Syntax 5: Assignment 4

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I. Introduction

The purpose of this paper is to determine how our current view of Verb Phrase Ellipsis (VPE) and its Identity Condition (IC) that licenses it are able to account for a new phenomenon, the name of which we do not know, and which, for the purposes of this paper we will refer to as Argument Dependent Ellipsis (ADE). We will consider ADE in detail and consider the ways in which it bears on our understanding of VPE and the IC, further justifying our assumptions or changing them as new evidence dictates. We will then conclude by reviewing where we stand on the issues of VPE and the IC, having considered this new set of facts brought out by ADE.

II. Laying the Foundation

VPE is a type of surface anaphora. It is an elision process that is licensed by a head and elides the entire complement of the licensor. In addition to which, it is a process that hinges on the fulfillment of an identity condition, which we have previously defined in the following way.

> Identity Condition (IC): In order for VPE to take place, there must be strict semantic identity between the antecedent and the complement of the licensing head. By strict identity, we are referring to identity of compositionally-derived lambda expressions, the building blocks of semantic representation (SR).

This particular formulation of the IC has served us well. It can account for the fact that VPE is licit in parallel structures, conjunction structures, and across speaker boundaries, that it can lead to ambiguous and unambiguous sentences, and that (together with our theory of binding) it can account for the ways in which pronoun reference is affected by VPE. The aim of this paper is largely to determine whether or not the IC, as currently stated, will be able to account for the patterns of ellipsis found in ADE.

At this particular junction, it is worth noting that by adopting the IC in its current form, we are also adopting a number of unspoken assumptions. First, we are assuming that the notion of semantics is readily available in our model, beginning at deep structure. This lends itself to a structure in which the meaning of a sentence gets built up along with the syntactic tree, a structure in which a semantic representation (SR) is associated with each node of the derivation. Second, we are assuming a model other than the Y-model. Although we have retained the concepts of deep structure, spell-out, vocabulary insertion rules, and surface structure, we are also making the claim that SR is available throughout the syntax, so notions such as identity and indices are available to the syntax from deep structure on. And

indices of what?

So these are referential indices.

lastly, we are assuming that indices make their way into deep structure via a process called sprinkling, in which they are constrained only by the binding theory, which will prevent illicit combinations of indices from arising, as the derivation will crash and burn if the binding theory is not adhered to. While these particular assumptions have been made explicit, there are a number of unresolved issues that have yet to be addressed. Specifically, there is the issue of the VP Internal Subject Raising. over →

VP Internal Subject Raising (VPISR) is the idea that subjects are generated within the VP, and later move up to their final location. This theory is well-established and quite useful in a number of arenas. However, it is problematic here. The presence of the subject within the VP is troublesome when it comes to the process of VPE. For the IC to be met, there must be identity between the SRs associated with both the antecedent and the elided VP nodes. In order for the IC to function as planned, we have assumed that the subject is no longer within the VP by the time the SR is built, and that it is the last argument to be added to the SR.[1]

This brings us to the issue of semantic representation itself. Due to the complex nature of the lambda expressions necessary to represent many of these sentences,[2] we will be taking a more holistic approach to the notion of Semantic Representation here than we have in previous works. It is our belief that the conceptual underpinnings of the theory, to the extent that we understand and can convey them, can be given with a minimum of fine-grained lambda calculus. It is our hope, too, that opting for prose might increase the expressiveness and therefore the ease of reading of this document. It often works out that way.

Now that we have summarized our current understanding of VPE and its IC, we can turn our attention toward the problem at hand.

III. The Problem at Hand

In this paper, we will consider four different issues surrounding ADE. Namely, all of these issues are focused around the matter of interpretability. We will consider sentences in which the intended antecedent for VPE is contained within an argument of the VP that would be targeted for elision, and consider the restrictions on the grammaticality of VPE in such contexts.

Can you really focus around something? That seems anti-thetical to focusing.

It is this set of data that will provide some complex instances of ungrammaticality which somewhat stretch our current analysis of our IC. Until now, we've cited strict identity of SR as a means of explaining the grammaticality (but fixed-alternating readings) of (1337) below, and similar constructions.

1337. The chickens are ready to eat, and the children are, too.

Unfortunately, sentences like (4a) and (6b) below pose a potential problem here.

[1] While this issue is certainly not the primary focus of this assignment (and will remain unresolved by the time we reach our conclusion), it is certainly worth recognizing the fact that it is potentially quite problematic to our current theory of VPE and the IC. It is also an interesting issue as it bears on the issue of when VPE takes place, whether or not elements can move out of an ellipsis site, and what type of identity is necessary in order to license the ellipsis in the first place. All very true.

[2] And due, in no small part, to that difficulty's exceeding our general comfort with semantic notation...

→ The tokens of this number are 7, 191.

This raises an interesting question: Is the binding theory in effect at every stage of a derivation?

Consider:

Who that Harvey dislikes would he invite to his party?

4a. *All those claims that my theory is incorrect are.

6b. *Every man who said Harvey would buy some salmon did.

The problem here is that our original analysis had nothing to say about subjects as semantic arguments of VPs. This makes sense, since, in a lambda-calculus sort of way, VPs are ostensibly distinct from their ultimate arguments, the subject. This is seen in the pair below.

1338a. [Bob [likes Jane]$_{VP}$]$_{TP}$ Shouldn't that be a (b) ?

1338b. [([\x.like'(x, j)]$_{VP}$)(j)]$_{TP}$

In such a view, object argument mismatch in potential readings of sentences like (1337) can be easily ruled out, and 'strict' versus 'sloppy' readings of elided content can be accounted for too[3]. There were issues with this analysis: type-theoretical niceties didn't always jibe with our proposed SRs, and, most notably, VPISR would effectively ruin such an analysis, at least if one were to take traces seriously (and we sort of have to). A naive application of this approach to the current data is stymying: why do subjects *now* appear to be somehow a part of the IC? It might behoove us at this juncture to recap a bit of what we know:

- □Subjects are arguments of the VP, but in a special fashion.
- □Subjects don't seem to matter in simple cases of VPE, and we'd expect that to export to more complex scenarios, too.
- □Sometimes apparently identical verb phrases seem to care about their subjects. Although, this is only in fairly specific cases involving argument clause embedding and some restrictive relative clauses.

What's going on in these cases? A glimpse at one of the early examples shown in (1a) is instructive:

1a. *A proof that God exists does.

One might be tempted to claim that this is an issue of unaccusitivity, suggesting that the direct-argument nature of this subject leaves a stronger 'trace' in the VP. This would allow for argument mismatch. But that's obviously not the case, since we can say things like "Alonzo exploded, and Alan did, too!" Plus, since the same operation (a PR□B□-related thing, no doubt) is probably implicated in moving subject DPs from *all* positions, be that spec of little vP or argument of A or whatever. Nice point.

So what is causing these sentences to be ungrammatical? While we don't have a perfect understanding of it, some things are becoming clear. The key observation here is that the arguments of the antecedent verb (and therefore the ellipsis verb) are being somehow tampered with in the ungrammatical areas. For each of the types of phenomenon that we see, there is a semantic relation between an argument in the antecedent and the elided material. As an example, we'll look at (4).

[3] Without wasting time and space on detail, bound variable (function/mapping) readings have a different SR than direct entity reference readings, and this difference in SR permits an expected difference in interpretation.

4. All those claims that my theory is incorrect are incorrect.

4a. *All those claims that my theory is incorrect are.

A rough semantic transcription of a simplified version of this might look something along the lines of (1339):

1339a. *Claims that x is incorrect are $[\text{incorrect}]_{\text{VP-elided}}$.

1339b. (\x. (incorrect'(x))(\y.claim'(y,x))(incorrect'(y))...

...and here we run into an issue: some of the information needed to complete our expression appears to be bound up in the previous clause.

A similar effect can be seen in the examples employing relative clauses (and, crucially, quantifiers in the upstairs . Since restrictive relative clauses are - to the best of our knowledge - depicted using 'and' notation (∧) in the lambda expression's restrictor, we'll potentially see 'lower' variables being bound by their 'upstairs' counterparts. Effectively, the variables' scopes are shifted and the result creates a dependency across the arguments

1340a. *Every man who claimed that Harvey stole salmon[4] did.

1340b. (steal'(x,s)) (\y.Ax. man'(x) ∧ claim'(x, y))(\w. steal'(h,w))(s)

There's a problem with the namespaces here. 'x' is bound in the restrictor and in the nuclear scope - it's unsurprising that such a malformed lambda expression was produced by such a poor semanticist, or that the sentence which produced *it* would be considered ungrammatical. So, in both situations, there's a binding operation across the arguments of the ellipsis verb which creates dependencies, thereby rendering attempts at ellipsis ungrammatical.

Note, too, that an additional potential antecedent must be present within the complex subject antecedent ~~must be present~~, and that the 'larger' antecedent, in every example here, is a legitimate one (assuming you're okay with stupid readings[5]). Additionally, theta-role assigning (argument-sensitive) verbs are employed throughout. Maybe there's something to this!

These concepts and more are explored, tested, fleshed out, and thoroughly enjoyed in the following sections. Probably.

IV. Antecedent-contained Ellipsis

We will begin by considering the issue of antecedent-contained ellipsis, which is a phenomenon found in VPE where the ellipsis site is contained within its antecedent.

(1) I read the same book Harvey did.

(2) I visited every city that my father did.

(3) The Americans made the same mistakes the Russians did.

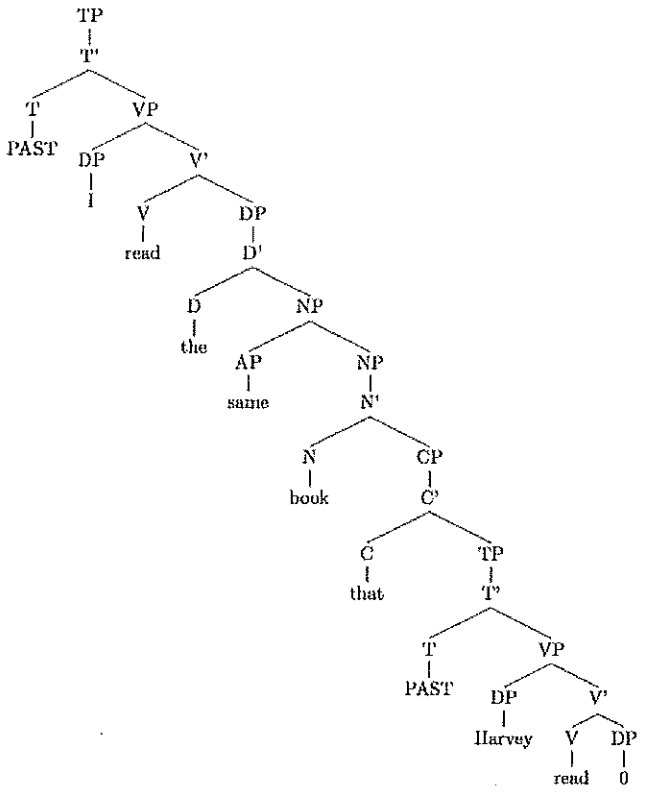
(4) People of my generation will not have seen as many new inventions as people of yours will.

---

[4] Why yes, of course 'salmon' is a distinct model/discourse referent.

[5] People who don't believe God exists don't [believe God exists]. The guy who claimed he stole the monkey didn't [claim he stole the monkey]. That sort of thing. ✓

All of the sentences above are comprised of antecedent-contained ellipsis (ACE). The issue we come to at this point is the notion that in order for VPE to occur, the elided VP must essentially be identical to its antecedent. In order for this to be true, the elided material would contain an infinite number of its antecedent. For example, in (1), the elision site would hold an infinite chain of *Read the same book Harvey read the same book Harvey read.*. and so on.
Let us first look at example (1) by looking at its deep structure:



In the DP complement of the lower V, *read* selects for *the same book that Harvey read* ... which is represented by 0 above. Our current theory of ellipsis can account for this phenomenon due to VPs coreference. Ultimately the VPs are in identity with one another. If we were to call book x The Hobbit, and Harvey read The Hobbit, we would know that I read The Hobbit, since it is the book that Harvey read. We know that in order for VPE to occur, the verb must have the same complement. Though the complements are not in syntactic identity, they are coreferent and this will eventually be able to represented in a logical structure.

In the case of sentences like (2), the elision site contains [visit x,] where x represents a set of cities. The VP of the antecedent is [visit relative clause]. Though we cannot represent this logically, we know that the complements of V ultimately refer to the same set of cities. If the father visited Tokyo, Shanghai, and Bangkok, these are the cities which the relative clause represents, as well as the

unless I've forgotten what 'refer' means, this should be cleaned up.

complement of the elided V. Thus giving identity to the VPs.

And lastly, in sentence (3), we produce the exact same structure as (1). The discussion of which should be able to be applied in the exact same way. The elided VP refers to the relative clause in which it is contained. We can see that the two VPs are coreferent in that the argument of the verbs is one in the same, *the same mistakes,* with two different external arguments: the Russians and the Americans. In sentence (4), we are faced with a variation of the above sentences. The variation lies in the negation of the higher VP and the affirmative of the elided material in the lower VP. The ellipsis site does not contain negation, nor the auxiliary *have,* therefore we can see that elided material contains only the lowest VP *see many new inventions.* Whether or not the adverb *as* is found in the ellipsis site is undetermined.

And unless "coreferent" means something new and different, I don't see how VPs can be coreferent.

you mean, and, don't you?

5?

Lambda calculus should be able to formally present the identity between the two VPs, however, we are currently unable to represent relative clauses in lambda calculus without the use of LF movements like quantifier raising. We are opposed to quantifier raising because it avoids the problem of representing quantifier scope logically in a way which corresponds to the sentence's overt syntactic representation. Also, we would rely on quantifier raising for the VPs to have the same logical representation such that VPE would be licensed. But in the Y model, VPE is a syntactic transformation that precedes LF movements like quantifier raising. Therefore, quantifier raising cannot happen in time for VPE. That is a problem.

Oh God

V. Proofs and Existence

The sentences in this section are characterized by a complex subject that contains the antecedent for the ellipsis, which occurs in the matrix clause of the sentence (or vice versa).

Do you know how much I hate that punchline error?

1. A proof that God exists exists.
1b. *A proof that God exists does.
1c. *A proof that God does exists.
2a. *There exists a proof that God does.
2b. *A proof exists that God does.
3a. All those claims that my theory is incorrect are incorrect.
3b. *All those claims that my theory is incorrect are.
3c. *All those claims that my theory is are incorrect.
4a. Charley's assertion that he is widely admired for his boldness is widely admired for its boldness.
4b. *Charley's assertion that he is widely admired for his boldness is.
4c. *Charley's assertion that he is is widely admired for its boldness.
5a. Most of the evidence that the documents were faked was faked.
5b. *Most of the evidence that the documents were faked was.
5c. *Most of the evidence that the documents were was faked.
6a. The rising nuclear power's desire to be dangerous is dangerous.

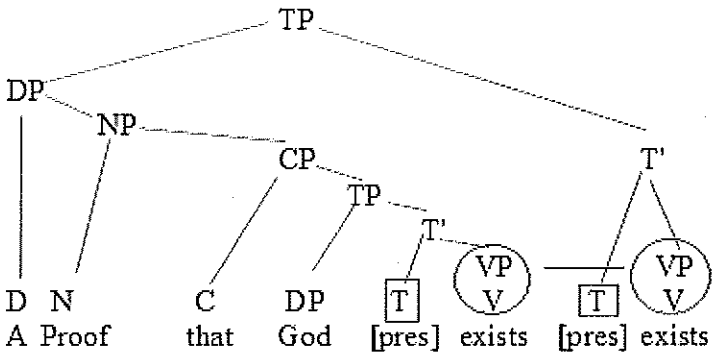
6b. *The rising nuclear power's desire to be dangerous is.
6c. *The rising nuclear power's desire to be is dangerous.
7a. That some true theorems are not provable is provable.
7b. *That some true theorems are not provable is.
7c. *That some true theorems are not is provable.

In none of these cases is it a relative clause where the antecedent is contained--all of these clauses are "argument clauses", i.e., clauses that are not optional. The CPs in (1)-(6) are arguments of nouns, and the one in (7) is a subject CP. Such clauses are different from relative clauses in that they do not have any gaps; a rel-gap is created with a relative clause because the NP that takes the CP as an adjunct creates a gap within that CP. Argument CPs of nouns do not do so (e.g., in (3) there is no "claim" gap in "my theory is incorrect"), and CPs which occupy verbal argument positions (subject, in the case of (7), at least at surface structure) do not have anything to create a relative gap. These facts become interesting when considering closely related sentences, such as those found in part III, such as "The house that was on fire still is". Although consideration of such sentences will be put off until the appropriate section of this paper, it behooves us to consider what conditions are causing sentences (1) - (7) to be ungrammatical while other, very similar sentences are grammatical.

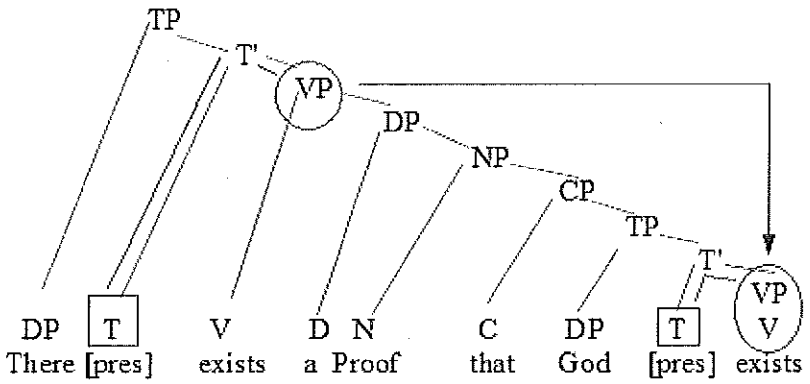
Importantly, sentences like "The house that was on fire still is" (let's call it (101)) differ minimally from sentences (1) - (7) of this section. One way they differ is that the antecedents in (1) - (7) are within argument clauses, while in the grammatical kind the antecedent is within an adjoined CP. We can then not attribute the ungrammaticality of these sentences to the fact that the ellipsis occurs in the matrix clause while its antecedent is embedded within it, or any other such story. Another difference is that the subjects of the antecedent VP and the elided VP are different in (1) - (7), but the same for cases like (101). We will find that this is also an important distinction for sentences like (101): "*The guy who claimed Harvey stole the monkey didn't". Thus, such cannot be a problem exclusive to the sentences of (1) - (7). There must be a violation that is exclusive to sentences like (1) - (7), where the VPE - antecedent relation occurs between the matrix VP and an argument-embedded VP, as opposed to an adjoined CP.

Let us consider the following trees:

(1)



(2)



The red circles indicate the VP's involved for the purpose of illustrating their location in the structure, with the red line simply connecting them visually. Either may be the antecedent or the ellipsis site, except in (2), where the first VP could not be elided, else it would elide the antecedent as well. In order to account for the lack of VPE licensing here, we must make use of the distinction between argument and adjunct CPs. Thus far, our theory has no way of incorporating this into a proper account of the phenomenon. We have not yet made use of distinctions based on argumenthood, but in order to capture the facts of this section, we must.

which/that

Although the facts in this section are far from leading us to a proper account of the phenomenon as a whole, and it is apparent that certain restrictions interact with each other, we can account for the facts in this section through prose, at least. Let us stick to the domain of sentences who only have one clause level and one overt argument, which contains a candidate for a VPE antecedent or ellipsis site. It may be possible to make use of the fact that the complex argument which contains a VP will be an argument of the other VP of the sentence. The restriction then, which is to be put forth and made subject to criticism, is that an antecedent-ellipsis relation between a VP_1 and a VP_2 when VP_2 is contained by the argument of an argument of VP_1, VPE is not licensed. This holds true for sentences (1) - (7), but does not interfere with the licensing of VPE in sentences like (101), where VP_2 is contained within an adjunct of an argument of VP_1.

account for, or describe?

There are exaples in part IV (like (5)) which indicate Rot 8 it's not an argument-adjunct distinction that is important.

VI. A new Wrinkle on the Problem

In this section, there are several interesting problems. Perhaps the most rudimentary is that there are examples of VPE in which the grammaticality hinges on the identity of the subject. Up until this point we have considered the subject of a predicate safely outside the domain of whatever part of the VPs in question must be identical for VPE to be licensed between them. Considering examples like

1) "Sally kicked the ball and (Bill/Heather/the boy/all the boys/the elephant/Sally's dog/the friend she had over for her birthday) did too."

this seems to be a safe assumption to make. Clearly, the subject of *kick* in the elision clause can be just about anything without compromising the possibility of VPE. This data could be easily described if we stipulated the domain of application of VPE is just the VP. Then the subject of *kick* would be in spec vP and would survive. However, this fails. Notice (2), in which the subject of *die* starts in the VP, but can still vary. Nice point.

2) "Sally died and (Bill/Heather/the boy/all the boys/the elephant/Sally's dog/the friend she had over for her birthday) did too."

Given these examples, it would seem a safe assumption that the identity condition on VPE doesn't take into account non-complement arguments of the predicate being elided.

This assumption is challenged by the data we see in section III. Consider example 5:

5) "The man who wanted to steal the books couldn't."
5b) *"The man who wanted Harvey to steal the books couldn't."

What's causing the ungrammaticality of (5b) must be some condition upon VPE. Consider the examples without VPE; the ungrammaticality disappears:

5') "The man who wanted to steal the books couldn't steal the books."
5b') "The man who wanted Harvey to steal the books couldn't steal the books."

This is a troubling observation. Before, we said that the subjects didn't have to be the same. But here, the only difference between (5b) and the grammatical (5) is the identity of the subject in the embedded clause of the relative clause. In examples 1-9, it appears again and again that the subject of the embedded clause within the relative clause has to be co-referent with the head of the relative clause (the subject of the matrix clause, where the antecedent/elision (depending on the example) occurs. If we

simply claim that the subject of "steal" is within the domain of the identity condition on VPE, we would predict that "John stole an apple and Bill did too," is ungrammatical. Clearly, it is not.

The dilemma we have laid out above may not have a clean-cut solution. If it does have a solution, we are more likely to seek such a solution not by merely toggling arguments of the predicate in and out of relevance to the identity condition on VPE. Rather, we must address the particular syntactic or logical structure presented to us in this section, drawing upon the relevant differences such examples have against the classic coordinate VPE structure of "Sally jumped and Bill did too."

We might be able to account for these sentences via an observation by Ivan Sag himself in his paper, *A Logical Theory of Verb Phrase Deletion* (1976). According to Sag, ". . . if there are any variables in [one of the lambda representations of the VPE predicates - call it A] that are bound by some quantifier outside of λx(A), then the corresponding variable in λy(B) [the lambda representation of the complement VPE predicate to A] must be bound by the same operator in order for alphabetic variance to obtain λx(. . .) and λy(. . .) are alphabetic variants in (Az)([John, λx(x loves z)] & [Bill, λy(y loves z)]) [sic]" (535). We are interpreting this quote to mean that if there is a variable within the logical lambda domain of either the elision or antecedent predicates that is bound by a quantifier, there must be an equivalent variable bound by the same quantifier in its complementary VPE VP in order for the identity condition on VPE to be upheld between them. The case in which this observation is interesting, however, is now the one in which the variable bound by the quantifier is in subject position.

Let's consider the following examples:

1a. People who don't believe they exist don't.
1b. *People who don't believe God exists don't.

In each of these sentences, there seems to be an implicit universal quantifier quantifying over *people*. The sentence "All people who don't believe they exist don't," after all, is synonymous with (1a). Thus it seems that "people" contains this reference to each person in the set of people implicitly. Syntactically, the subject of the matrix clause is the relative clause, and the VPE antecedent of the matrix clause predicate is within that relative clause. *People* therefore scopes over both the antecedent and the elision clause. If *people* indeed possesses an implicit universal quantifier, then we also know that this quantifier has scope over both the antecedent and elision clauses.

Now, let's recognize that the antecedent, ". . . who believe they exist . . .," has a variable, "they," that refers to "people" and is therefore bound by a quantifier (the universal quantifier that implicitly quantifies "people"). If we take Sag's condition on alphabetic variance seriously, we then know enough about the antecedent to say that there must be an equivalent variable bound by the same quantifier in its complementary VPE VP. To know this, we should have an understanding of the lambda calculus at work. That is, if the antecedent clause is, roughly:

I don't think this can be right. You've got one variable bound by two operators.

(Az) . . . [λz (z exists)] . . .

then its VPE complement, where the elision takes place, must also have z as its variable in subject position, and z must be bound by the same quantifier that binds the z in its antecedent.

If we follow this generalization, we can explain not only why (1a) is grammatical, but why (1b) fails to be grammatical. In (1a), "they" is a reference to "people," and z is therefore preserved within the logical structure of the predicate between both antecedent and elision. In (1b), the argument of "exist" is a constant, "God." There is therefore a variable within the logical lambda domain of the antecedent that is bounded by a quantifier, and there is no equivalent variable bound by the same quantifier in its complement. So long as we take the rule outlined above seriously, there can't be alphabetic variance between the predicate in the antecedent and the predicate in the elision, and we therefore can't have VPE occur between them.

This reasoning helps explain why the variable in subject position can matter in certain cases but not in others. In classic coordination examples like "Sally hit the ball and Bill did too," the well-formedness of VPE doesn't hinge upon what is in subject position of the elision clause, as detailed above. This is because [λx hit'(x,y)(the ball)](Sally) and [λz hit'(z,x')(the ball)](Bill) are alphabetic variants. (Sally) and (Bill) are outside of the scope of consideration for VPE identity, and they are both represented within the scope of the VP as a bound variable. For this reason, they are alphabetic variants. In the case of *"The guy who claimed Harvey stole the monkey didn't," VPE is not licensed because the two VPs in question ("Harvey stole the monkey," and "The guy who . . . stole the monkey,") are not alphabetic variants. This is because the bound variable the elision clause's subject position, as represented by in the lambda structure, is also a variable bound by a quantifier. Because of this, or at least because the quantifier also has scope over the VP's antecedent, the corresponding variable of the antecedent has to be bound by the same quantifier. Subject position almost never matters for VPE in simple coordinate structure examples because the subject is at most represented within the VP as a bound variable, and two different bound variables are consistent with alphabetic variance. When the subject is also a variable bound by a quantifier, however, the subject of its VPE complement predicate must be bound by the same variable for alphabetic variance to exist between them. This may account to some extent for the dilemma set up at the beginning of this section.

I think we'll need to talk about this.

Not every sentence can be accounted for by this theory, however. Let's consider (9c), which is a problem for the theory outlined above because it does not contain a quantifier that scopes over both predicates.

9c. What I thought would persuade Stanley to change his mind didn't.

(9c) is unambiguous. There are multiple possible readings but only (9c.B) is grammatical, as shown below:

9c.A. *What I thought would persuade Stanley to change his mind didn't [think (it) would persuade Stanley to change his mind]
9c.B. What I thought would persuade Stanley to change his mind didn't [persuade Stanley to change his mind]
9c.C. *What I thought would persuade Stanley to change his mind didn't [change his mind]

If we are going for a basic description of this data, the subjects within the argument have to be identical even though we don't see this restriction for the most basic cases: 'John exists and Jill does too.' In (9c.A), the subject of the antecedent is *I* and the subject of the anaphor is 'what I thought would persuade Stanley to change his mind'. It's hard to say if this is the non-coreferent subjects that's causing the ungrammaticality, but it seems more likely that it's just because 'what i thought would persuade Stanley to change his mind' isn't an entity capable of thinking. In (9c.B), the subject of the antecedent is the *what* that has moved up to spec CP and the subject of the anaphor is 'what I thought would persuade Stanley to change his mind'. Since these corefer, (9c.B) is the only grammatical reading. In (9c.C), the subject of the antecedent is *Stanley* and the subject of the anaphor is 'what I thought would persuade Stanley to change his mind'. These don't corefer and this creates the ungrammaticality.

I'm not sure I understand this.

If we're trying to make this about entities vs. quantifiers scoping over functions, then there might be a much better answer to explain (9c.C). Before, in (1), we were saying that the universal quantifier having scope over *they* causes *they* to be a function rather than an entity like *God.*

1a. People who don't believe they exist don't.
1b. *People who don't believe God exists don't.

If we try to import that argument to (9), it seems to give us a really nice result. The reason for (9c.C) being ungrammatical could very well be due to a general constraint of VPE that breaks apart raising/control predicates, as below.

Explain this better.

301. a. I persuaded John to eat ten bagels and Mary did too.
b. *I persuaded John to eat ten bagels and Mary persuaded him to too.
302. a. John seems to be angry and Mary does too.
b. *John seems to be angry and Mary seems to be too.

Trying to create this alternate story, (9c.C) is explained well. Perhaps this has to do with how raising/control predicates are translated into lambda calculus. If the relation between the controlled argument and the controllee (or between the empty spot and the raising argument) was acting more like a relational function (similar to xself) rather than an actual entity being plugged into both clauses, this

might lead to a more satisfying answer. *Persuade* would thus be 'persuade x for x to VP'. The reason why (9c.C) would be ungrammatical would be due to trying to split that function relation up. The x in the complement clause of *persuade* wouldn't have a way to receive its interpretation without the VP that is going to be elided. This sort of explanation might explain the difference between (8) and (8b).

8. The man who promised me to left town.
8b. *The man who persuaded me to left town.

Sentence (8) means 'The man who promised me for him to leave town left town'. Since (8b) is a control predicate, the sentence is trying to mean 'The man who persuaded me for me to leave town left town'. But this would break our story. When the quantifier scopes over a noun, it treats it like a variable. These raising and control predicates must be acting in the same way. Therefore, the problem with (8) isn't that the subjects are different, it's that in the antecedent the subject is an entity and in the anaphor, the subject is a variable bound by the raising/control predicate. Entities and variables are treating very differently in semantics, so using this distinction, when VPE is control so completely by the semantics, seems natural.

In summary, one possibility for an explanation to the grammaticality of sentences like "People who don't believe they exist don't," in light of the ungrammaticality of sentences like *"People who don't believe God exists don't," is that, in both, there is a variable in the elision site that is bound by a quantifier outside of the lambda expression immediately containing it. If we take Sag's restriction on alphabetic variance seriously, it must also be true that its VPE complement must contain a corresponding variable bound by the same quantifier. Because "God" is the corresponding variable in the ungrammatical sentence and it isn't bound by the same quantifier as the subject of the elision clause, the antecedent and elision VPs are not alphabetic variants and VPE is not licensed between them.

Since who is God a variable

This does not work for all of the examples because not all of the examples are such that a quantifier scopes over both antecedent and elision predicates. For that reason we might look to other possibilities for a solution. Perhaps we need to treat other things in the same way we treat these quantifiers scoping over arguments. Maybe raising and control predicates are treating the argument of the embedded clause as variables rather than actual entities and that's what causes examples like (9c) to be unambiguous. This would unite our theory behind a single notion of the identity condition of VPE, one that requires exact logical representation and cares deeply about type logic, much more than a theory in which the data in this problem are an additional constraint upon VPE within arguments of the verb.[6]

[6] This could explain facts the following:
303. *John exists and a dog does too.
304. *A dog exists and John does too.

?? I don't see any ungrammaticality.

VII. A little lagniappe

Obviously, the problem that needs to be dealt with in this section is the IC for VPE. One observation seems to be that the IC for VPE is very promiscuous, because it seems to care about the identity condition for subjects in some cases, such as "*A proof that God exists does", and it other cases it cares about the IC for direct objects "Holly ate the sandwich and Mark did, too," while finally section IV shows that the IC must be met for indirect objects such as "*Eric sent letters to every aide who worked for a senator Polly did." In all of these cases, it seems that the only condition at play is the IC for the domain of the ellipsis site; meaning if there is ellipsis, then the domain of its antecedent *must* have strict identity, notice the following.

(1) Eric sent letters$_k$ to every senator$_i$ Polly sent letters$_k$ to (every senator)$_i$

(2) Eric sent letters to every senator Polly did.

(3) *Eric sent letters$_k$ to every aide$_e$ who worked for a senator$_i$ Polly sent letters$_k$ to (every aide)$_a$

The ellipsis site is represented by the underlined mark, while the gap for the relative clause is represented by the parentheses. Specifically, sentence (3) is grammatical, but only if VPE hasn't applied. Moreover, it would be ungrammatical if VPE occurred, because the domain of the ellipsis site doesn't match the identity with its antecedent. Of course, if the IC has been met, then VPE can occur, such as examples (2) and (2a) demonstrate.

(2) Polly visited every town$_i$ Eric visited (every town)$_i$

(2a) Polly visited a town in every country$_i$ Eric visited (a town in every country)$_i$

The last two examples (2) and (2a) show that the IC for the argument of 'visit' has exact identity which means that VPE is possible. In our general understanding of VPE we have been assuming exact semantic identity between the two structures and this section is no exception to that notion. Therefore, in our current understanding of ellipsis, this section shows that we must have exact semantic identity between the two structures; otherwise, if they differ in semantic identity, VPE cannot occur within one of the structures.

VIII. Conclusion

In short, we have determined that our IC as initially stated was unable to account for all of the issues that arose during our consideration of Argument Dependent Ellipsis. Specifically, we have determined that identity of the semantic representation associated with the nodes of the antecedent VP and the elided VP is not sufficiently representing requirements that need to be met in order for VPE to take place and result in a grammatical sentence. In cases involving ADE, there seem to be restrictions on the the exact location in which an a verb phrase can find its antecedent. In particular, a number of issues arise when the potential antecedent for VPE is found within a semantic argument of the main verb. We have argued throughout this paper that the potential ungrammaticality of such VPE is due to issues of binding. In the ungrammatical sentences that we have considered, there are binding operations across the arguments of the elided verb, which generates dependencies that result in crashing derivations and

ungrammatical sentences. The sentences that are grammatical, whether or not they contain VPE, are grammatical in part because they do not contain such dependencies.

That being said, there are a number of issues that, as of yet, are unresolved. We have not determined where VPE takes place with respect to the rest of the syntax and morphology. Nor have we determined what needs to be said about VPISR and quantifier raising. Additionally, we have not determined to what extent interpretability should be incorporated into our model. Besides these few issues, there are undoubtedly many more issues concerning VPE that we have yet to encounter.

undoubtedly.

This is a very good stab at it.
As yr see, the identity condition is not very straightforward.