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A Step-by-step Guide to VP Ellipsis Resolution[1]

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1. Outline of the Problem

The topic of this paper is how VP ellipsis sentences, such as (1), are represented in syntax.

(1) When John had to cook, he didn't want to [$_{VP}$ ∅].

It is undeniable that an elided VP demands the presence of the 'same' VP or VP meaning, but defining the 'sameness' is no easy task. One of the two main approaches to this issue is the Pro-form approach, according to which the missing VP is represented as some kind of silent pronoun whose semantic value is retrieved via a meaning recovery strategy similar to nominal anaphora resolution. The advocates for this thesis include Bach and Partee (1980), Rooth (1981), Klein (1987), and most recently Hardt (1993, 1999). The other approach, which I call the LF Structure approach, posits full-fledged syntactic structure for the missing VP at the level of Logical Form (LF). Within this approach, there are two variants. In the 'PF-Deletion' analysis, a missing constituent begins its life in the derivation with fully represented structure, which will be deleted in the phonological component but remain in tact at LF (cf. Chomsky and Lasnik 1993, Fox 2000). The other variant, including Fiengo and May (1994), treats the missing material to be truly missing at the beginning but copied from its antecedent at LF. The debate between the Pro-form and the LF Structure camps has a long history and is still on-going. The purpose of this paper is not to provide the full review of this debate but to concentrate on a particular phenomenon which is considered by many to be one of the most convincing arguments in favor of the Pro-form approach.

Hardt (1999) and Schwarz (1999) independently noted that, when an elided VP is contained within another elided VP, the first VP can get the 'sloppy' interpretation. Here are the examples that Hardt and Schwarz present.

(2) (= Schwarz 1999, Chapter 4 (35))
A: When John had to cook, he didn't want to Δ.
B: When he had to clean, he didn't Δ, either.

(3) (= Hardt 1999, (17))
I'll help you if you want me to Δ. I will kiss you even if you don't Δ.

The elided VP in B's utterance in (2) is understood to mean 'want to clean', and similarly, the missing VP in (3) is interpreted as 'want me to kiss you'. For a theory of ellipsis which assumes

full-fledged LF structure for elided material, these examples are problematic. The second VP ellipsis which contains another elided VP fails to satisfy the LF identity condition. Take (2), for instance. Its LF representation would look like (4), in which the material within { } corresponds to the unpronounced VPs.

(4) A: When John had to cook, he didn't want to *{cook}*.
B: When he had to clean, he didn't *{want to clean}*, either.

The first VP ellipsis (i.e., in A's utterance) can be successfully represented as $[_{VP}$ *cook]* since there is an identical VP in the preposed adjunct clause. However, the second VP ellipsis creates a problem. The sloppy interpretation requires that the elided VP be of the form $[_{VP}$ *want to clean]*. However, the preceding sentence furnishes no such VP. Intuitively, the second VP in A's utterance, $[_{VP}$ *want to* Δ *]*, should count as an antecedent, but its LF representation, $[_{VP}$ *want to {cook}]*, would not be considered as identical to the missing VP under any theory of LF identity.

The second difficulty, pointed out by Schwarz (1999) is that the sloppy interpretation is not possible when the first sentence does not have ellipsis. In (5), for instance, the missing VP is only understood to mean 'want to cook' although this 'strict' reading is rather odd pragmatically.

(5) A: When John had to cook, he didn't want to cook. (= Schwarz 1999 (37))
B: When he had to clean, he didn't, either.

As far as the LF representations are concerned, (4) and (5) should be identical. Therefore, the LF structure approach fails to distinguish them, leaving the contrast completely unaccounted for.

What can the Pro-form approach say about this? The answer depends on what kind of pronominal element is assumed for VP ellipsis. Hardt (1999) argues, extending Muskens' (1996) dynamic logic system to VP anaphora, that all instances of VP ellipsis should be treated as silent dynamic property anaphora. Schwarz (1999) is considered as a mix of the Pro-form and the LF structure approaches. While he maintains the possibility that elided material has full structure, he argues that those instances that yield sloppy interpretations must be represented as silent VP pronouns. Hardt's theory must be evaluated in light of all the phenomena which arguably suggest that VP ellipsis requires internal syntactic structure (e.g., an elided VP's capability of hosting a Wh-trace, subject agreement in VP ellipsis in the *there*-insertion construction, etc.). On the other hand, Schwarz's idea may be more modest but seems to have the best of the two approaches. For this reason, I will focus on Schwarz's analysis and use it as the starting point of this paper. In the next section, I will first review Schwarz's analysis and demonstrate how it accounts for the presence and absence of the sloppy interpretation of ellipsis within ellipsis. Despite its success, however, Schwarz's account encounters several problems of its own, some of which were already anticipated by Schwarz himself. In Section 3, I offer an LF Structure account, in which the LF identity of an elided VP is checked in a 'step-by-step' fashion. I will make a crucial use of E-feature marking which is derivationally interpreted at PF and at LF. A re-interpretation of Merchant's (2001) theory, to which I owe the idea of E-feature marking, is presented as a comparison. Section 4 begins with another problem. Even if the LF identity problem of sloppy ellipsis is successfully circumvented, it appears that the new LF identity condition makes a

condition on focus unworkable unless sloppy ellipsis is treated as an instance of a bound variable. I argue that the problem can be avoided by adopting Kratzer's (1991) analysis of focus which employs Focus indexing and designated variables.

2. VP Ellipsis as Silent Bound Variables

Sloppy readings of nominal anaphora have been regarded as the indication that they are construed as bound variables (cf. Sag 1976, Williams 1977, Reinhart 1976, Lasnik 1976), and Schwarz analogizes the sloppy VP ellipsis cases to nominal anaphora. Specifically, he suggests that a missing VP can, but not necessarily must, be represented as a phonologically silent VP pronoun, and that such a pronoun can be bound by an overt VP which undergoes LF fronting. Let us illustrate his analysis with the example (2).

(2) A: When John had to cook, he didn't want to.
B: When he had to clean, he didn't, either.

Under the sloppy interpretation, the sentence has the following LF.

(10) A: $[_{VP}$ cook$]_3$ [When John had to t_3, he didn't want to Δ_3]
B: $[_{VP}$ clean$]_4$ [When he had to t_4, he didn't {want to Δ_4}], either.

What we see in the second instance of VP ellipsis is a mixture of the pro-form and the LF structure approaches, in which the smaller VP is represented as a bound variable VP and the larger VP has structure associated with the lexical verb *want*. With the LF representation (10), the two VPs, *want to* Δ_3 and *want to* Δ_4, can be considered LF identical under a certain theory of ellipsis (such as Rooth 1992, Heim 1997, Tomioka 1997, Romero 1998) which states that the LF identity condition demands the lexical items and the structure to be identical between an elided VP and its antecedent but is oblivious to indexical differences. *Want to* Δ_3 and *want to* Δ_4 use the same lexical items and have the identical structure with the only difference being the indices on the silent VPs. Hence, they satisfy the LF identity condition. The proposal also provides an account for the lack of sloppy interpretation in (5).

(5) A: When John had to cook, he didn't want to cook.
B: When he had to CLEAN, he didn't, either.

Imagine that the sentences in (5) undergo LF VP movements comparable to the ones in (10). The resulting LF configuration is (11).

(11) A: $[_{VP}$ cook$]_3$ [When John had to t_3, he didn't want to cook]
B: $[_{VP}$ clean$]_4$ [When he had to t_4, he didn't {want to Δ_4}], either.

Unlike in (10), the elided VP *{want to* Δ_4*}* fails to find an appropriate antecedent. One of the VPs in A's utterance, *want to cook*, cannot be considered to be LF equivalent to the elided VP. Hence,

the sloppy reading is blocked.

While the Bound Variable VP theory of Schwarz successfully accounts for the sloppy reading of VP ellipsis as well as the absence of such a reading in the non-ellipsis contexts, it faces several challenges. First of all, this analysis presupposes that the antecedent of elided material can scope out to a position high enough to c-command the ellipsis site where a bound variable sits. As Schwarz himself admits, however, such a movement seems oblivious to the stricter-than-expected constraint (i.e., clause-boundedness) on QR. In the LF (10), for instance, the overt VP must scope out of a tensed clause. Moreover, this movement would violate an island constraint since it comes out of an adjunct CP. Apart from this mystery of a locality condition (or the lack thereof), the LF raising of a VP is not completely unintuitive. A VP can be fronted overtly in English, as shown in (12a), and Johnson (2001) indeed suggests that VP ellipsis is an instance of VP topicalization where the topic VP becomes unpronounced; a process akin to the null topic construction in German, exemplified in (12b), where we find the V1 order instead of the canonical V2.

(12) a. Mark always said he would move to L.A., and [move to L.A.]$_1$, he finally did t_1.

b. ϕ habe ich schon gehört.
have I already heard
"I have already heard (about it)."

However, the availability of movement and that of sloppy interpretation of ellipsis do not always coincide. Sloppy interpretations are also available with NP ellipsis (cf. Elbourne 2001) and with sluicing, as shown below.

(13) NP ellipsis within VP ellipsis
a. Everyone who arrested some murderers insulted a few, and everyone who arrested some burglars did Δ, too. (Δ = *insult a few (of the) <u>burglars</u>*) (= adopted from Elbourne 2001 (109))

b. Speaking of syntacticians, of course Ken knows many, but semanticists... I don't know. My guess is that he doesn't Δ. (Δ = *know many <u>semanticists</u>*)

(14) Sluicing within VP ellipsis
If Fred IS marrying someone, we want to know who, but if he (just) MIGHT be marrying someone, we don't Δ. (Δ = *want to know who he <u>might</u> be marrying*) We have had too many false alarms.

If these sloppy ellipsis cases were to be analyzed in the way analogous to the VP ellipsis cases, it would be necessary to posit LF movement that has been unattested, either in the overt syntax or at LF; movement of an NP out of a DP and movement of an IP out of a CP.[2] [3]

The bound variable analysis also predicts that the occurrence of sloppy ellipsis should be regulated by the same structural constraints that are imposed on nominal variable binding. One of

such constraints is Weak Crossover. It turns out, however, that sloppy ellipsis is not subject to Weak Crossover. Consider (15).

(15) If you tell me to, I will gladly quit drinking, but even if the Queen did Δ, I would never quite smoking! (Δ = *tell me to quit <u>smoking</u>*)

To obtain the bound variable interpretation, this sentence must have the following LF.

(16) $[[_{VP}$ quit drinking$]_1$ [[if you tell me to Δ_1] I will gladly t_1]]], but $[[_{VP}$ quit smoking$]_2$ [[if the Queen did {tell me to Δ_2}] I would never t_2]]]

This is, however, a kind of configuration that causes a Weak Crossover violation for variable binding, as witnessed in (17).[4]

(17) *If he reads it_1, Bobby criticizes [every paper]$_1$.

The availability of a sloppy reading in (17), therefore, indicates that its source is not the bound variable nature of the elided VP.

The conclusion we can draw at this point is that if a sloppy reading inducing VP is pronominal, it is unlikely to be a bound variable. Schwarz indeed points to the fact that the sloppy reading of a personal pronoun doesn't require the usual c-command requirement, either (e.g., the well-known Wescoat example, the subject of many subsequent papers, such as Dalrymple et al 1991, Fiengo and May 1994, Hardt 1993, and Tomioka 1997).

With this possibility in mind, let us come to the final problem, which I believe is applicable to a pro-form hypothesis in general. It is predicted that the sloppy VP cannot host a trace because a pro-form is believed to be incapable of doing so. Once again, Schwarz already anticipated this problem with the following example.

(18) A: When John cooks something, he doesn't say what he does.
B: When he BAKES something, he doesn't, either. (= Schwarz 1999, p.169)

He says, 'Unfortunately, this case and similar ones are not fully significant since the (A) sentence is degraded in isolation. However, it seems that to the extent that (A) is acceptable, the above prediction is not borne out, that is the discourse has a sloppy interpretation...' (p.169) I believe that the reason Schwarz's sentence (i) does not sound good is that it violates Schuyler's (2002) generalization that Wh-movement out of an elided VP must be accompanied by a contrastively focused constituent that is c-commanded by the moved Wh. Unlike (18), the example (19) has focus on the negative AUX, *DOESN'T*, which is helpful in overcoming the degradation problem that (18) has.

(19) A: John has a very indirect way of telling what he thinks. For instance, when he likes someone, he tells you who$_1$ he DOESN'T Δ. (Δ = *like* t_1)
B: Wait a minute. But, when he HATES someone, he doesn't Δ. Instead, he tells you

exactly who he hates. (Δ = *tell you who$_2$ he doesn't <u>hate</u> t$_2$*)

Although the judgment is subtle, perhaps due to the complexity of the sentence, (19) seems to have the sloppy reading, contrary to what a pro-form analysis would predict. Jason Merchant (personal communication) warned me, however, that the issue of a Wh-trace may be far more complex. He points out that Antecedent Contained Deletion (ACD) and Comparative Deletion (CD) cases, which also involve A-bar traces in elided VP, are not acceptable.

(20) ACD
Fred read the book that he was supposed to Δ, and *he also REVIEWED the one that he was Δ.

(21) CD
Fred read more books than he was supposed to Δ, and *he also REVIEWED more books than he was Δ.

What is striking about these examples is that they are simply ungrammatical, regardless of the interpretations of the second empty VPs. In other words, they don't even have the strict readings. That indicates that the ungrammaticality of (20)/(21) is unrelated to the question of whether sloppy VP ellipsis can host a Wh-trace or not. As a matter of fact, the examples in (22) and (23) are also unacceptable despite the fact that they do not involve sloppy VP ellipsis.

(22) ACD
a. Fred read the book that he was supposed to Δ, and *ERIC also read the one that he was Δ.
b. Fred read the book that he was supposed to Δ, and *he also read the JOURNALS that he was Δ.

(23) CD
a. Fred read more books than he was supposed to Δ, and *ERIC also read more books than he was Δ.
b. Fred read more books than he was supposed to Δ, and *he also read more JOURNALS than he was Δ.

It should be noted that all of the examples in (20)-(23) involve A'-movement of an operator (either an empty relative operator or an empty degree operator). In none of these examples, however, is there any contrastively focused material that is c-commanded by the moved operator, which leads to a kind of configuration that is ruled out by the aforementioned generalization by Schuyler. Once this factor is controlled, sloppy interpretations become available or at least easier to detect.[5]

(24) A: Why are you so upset with Fred? He bought the books that he was supposed to, right?
B: Yeah, but then, (?) he READ the books (Op$_1$) that he WASN'T Δ. (Δ = *supposed to*

read t_1)

Thus I conclude that an instance of sloppy VP can indeed host a Wh-trace.

The significance of our finding concerning Wh-traces is not simply a matter of quantifying into a pronoun. If it were, we might be able to account for it by using double-indexing on the VP pronoun or by changing the semantic denotation to functions from assignment functions to whatever the denotation we ordinarily assign to a linguistic expression. Or at least we find a similar case in nominal anaphora, namely a pronoun of laziness (or a paycheck pronoun).

(25) The man who$_2$ gives his$_2$ paycheck to his wife is wiser than the one who$_2$ gives **it** to his cat. (*it = his$_2$ paycheck*)

What our examples of sloppy VP ellipsis show is more than that, however. There are no known pronouns of any kind which can contain Wh-traces within them. The following examples illustrate this point.

(26) a. We know which countries Kim visited. *The question is which countries she didn't *do so*.
b. Tell me which models you took good pictures of and *which models you took ugly *ones*.

To sum up the challenges that a Pro-from thesis faces, were it to be adopted, we would be looking for a silent pronoun that has the following attributes: (i) it is neither referential nor a bound variable, (ii) it is cross-categorical, corresponding to a VP, an NP (in the DP structure), or IP, and (iii) it can host a Wh-trace. As far as I can see, there are no pronominal forms that satisfy all of these requirements. Therefore, we are forced to postulate a new kind of empty anaphora specifically tailored for ellipsis. Such a move comes with great cost, and it is difficult to justify.

3. LF Identity 'Step-by-Step'

3.1. Basics

The previous section has shown that it is not easy to implement a Pro-form approach for sloppy VP ellipsis. On the other hand, the problem for the LF Structure approach is also obvious. Consider (2) and (4) again.

(2) A: When John had to cook, he didn't want to.
B: When he had to CLEAN, he didn't, either.

(4) LF Structure of (2)
A: When John had to cook, he didn't want to *{cook}*.
B: When he had to CLEAN, he didn't *{want to clean}*, either.

The second VP ellipsis should not be licensed since there is no VP that has the LF structure of the form 'want to clean'. The problem cannot be avoided as long as we are looking at LF representation globally. The solution I propose crucially relies on the idea that the LF identity for ellipsis does not apply in one big step. Or at least it does not have to. Imagine XP dominates YP. YP has an appropriate antecedent for deletion. For the determination of an appropriate ellipsis antecedent of XP, the content of YP doesn't matter, as long as a potential antecedent of XP also has elided material in the position corresponding to YP. Putting it differently, smaller ellipsis gets the 'seal of approval' when it finds an appropriate antecedent for itself, and once this is accomplished, the identity condition for a larger ellipsis containing the smaller ellipsis does not care the content of the small ellipsis. To distill this intuitive idea, it may be useful to examine a case like (20), which involves 'partial' VP ellipsis.

(21) A: When John had to cook, he didn't want to Δ.
B: When he had to clean, he didn't want to Δ, either. (sloppy OK)

There is no problem here. Each instance of VP ellipsis should be and indeed is licensed. The question is whether the two instances of *want to* Δ can be regarded as LF identical. The answer is not obvious. They are identical as far as the surface strings are concerned whereas the semantic contents of the two VPs differ, provided that the missing VPs have full representations at LF. If the surface string argument wins, then we will get (22).

(22) A: When John had to cook, he didn't want to Δ.
B: When he had to clean, he didn't ~~want to Δ~~, either. (sloppy OK)

The outcome in (22) is, of course, exactly what we have in (2). But why should a surface string matter for the LF identity condition? Perhaps, the term 'surface string' is misleading. The task here is to determine whether the second instance of *want to* Δ can be left unpronounced. I suggest that, in this decision making process, the content of what has been already decided to be deleted should not play a role. (23) shows a slightly more schematic illustration of how this idea should be cashed out.

(23) Step 1: When he had to clean, he didn't *want to clean*
Find an antecedent for this VP ☞ └──────┘

Step 2: When he had to clean, he didn't *want to* ~~*clean*~~.
A matching VP in the *when*-clause licenses the deletion

Step 3: When he had to clean, he didn't *want to* ~~*clean*~~
Find an antecedent for this VP ☞ └──────────────┘

What we are looking for in Step 3 is a VP of the form '$[_{VP}$ want to $[_{\text{UNPRONOUNCED VP}}]$'. Since A's utterance in (2) furnishes such a VP, the ellipsis is licensed. It is also obvious that the sloppy reading is not available in (5), which constitutes a minimal pair with (2).

(5) A: When John had to cook, he didn't want to cook.
B: When he had to CLEAN, he didn't, either.

With this example, Step 3 of (23) fails since there is no VP of the appropriate form in A's utterance.

In a sense, Schwarz and I share the same goal: Prevent the content of smaller ellipsis from coming into play in the resolution of larger ellipsis. In Schwarz's system, this goal is achieved by making the smaller elided VP a silent bound variable. In the current proposal, the smaller VP is ignored because it has already been decided to be deletable. The phrase 'already been decided to be deletable' is very suggestive. It points to the direction that ellipsis resolution is not a one-step process but can involve a combination of smaller steps.

3.2. Towards Formalization

In this subsection, I will formalize the 'from-bottom-to-top' way of VP ellipsis resolution. First, I assume, along with Chomsky and Lasnik (1993), Fox (2000) Merchant (2001) and many others, that VP ellipsis is an instance of PF deletion. The instruction for the PF component to delete is featural, and my analysis owes greatly to Merchant's (2001) E-feature marking idea.

(24) E-feature Marking
(i) Some heads select XPs marked for an E-feature.
(ii) All E-marked constituents are unpronounced.

This is a slight modification of Merchant's theory, which puts an E-feature on a head, and what is elided is the complement of an E-marked head. The reason for the change is simply a matter of convenience since I find it a lot easier to assume that E-features are placed on elided constituents. E-feature marking is obligatory in the sense that, if an XP is selected by an E-marking head, then, the XP must bear an E-feature and consequently delete. The optionality of deletion does not come from the optionality of E-marking, but rather from the choice of a head from the lexicon. Hence, E-marking is not constrained by any kind of economy principle. [6]

Of course, E-features are relevant for the recoverability of elided material as well. I propose the following identity condition for E-marked constituents.

(25) Identity Condition for Ellipsis
An E-marked constituent α must have an antecedent β such that
(i) The E-marking of α is identical to that of β, AND
(ii) α and β are LF identical up to indices and structural content of any E-marked constituents that are properly contained by α or β.

If an E-marked constituent does not embed any further E-feature, (25) is basically identical to the identity condition that has been proposed in the past (e.g., Rooth 1992a, Heim 1997, Tomioka 1997, Romero 1998). The reference to properly contained E-marking is added so that the content of the smaller ellipsis is spared from the Identity Condition imposed on the larger ellipsis.[7] Let us

see how this new condition works with the example we have been discussing.

(26) LF of (2) under the sloppy reading:
A: When he had to cook, he_1 didn't want PRO_1 to $[_{VP\ E}$ cook]
B: When he had to clean, he_1 didn't $[_{VP\ E}$ want $[_{CP}\ [_{IP}\ PRO_1$ to $[_{VP\ E}$ clean]]]]

For each of the three instances of E-marking, the condition in (25) must be satisfied.

(27)	a. $[_{VP\ E}$ cook]]	✓ because of the presence of 'when he had to **$[_{VP}$ cook]**'
	b. $[_{VP\ E}$ clean]]	✓ because of the presence of 'when he had to **$[_{VP}$ clean]**'
	c. $[_{VP\ E}$ want $[_{CP}\ [_{IP}\ PRO_1$ to $[_{VP\ E}$ clean]]]]	✓ because of the presence of 'he didn't **$[_{VP}$ want PRO_1 to $[_{VP\ E}$ cook]]**'

(27ab) are straightforward. (27c) is licensed by the new condition. The VP in A's utterance has the structurally identical E-marking, and everything apart from the material within the embedded E-marking is identical to the elided VP. Thus, the condition is met.

We can also correctly predict that (5), the phonologically repeated version of (2), fails to satisfy the condition.

(28) LF of (5) under the sloppy reading:
A: When he had to cook, he_1 didn't want PRO_1 to $[_{VP}$ cook]
B: When he had to clean, he_1 didn't $[_{VP\ E}$ want $[_{CP}\ [_{IP}\ PRO_1$ to $[_{VP\ E}$ clean]]]]

(29)	a. $[_{VP\ E}$ clean]]	✓ because of the presence of 'when he had to **$[_{VP}$ clean]**'
	b. $[_{VP\ E}$ want $[_{CP}\ [_{IP}\ PRO_1$ to $[_{VP\ E}$ clean]]]]	* because there is no VP of the form **$[_{VP}$ want PRO_1 to $[_{VP\ E}$]]**'

Since the VP in A's utterance does not have an E-marked constituent in the structurally parallel position, (29b) fails. Hence, no sloppy reading. One may wonder, however, whether (25) can successfully license the strict reading of (5). If we minimally change (28) in such a way that we have $[_{VP\ E}$ cook] , instead of $[_{VP\ E}$ clean], then, the condition (25) rules it out for the same reason that we saw in (29b). However, there is another possibility for the strict reading of (5) in which there is no embedded E-marking.

(30) LF of (5) under the strict reading:
A: When he had to cook, he_1 didn't want PRO_1 to $[_{VP}$ cook]
B: When he had to clean, he_1 didn't $[_{VP\ E}$ want $[_{CP}\ [_{IP}\ PRO_1$ to $[_{VP}$ cook]]]]

(31)	$[_{VP\ E}$ want $[_{CP}\ [_{IP}\ PRO_1$ to $[_{VP}$ clean]]]]	✓ because the VP in A's utterance is LF equivalent

Whether we have an embedded E-feature or not, the outcome is identical. Thus, the LF in (30) should be allowed, and (5) can have the strict reading.

It is now the time to ask ourselves the question of why the identity condition should be formulated as in (25). The trend of the recent syntactic theories, most notably the Minimalist framework, is to rely heavily on the notion of derivations. The current proposal, though it itself is not derivationally formulated, is in line with this trend. The LF identity condition of an elided constituent 're-lives' the history of its derivation as it is evaluated in the 'from-bottom-to-top' fashion. Once the elided material clears the condition, it is no longer considered as a part of the LF identity of a larger elided material that contains it. This part of the condition is reminiscent of Chomsky's (2000) idea of derivation by phase, in particular the Phase Impenetrability Condition, which provides that operations in one phase cycle are not visible beyond its phase boundary. Could the Identity Condition that I have proposed be re-formulated in a more derivational fashion? It is a legitimate question, and such an attempt is certainly worthwhile. I may add one cautionary note, however, that ellipsis requires global knowledge of the context; in resolving ellipsis, one must go beyond what has been already built up in the derivational process in order to find an antecedent. It is not entirely clear to me whether such a move can be justified. I will leave this issue for the future investigation.

3.3. An Alternative: E-Givenness

A possible alternative to the solution proposed in 3.2. can be devised by appealing to the theory proposed in Merchant (1999, 2001). Merchant's idea of E-Givenness, inspired by the focus theory of Schwarzschild (1999), combines the identity condition for ellipsis with the general theory of focus licensing. Merchant's theory can be summarized as follows. Ellipsis of a constituent α is licensed if and only if α is selected by a head marked for the ellipsis feature E. The sister of an E-marked head must satisfy the E-Givenness condition, a semantic identity condition based on focus structure.

(32) E-givenness:
An expression E is e-given iff E has a salient antecedent A and, modulo existential type-shifting,
(i) A entails E-clo(E), and
(ii) E entails E-clo(A)

(33) The E-closure of α (E-clo(α)) is the result of replacing all F(ocus)-marked elements of α with existentially bound variables of the appropriate type (modulo existential type-shifting).

The existential type-shifting of a constituent α existentially closes all the unsaturated arguments of α. Here is an example that demonstrates how Merchant's theory works for VP ellipsis.

(34) a. Abby left the party, and then, Bob did Δ.
b. LF: Abby [$_{VP}$ left the party], and then Bob did$_{E}$ [$_{VP}$ ~~left the party~~]

The elided VP is the sister of the E-marked head did_E and must satisfy the E-givenness condition. The following steps show how the condition is satisfied.

(35) a. The denotation of the elided VP: λx. x left the party
b. E-type-shifting: ∃x. x left party
c. E-clo (vacuous): ∃x. x left party

There is an antecedent (34a) that satisfies the conditions in (32). Both the E-clo and existential type-shifting of the VP in the first conjunct *left the party* would give the proposition '∃x. x left party'.

As is formulated, Merchant's E-Givenness cannot account for the Hardt/Schwarz puzzle. However, Merchant (2005) suggests that a small amendment to the definition of E-closure can be made in order to accommodate the problem.

(36) The E-closure´ of α (E-clo´(α)) is the result of replacing all F-marked elements and the sisters of all E-marked heads contained in α with existentially bound variables of the appropriate type (modulo existential type-shifting).

With this modified definition of E-closure, we existentially close not only F-marked elements but also a constituent selected by a head with an E-feature. Let us see how this modified E-Givenness can deal with the puzzle at hand.

(2) A: When John had to cook, he didn't want to$_{\mathbf{E}}$ {cook}.
B: When he had to clean, he didn't $_{\mathrm{E}}$ {want to$_{\mathbf{E}}$ clean} , either.

The Existential Type shifting and E-closure´ of the bigger VP in B's utterance, *want to$_E$ clean*, are shown in (37).

(37) a. Existential Type-shifting: ∃x. x wants to clean
b. E-clo´: ∃x. $\exists P_{<e,t>}$. x wants to do P.

Now we need to find an antecedent whose E-closure entails (37b) and whose Existential type-shifting is entailed by (37a). The E-closure´ of the bigger VP in (1A), *want to$_E$ cook*, is precisely that, as shown in (38).

(38) a. Existential Type-shifting: ∃x. x wants to cook
b. E-clo´: ∃x. $\exists P_{<e,t>}$. x wants to do P

(37a) entails (38b), and (38a) entails (37b). So, the sloppy reading in (2) is licensed. However, the situation in (5) is different.

(5) A: When John had to cook, he didn't want to cook.
B: When he had to clean, he didn't $_{\mathrm{E}}$ {want to $_{\mathrm{E}}$ clean}, either.

The E-closure´ and the existential type-shifting of the bigger VP in (5A) is (39).

(39) ∃x. x wants to cook.

It is obvious that (37ab) and (39) do not have the entailment relations that E-giveness requires: (39) entails (37b) but is not entailed by (37a). So, ellipsis is not licensed. Hence, no sloppy reading in (5).

The revised version of Merchant's theory provides another effective means to make the semantic content of an embedded ellipsis irrelevant. However, there are two aspects of this theory that are crucially different from the proposal above. First, recall that E-marked elements are not the only things that are replaced with variables; F-marked constituents are also replaced with variables of the appropriate type. Therefore, Merchant's theory predicts that sloppy ellipsis is possible with non-ellipsis antecedent as long as the antecedent is F-marked. Now, let us look at (5) again. Schwarz notices that, when repeated, the second VP *cook* can have prosodic prominence. Thus, the following pattern (CAPITAL LETTERS indicate stress) is acceptable.[8]

(40) A: When John had to COOK, he didn't want to COOK.
B: When he had to CLEAN, he didn't, EITHER.

The conventional interpretation of this stress pattern is to mark the stressed constituent with the focus feature F. Then, (5) has the following LF.

(41) A: When John had to $[\text{cook}]_F$, he didn't want to $[\text{cook}]_F$.
B: When he had to $[\text{clean}]_F$, he didn't $_E$ {want to $_E$ clean}, either.

Then, the E-closure of the VP $[_{VP}$ want to $[\text{cook}]_F]$ is indeed (16), making it identical to the elided version of (5). Therefore, Merchant's theory of E-Givenness actually fails to account for the contrast Schwarz noted.

The second difference is the treatment of an elided structure that contains a trace (or a bound variable in general). One of the arguments against the pro-form analysis of sloppy ellipsis was that it can host a Wh-trace. The relevant example is repeated below.

(19) A: John has a very indirect way of telling what he thinks. For instance, when he likes someone, he tells you who_1 he doesn't Δ. (Δ = *like* t_1)
B: Wait a minute. But, when he HATES someone, he doesn't Δ. Instead, he tells you exactly who he hates. (Δ = *tell you* who_2 *he doesn't* <u>*hate*</u> t_2)

(24) A: Why are you so upset with Fred? He bought the books that he was supposed to, right?
B: Yeah, but then, (?) he READ the books (Op_1) that he WASN'T Δ. (Δ = *supposed to* <u>*read*</u> t_1)

The second instance of ellipsis has the following E-marking pattern.

(42) ... he doesn't $_{E}$ [tell you who$_2$ he doesn't $_{E}$ [hate t$_2$]]

It is not clear how the E-closure of the smaller VP can be achieved since it contains a variable that remains free within that VP. Imagine, as Tomioka (1997, Chapter 3) suggests, that an unbound variable is treated as a missing argument à la Categorial Grammar.[9] However, it would create a different problem. If the variable is closed off at the level of the VP via E-closure, the Wh-phrase *who$_2$* has no variable to bind. In other words, if an elided constituent has a bound variable and its binder is contained in larger ellipsis, the existential closure of smaller ellipsis cannot be easily incorporated into compositional interpretation.

It remains to be seen whether these differences can be eliminated. If they could, then, the proposal here and the E-givenness theory would become notational variants as far as sloppy ellipsis is concerned, and the evaluation of the two hypotheses would have to be done in larger and more general contexts.

5. Focus

There is growing consensus among ellipsis researchers that ellipsis should be treated as a part of a larger scheme of linguistically representing redundant information. Particularly influential was Rooth's (1992) idea that, in addition to the LF identity condition, a licensing condition of focus is imposed on elliptical sentences. and in this sense, focus structure of sentences with ellipsis must be licensed independently of the LF identity condition. While the main theme of this paper is to construct a syntactic identity condition motivated by sloppy ellipsis data, it is not a trivial issue whether the proposed analysis can be properly embedded in a reasonable theory of focus. Let us once again come back to the example (2).

(2) A: When John had to cook, he didn't want to Δ.
B: When he had to clean, he didn't Δ, either.

Since the contrasted VP *clean* in B's sentence necessarily receives prosodic prominence, let us assume that it is marked for focus. If nothing else is focused and the missing VP is fully represented, the sentence has the following LF representation. For a matter of simplicity, the presence of *either* is ignored.

(43) When he had to [CLEAN]$_F$, he didn't *{want to clean}*.

The next step is replace the F-marked constituent with a variable of the type identical to the denotation of that constituent. After this operation, we get the following proposition.

(44) When he had to do P, he didn't want to clean.

In Rooth's theory of focus, the utterance context must furnish one of the two LF representations shown below.

(45) a. An LF the denotation of which is a set of propositions of the form 'When he had to do P, he didn't want to clean' and contains at least one member in which P ≠ ⟦clean⟧.

b. An LF the denotation of which is a proposition of the form 'When he had to do P, he didn't want to clean' in which P ≠ ⟦clean⟧.

It is obvious that such an LF cannot be found. Since B's sentence is contrasted with what A has said, we would hope that A's sentence satisfies the condition. Unfortunately it doesn't, and the problem is not unique to Rooth's theory of focus. In Schwarzschild's (1999) theory, for instance, the existentially closed version of (44), shown in (46), must be entailed.

(46) ∃P. when he had to do P, he didn't want to clean.

Clearly this proposition is not entailed by A's sentence.

The heart of the problem is that the second instance of *clean* in (43) is a constant so that its meaning does not co-vary with that of the first instance of *clean*. The only available option, apart from treating it as a bound variable like Schwarz does, is Kratzer's (1991) idea of F-indexing. Under this system, each occurrence of focus comes with an index, but unlike an ordinary index, it is invisible to ordinary assignment functions. In computing the focus meaning of a sentence, however, distinguished assignment functions, as well as ordinary ones, are used, and an F-index is sensitive only to distinguished assignments. The following example illustrates how the system works. 'g' is an ordinary assignment function whereas 'h' is a distinguished assignment function.

(47) a. $[\text{FRED}]_{F1}$ left early.
b. Ordinary meaning: $[\![[\text{FRED}]_{F1} \text{ left early}]\!]^{g}$ = the proposition that Fred left early.
c. Basis of focus meaning: $[\![[\text{FRED}]_{F1} \text{ left early}]\!]^{g,h}$ = the proposition that h(1) left early.
d. Focus meaning: $\{p: \exists x \in D_e.\ p = [\![[\text{FRED}]_{F1} \text{ left early}]\!]^{g,h1/x}\}$ = {p: ∃x∈D_e. p = x left early}

The addition of F-indexing makes it possible to license the focus marking of sloppy ellipsis. For the LF of (2B), we now have (48), instead of (43).

(48) When he had to $[\text{CLEAN}]_{F2}$, he didn't *{want to [clean]$_{F2}$}*.

Notice that the two instances of the same VP *[clean]* are F-co-indexed, and they co-vary under the distinguished assignment h. Thus, the basis of focus meaning and the focus meaning are (49a) and (49b), respectively.

(49) a. The proposition that, when he had to do h(2), he didn't want to do h(2).
b. $\{p: \exists P \in D_{<e,t>}.\ p =$ when he had to do P, he didn't want to do P$\}$

Rooth's condition is now satisfied since (2A) denotes a proposition of the form 'when he had to

do P, he didn't want to do P', and P is not 'clean'. (49) can also be used for Schwarzschild's focus theory. Let (49a) be the input of his E-Closure in the way specified in (50a). Then, the result of applying it to (49b) will be (50b).

(50) a. Let 1, ... , n to be F-indices within an expression α. Then,
E-Closure of α with respect to g and h = $\exists x, ..., z \llbracket \alpha \rrbracket^{g,\ h\ 1/x,\ ...\ n/z}$
b. E-Closure of (49b) = ∃P. when he had to do P, he didn't want to do P

(50b) is entailed by the meaning of (2A). Thus, Schwarzschild's condition is met.

To sum up this section, the revised LF identity condition appears to make trouble for a focus theory. Embedded ellipsis is not a bound variable, but in order to get the right focus meaning, it must co-vary with its antecedent. It is crucial, therefore, that Kratzer's designated variables are brought into the computation of focus meaning.

6. Conclusion

The difficulty that sloppy ellipsis presents is very acute. Although a Pro-form theory seems to be an easy way out, I have pointed out several challenges that such a theory must overcome. Sloppy ellipsis is found with other types of ellipsis, such as sluicing, and some of the well-known constraints on bound variables do not apply to sloppy ellipsis. With some effort, we can even find some instances in which sloppy ellipsis contains an A' trace. There are no known pronominal forms that can fend off all these challenges. On the other hand, sloppy ellipsis is equally troublesome for an approach that assumes full-fledged LF structure of elided material. In this paper, I made an attempt to show that it is still possible to maintain the LF structure approach even in light of sloppy ellipsis data. The idea behind the current proposal is that the LF licensing of VP ellipsis should allow the LF structure of smaller ellipsis to be ignored in the computation of the LF identity of larger ellipsis that contains it. While the analysis presented in this paper is in accordance with the recent trend in Minimalist syntax that syntactic constraints apply derivationally, I leave as an open question whether the proposed LF identity condition is properly couched within the notion of phases. Sloppy ellipsis also has an impact on the focus licensing condition that is believed to be essential in ellipsis. Since ellipsis with sloppy meaning is not treated as a bound variable, it is expected to act as a constant in the semantic computation. Although it does not pose a problem for the ordinary semantic meaning, its focus meaning should be represented as a bound variable. Kratzer's (1991) theory of focus, which makes use of focus indexing and designated variables, provide the machinery that solves this problem.

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2.As for NP movement out of a DP, the Split Topicalization in German, which can strand a quantifier, might be considered as movement of that kind.

3. Sluicing is probably the least likely case of ellipsis that is represented as a pro-form. It would require some serious semantic tools, such as double-indexing or addition of assignment functions to basic types. For extensive evidence for the presence of LF structure in sluicing, see Merchant (2001).

4. The weak crossover effects in preposed adjuncts turn out to be rather complicated. If the quantifier in the matrix clause is in the subject position, variable binding seems possible, as discussed in Reinhart (1976, 1983) and Chierchia (1995).

(i) (?) If his$_1$ favorite toy is missing, [every boy]$_1$ will cry.

This example shows that the reconstruction of a fronted adjunct is in principle possible (see Chierchia 1995 Chapter 4 for discussion). Let us assume that the adjunct clause is adjoined back to VP. The following LF structures illustrate the subject-object asymmetry. The numeral nextto the moved NP is an index binder in the sense of Heim and Kratzer (1997).

(ii) a. Binding by the subject possible

$[_{IP}$ [Subj NP] 1 $[_{VP}$ $[_{VP}$ t_1 ...] $[_{Adjunct\ CP}$ ... pronoun$_1$ ...]

b. Binding by the object not possible

$[_{IP}$ [Subj NP] 1 $[_{VP}$ $[_{VP}$ t_1 Object NP] $[_{Adjunct\ CP}$ ... pronoun ...]

If the A-movement of the subject has the effect of Predicate Abstraction, then the pronoun in the CP is successfully bound. However, the pronoun is not bound by the object NP in (iib). In order to establish the binding by the object, the object must raise. Imagine that this additional movement creates Weak Crossover. Now turning back to VP pronouns, the sentence (15) has the following LF after the reconstruction of the *if* clause.

(iii) $[[_{IP}$ $[_{VP}$ $[_{VP}$ quite smoking] $[_{Adjunct\ CP}$ ... $[_{VP}\ \Delta$]]

As was the case with the object NP, (iii) requires the movement of the matrix VP so as to yield

the bound variable VP interpretation. In this sense, the sentence should pattern with the example (17), rather than (i). The availability of sloppy reading in (15) therefore suggests that the elided VP is not a bound variable.

5. Unfortunately I could not construct a sensible example with CD. In the ACD example, the negative auxiliary is contrasted with the affirmative one. However, the same strategy does not work for CD cases because a *than* clause cannot host negation (e.g., *Dan read more books than he didn't want to). See Rullmann (1994) for relevant discussion. The best that I can think of is (i).

(i) Fred bought more books than Eric asked him to Δ, and then he READ more books than BILL did Δ.

It still seems very hard to get the intended sloppy reading for the second ellipsis (i.e., Δ = *ask him to* <u>*read*</u> $t_{degree\ 1}$ *many books*). It is perhaps due to the much easier resolution being available (i.e., Δ = <u>*read*</u> $t_{degree\ 1}$ *many books*). I do not know how to control this factor.

6. I am grateful to Nina Zhang and Akira Watanabe for reminding me of this.

7. There are some alternative ways to get the same result. Imagine, for instance, that an E-marked VP can optionally undergo raising at LF. Let us use (2) as an illustration. The LF structure of (2) will be (i).

(i) A: ....., he [does not [$_{VP}$ [$_{VP\ E}$ cook]$_1$ [$_{VP}$ want to t_1]]]

B: ....., he [does not [$_{VP}$ [$_{VP\ E}$ clean]$_2$ [$_{VP\ E}$ want to t_2]]]

With this structure, we no longer need to make reference to any E-marking in the identity condition. All E-marked VPs have appropriate antecedents (we still keep the "upto indices" clause in the condition). Then, the PF outcome is exactly what we have in (2).

(ii) A: ....., he [does not [$_{VP}$ [$_{\underline{VP\ E}}$ cook]$_1$ [$_{VP}$ want to t_1]]]

B: ....., he [does not [$_{VP}$ [$_{\underline{VP\ E}}$ clean]$_2$ [$_{\underline{VP\ E}}$ want to t_2]]]

This is certainly a feasible alternative to (25). However, one of my earlier criticisms of Schwarz's analysis applies here as well: The movement of a smaller VP seems insensitive to islands. For example, (iii) has the sloppy reading.

(iii) When John has to cook, he finds someone else who is willing to Δ, but when he has to clean, he doesn't Δ.

To license this reading with (i), the VPs *cook* and *clean* must raise out of the complex NPs that contain them. In addition, it is necessary to restrict this movement to an E-marked VP only. The LF of (5) would just like (ii) above except that *[$_{VP}$ cook]* is not E-marked. That would not affect the deletability of the two VPs in B's sentence, however. Therefore, the lack of the sloppy interpretation in (5) would not be explained. It is unclear at best whether this kind of movement constraint is well-motivated.

8. It is not clear to me whether the F-marking indicated in (40) is the only possibility. The native

speakers that I have consulted do not have agreement on this. However, what is important for our current discussion is the fact that prosodic prominence on the second occurrence of *cook* is possible.

9. For an alternative analysis, see Tomioka (2001).