad \neg \textit{inf} \\ \text{LOCAL} \quad \boxed{1} \end{array} \right] \left[\begin{array}{l} \text{H} \\ \text{SLASH} \quad \{ \boxed{1} \} \end{array} \right]$$

We thus accept the idea that VPF is different from VPE in that the former is a subtype of a *head-filler-ph* construction constituting a filler and a sentence with this filler as a gap. To allow a VP to be gapped, all we need to do is to slightly revise the Argument Realization Constraint on *auxiliary verbs* as in (42).

(42) Argument Realization Constraint on *aux-verbs* (final):

$$aux\text{-}verb \rightarrow \left[\begin{array}{ll} \text{SUBJ} & \boxed{A} \\ \text{COMPS} & \boxed{B} \\ \text{ARG-ST} & \boxed{A} \oplus \boxed{B} \oplus \text{list}(\text{XP}[\text{noncanon-ss}]) \end{array} \right]$$

This revised constraint tells that when the final member of the ARG-ST is realized as *noncanon-synsem* whose subtypes are *pro* and *gap-ss*, it does not appear in its COMPS list. Thus when it is realized as *pro*, it introduces *ellipsis-ph* and when it is realized as *gap*, the auxiliary verb lexically introduces a nonempty SLASH value in accordance with the constraint in (43)a. The information in (43)b is partial lexical information for the verb *was* in (40), whose VP complement is topicalized.

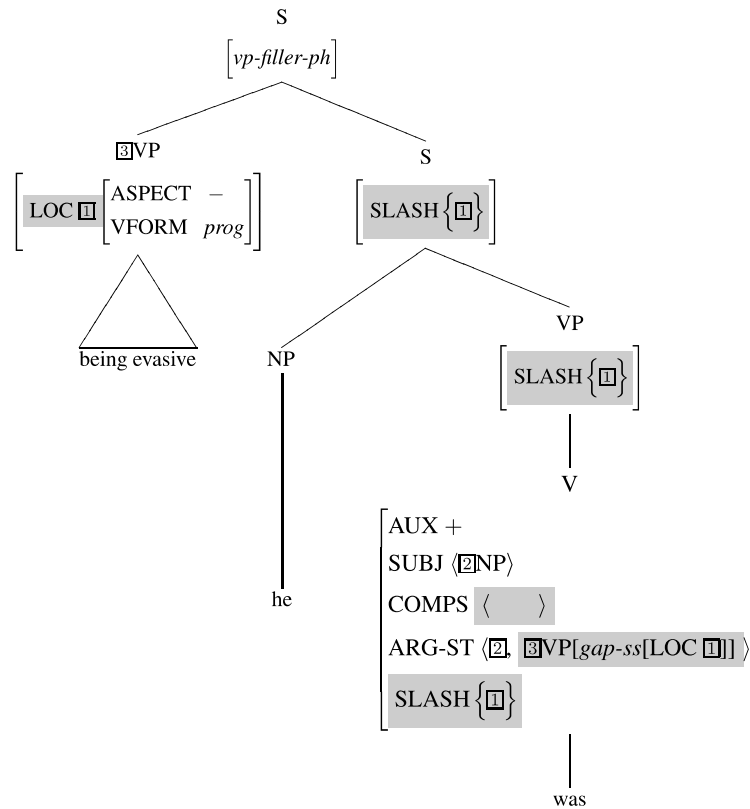
(43)

$$\text{a. } [gap\text{-}synsem] \rightarrow \left[\begin{array}{l} \text{LOC } \boxed{1} \\ \text{SLASH } \{ \boxed{1} \} \end{array} \right] \quad \text{b. } \left[\begin{array}{l} \textit{word} \\ \text{HEAD } [AUX +] \\ \text{SUBJ } \langle \boxed{2}NP \rangle \\ \text{COMPS } \langle \quad \rangle \\ \text{ARG-ST } \langle \boxed{2}, \text{VP} \left[\begin{array}{l} \textit{gap-ss} \\ \text{LOC } \boxed{1} \end{array} \right] \rangle \\ \text{SLASH } \{ \boxed{1} \} \end{array} \right]$$

This lexical information, together with the constraint on *gap-synsem*, would then generate the structure (44) for (40):

VP Ellipsis and VP Fronting

(44)



The current system that allows only the complement of an auxiliary verb ([AUX +]) to be realized in a nonlocal position (realized as a *gap-ss*) can easily block overgenerating cases such as those given in (45):

- (45) a. *I never thought that he would want to go, but [to go] he wanted __.
 b. *I never thought Lee would help move the chair, but [move the chair] Lee helped __.
 c. *I never thought Lee would stop feeding the dog, but [feeding the dog], Lee stopped __.

The constructional constraint in (41) also imposes constraints on its filler. The slashed VP should be [−ASP], i.e. not headed by progressive *be* or perfective *have*.⁵ By requiring such restrictions on the filler VP, we can account for the grammatical contrast in the following examples:

⁵ The filler also has the constraint that it should not be infinitive. Such a constraint will block examples like (43a) and (45a).

Jong-Bok Kim

- (46) a. *They said he would go, and $VP_{[+ASP]}$ [be going] he will __ .
b. *They said he would have finished it, and $VP_{[+ASP]}$ [have finished] he will __ .
c. They said he would be noisy, and $VP_{[-ASP]}$ [being noisy] he was __ .

As assumed, the progressive *be* and perfective *have* in (46a-b) are [+ASP]. The lexical rule specifies that the VP headed by either of these aspect verb cannot undergo the fronting process.

Taking VP fronting to be a special case of topicalization, the analysis also allows unbounded examples like (47) (data from Gazdar et al. 1982).

- (47) a. ... and [go], I think he will __ .
b. ... and [going], I believe Kim knew he was __ .
c. ... and [being evasive], I believe he knew he was __ .

Notice that this constructional analysis explicitly factors out the similarities and differences between VPF and VPE phenomena. VPF is relevant only to the phrase whose head is an auxiliary. This restriction similarly holds in VPE too. But the restriction on the aspectual value of the gapped VP complement makes them different: the head of the VP that undergoes fronting should be nonaspectual. This accounts for the difference between VPF and VPE (relevant data repeated here).

- (48) They swore that Lee might have been taking heroin, and
a. taking heroin he might have been __ !
b. *been taking heroin he might have __ !
c. *have been taking heroin he might __ !
- (49) Lee might have been taking heroin, and
a. Sandy might have been __ too.
b. Sandy might have __ too.
c. (?)Sandy might __ too.

Then, what does this VP fronting analysis predict concerning negation? Recall that our treatment allows *not* to be either a VP modifier or a syntactic complement of a finite auxiliary, and that we permit the negator *not* to be stranded only if it becomes a complement of a finite auxiliary, i.e. only when it occurs immediately after a finite auxiliary. This prediction is borne out:

- (50) a. They all said that John was not being followed, and [being followed] he was not __ .

VP Ellipsis and VP Fronting

- b. They all said that John was not being followed, and [not being followed] he was __.

The negative marker *not* in (50a) is the complement of the auxiliary *be*, and its VP complement *being followed* is fronted. In (50b), the same VP is fronted and *not* is modifying the fronted VP.

But notice a different behavior of the modifier *not*.

- (51) Kim said she would be not eating spinach, and
a. *[eating spinach] she will be not __.
b. [not eating spinach] she will be __.

The negator *not* (51)a can be only a modifier. As noted in the previous section, the modifier *not* cannot be stranded, since the modifier *not* does not satisfy its MOD requirement. Meanwhile, nothing blocks (51)b in which *not* is a modifier.

Within the present analysis, examples like (52) will be predicted to be unacceptable:

- (52) Kim said she would not be eating spinach, and
a. *[be eating spinach] she will not __.
b. *[not be eating spinach] she will __.

The fronted VP is headed by the aspectual head, the progressive *be*. This violates the condition on the assumed *vp-filler-ph*.

3. Conclusion

I have presented an analysis of VP ellipsis and VP fronting within a system in which phrases are modeled as typed feature structures. This theory of grammar, introducing grammatical constructions together with declarative constraints on them, gives us a clean analysis of some otherwise puzzling phenomena in English, VP ellipsis and VP fronting. It has been common practice to accept such phenomena as idiosyncratic in terms of their distributional properties. This has led to the adoption of English-specific rules like *do*-support and the introduction of functional projections such as NegP, Σ P, AgrP, and PredP, as well as transformational operations and empty categories. The construction, constraint-based analysis presented in this paper makes it unnecessary to resort to such abstract machinery, enabling us to find new levels of generalizations within the English auxiliary system, which has often been regarded as a storehouse of peculiarities.

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VP Ellipsis and VP Fronting

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