Ellipsis, Parallelism, and Polarity*

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Abstract We explore the distribution of polarity items in antecedents of VP ellipsis. We show that the data can be derived from (i) the assumption that parts of polarity items are not interpreted *in situ* (cf., e.g., Lahiri 1998) and (ii) the standard assumptions about parallelism in ellipsis licensing (e.g., Rooth 1992, Fox 2000).

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1 Two puzzles about ellipsis and polarity

A well-formed VP may be elided (i.e., deleted at PF) if it is recoverable. Recoverability is standardly captured as a requirement that the elided VP, or some constituent dominating it, stands in an appropriate matching relation with an antecedent constituent in the discourse. A particularly influential characterization of this matching relation has been put forward by Rooth (1992). A simplified version of it is provided in (1) (see, e.g., Fox 2000 for details). (We will call the α and β constituents 'parallelism domains', PD_A and PD_E, respectively.)

(1) *Parallelism Condition on VP Ellipsis:*
   a. A VP may be elided if it is reflexively dominated by a constituent α that stands in a parallelism relation with a constituent β in the discourse.
   b. A constituent α stands in a parallelism relation with a constituent β iff $[\![\beta]\!] \in \text{F}(\alpha)$, where $\text{F}(\alpha)$ is the focus value of α.[1]

For illustration: the ellipsis of *eat lunch* in the second sentence of (2a) is licensed because the sentence stands in a parallelism relation with the first sentence, i.e., because Parallelism is satisfied, as stated in (2c) (note that there may be further PDs that satisfy Parallelism); the same would fail to hold for, say, *eat something*.

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1 See, e.g., Rooth (1985) for a description of how focus values are computed. We represent focus values by relying on the following convention: $\{\text{ˆx eat lunch: x}\in D_e\} := \{\text{p: }\exists\text{x(p = ˆx eat lunch)}\}$.

(2) a. You didn't eat lunch, but I did.
b. [neg [$_{PD_A}$ you [$_{VP}$ eat lunch]]. [$_{PD_E}$ I_F [$_{VP}$ eat lunch]].
c. $[\![PD_A]\!] \in F(PD_E)$, i.e., $[\![$you eat lunch$]\!] \in \{\hat{}x$ eat lunch: $x \in D_e\}$

1.1 Polarity alternations

Many examples of VP ellipsis have been brought forward where the forms of the elided and the antecedent VPs differ in their morphology but arguably not in their semantics. Sag (1976) discusses examples like (3), in which the antecedent VP contains the polarity item (PI) *anything*:

(3) John didn't eat anything, but I did.

If the second VP in (3) contained *anything*, the sentence would not have been well-formed (**I ate anything*). Accordingly, Sag and others assumed that whatever property of *anything* is responsible for it being a PI, it does not noticeably affect the syntax and semantics of the VP containing the PI (at least not for the purposes of ellipsis licensing). This assumption remains the gold standard when it comes to the treatment of PIs in antecedents of VP ellipsis (see Merchant 2013 for an overview).[2]

(4) *Standard assumption about PIs in antecedents of VP ellipsis:*
Although 'polarity features' affect the distribution of the PIs that carry them, they do not affect the semantics of the VPs in which they occur.

A VP containing *anything*, which denotes an existential quantifier (see, e.g., Ladusaw 1979), may thus be a licit antecedent to an elided VP containing *something* in a parallel position. Put in terms we introduced above, the discourse in (3) satisfies Parallelism because it has the following derivation (among others):

(5) a. You didn't eat anything, but I did.
b. [neg [$_{PD_A}$ you [$_{VP}$ eat anything]]. [$_{PD_E}$ I_F [$_{VP}$ eat something]].
c. $[\![PD_A]\!] \in F(PD_E)$, i.e., $[\![$you eat anything$]\!] \in \{\hat{}x$ eat something: $x \in D_e\}$, i.e., $\hat{}$you eat something $\in \{\hat{}x$ eat something: $x \in D_e\}$

In the remainder of the section we present data that appear to be at odds with the combination of (1) and (4). Accordingly, one of these assumptions will have to be supplanted, at least on the supposition that the PIs involved should not be analyzed as being substantially different from those discussed by Sag and others.

2 For illustration, Merchant (2013) proposes that PIs have an unspecified polarity feature which gets valued by a c-commanding polarity head, which is external to the VP. This process determines the morphology of the PI, say, whether it is realized as *anything* or *something*.

1.2 A puzzle involving free choice items

In addition to downward-entailing (DE) environments, *anything* may occur also in the scope of existential modals. The occurrences of *any* in existential modal environments have been referred to as 'free choice *any*': namely, they give rise to the so-called free choice inference that, roughly, every element in the domain of *any* verifies the statement (see, e.g., Dayal 1998, Menéndez-Benito 2010, Chierchia 2013, among many others). A felicitous occurrence of free choice *any* is exemplified in (6a); a paraphrase of the free choice inference it induces is provided in (6b).

(6) a. John may/is allowed to eat any dessert.
b. ≈ Every dessert is such that John may eat it.

While free choice *any* may occur in existential modal environments, it appears not to be acceptable in universal modal environments: the counterpart of (6) in which *any* is embedded below a universal modal is infelicitous, given in (7).[3]

(7) #John must/has to eat any dessert.

It has been argued that free choice *any*, just as the occurrences of *any* in DE environments, should be analyzed as involving existential quantification (see, e.g., Menéndez-Benito 2010, Chierchia 2013, Dayal 2013). If this assumption is correct, and free choice *any* falls under the assumption in (4), then a VP containing an occurrence of free choice *any* should be a licit antecedent for VP ellipsis if the elided VP would contain *some dessert* in a position parallel to that of *any dessert*.

This expectation is not borne out: while a VP that is embedded under an existential modal can be elided, exemplified in (8a), a VP that is in an episodic environment or is embedded under a universal modal cannot be, exemplified in (8bc). Plain indefinites behave differently: the counterparts of (8bc) in which *any dessert* is replaced with *a/some dessert* are judged as acceptable, given in (9).

(8) a. John may/is allowed to eat any dessert. Bill is also allowed to.
b. #John may/is allowed to eat any dessert. Bill (already) did.
c. #John may/is allowed to eat any dessert. Bill must/has to.

(9) a. John may/is allowed to eat a dessert. Bill is also allowed to.
b. John may/is allowed to eat a dessert. Bill (already) did.
c. John may/is allowed to eat a dessert. Bill must/has to.

3 This is an idealized description of the distribution of *any* in modal environments (see, e.g., Crnič 2013 for some qualifications). We briefly discuss how potential occurrences of *any* in universal modals statements could be captured in our account of polarity licensing in Section 2.2.

Let us elaborate on why the pattern in (8) is unexpected. If we assume that free choice *any* is an indefinite that is interpreted *in situ* and whose import is utilized by some operator higher in the structure to yield the free choice inference, the discourse in, say, (8b) may have the representation in (10) (the mechanism responsible for the free choice inference is left unspecified here and a specific candidate for it will be discussed in the following section; see also, e.g., Aloni 2007, Menéndez-Benito 2010, Chierchia 2013). Importantly, the PD_E stands in a parallelism relation with the PD_A, which should suffice for the ellipsis to be licensed.[4,5]

(10) a. [... [may [$_{PD_A}$ John eat any dessert]]. [$_{PD_E}$ $Bill_F$ eat a dessert].
b. $[\![PD_A]\!] \in F(PD_E)$, i.e., ˆJohn eat a dessert $\in$ {ˆx eat a dessert: $x \in D_e$}

1.3 A puzzle involving negative polarity items

A puzzling pattern appears to emerge also with PIs in certain DE environments. For example, if a VP containing *any dessert* is, say, in the scope of a DE attitude predicate or a negated attitude predicate, the ellipsis of a VP containing *some dessert* in a position parallel to that of *any dessert* need not be licensed. In particular, while the ellipsis is licit with such antecedents if the elided VP is also embeded under an attitude predicate, exemplified in (11), it is marked if the elided VP is unembedded.

(11) a. I am surprised that John ate any dessert, because I expect Sue did too.
b. I don't think that John ate any dessert, but Sue thinks he did.

(12) a. #I am surprised that John ate any dessert, because Sue also did.
b. #I don't think that John ate any dessert, but Sue did.

Plain indefinites behave differently: the counterparts of (12) that lack PIs in antecedent VPs, given in (13), are judged as comparatively better.

(13) a. I am surprised that John ate a dessert, because Sue also did.
b. I don't think that John ate a dessert, but Sue did.

4 Chierchia's (2013) representation of the sentence with free choice *any* in (8) is more involved than what we provide in (10), sketched in (ia). Cleary, Chierchia's full proposal does not *ceteris paribus* lead to a prediction that is different from the one we discuss in the main text:

(i) a. [OP [$_{PD_A}$ [any dessert$_@$] $\lambda 1$ [$\Diamond$ John eat t_1]]].[$_{PD_E}$ $\Box_F$/did_F [$Bill_F$ eat a dessert$_@$]].
b. $[\![PD_A]\!] \in F(PD_E)$, i.e., ˆ$\Diamond$(J. eat a dessert$_@$)$\in${ˆf(x eat a dessert$_@$): $f \in D_{(st)(st)}$, $x \in D_e$}

5 A possible response to these data may be to adopt a universal-like analysis of free choice *any*, contra Chierchia (2013) and others, and assume that the relevant 'polarity features' of free choice *any*, unlike those of other occurrences of *any*, do affect the semantics of the VPs in relevant ways. We cannot do justice to this response here due to space constraints but hope to return to it at another occasion.

On the assumptions in (1) and (4), the discourses in (12) should satisfy Parallelism. For illustration: the discourse in (12a) may have the representation in (14), on which the PD_A is in the focus value of PD_E.

(14) a. [I am surprised [$_{PD_A}$ John eat any dessert]]. [$_{PD_E}$ Sue$_F$ eat a dessert].
b. $[\![PD_A]\!] \in F(PD_E)$, i.e., ^John eat a dessert $\in$ {^x eat a dessert: x$\in D_e$}

1.4 A preview of the account

We have seen two types of examples that are unexpected on the combination of (1) and (4). We argue for dropping the latter assumption. Instead, we submit that PIs in antecedent VPs affect ellipsis resolution in ways similar to that of bound elements (say, bound variables or traces). We show that this state of affairs may be predicted on some recent approaches to polarity licensing.

More concretely, we propose that PIs (or one of their subconstituents) stand in a dependency relation with an alternative-sensitive operator that c-commands the DE (or non-monotone) environment in which the PIs are located. In this, we build on the work of Krifka (1995), Chierchia (2013) and, especially, Lahiri (1998).

(15) [OP [... neg/surprise/etc. [... PI ...]]]

Now, if an antecedent VP contains an element that stands in such a dependency relation with a c-commanding operator, then any PD_A containing this VP will have to contain this operator as well (for independently-motivated reasons). Accordingly, the elided VP will have to be appropriately embedded to satisfy Parallelism.

(16) PD_A: [OP [... neg/surprise/etc. [... PI ...]]]. PD_E: ([OP) [X$_{(F)}$ [... Indef ...]].

the minimal size of PD_A, as dictated by independent principles of grammar

the minimal size of PD_E, as dictated by Parallelism

In other words, the scope of the operator accompanying a PI in an antecedent VP determines the lower bound on the size of the PDs. This lower bound is respected in the acceptable examples discussed above but not in the unacceptable ones.

2 A theory of polarity licensing

We adopt a theory of polarity licensing that takes PIs like *any* to be existential quantifiers that invoke logically stronger alternatives; these alternatives are used up by an alternative-sensitive operator (e.g., Krifka 1995, Lahiri 1998, Chierchia 2013). For concreteness, we choose its implementation in Crnič (2014).

2.1 Negative polarity items

Basic assumptions. We propose that *any* NPs have the structure in (17). In adopting this structure, we effectively follow Lahiri (1998) in taking PI distribution to be tied to the distribution of covert *even* operator (see also Lee & Horn 1994), as well as Krifka (1995) and Chierchia (2013) in taking the alternatives invoked by PIs to correspond to the subsets of the resource domains of PIs (these are their so-called 'subdomain alternatives').

(17) [[any [even$_{\prec}$ D]] NP]

More concretely: *Any* is a determiner that denotes an existential quantifier corresponding to the denotation of *a/some*. Its slightly simplified meaning is in (18).

(18) $[\![\text{any}]\!] = \lambda D_{et}.\ \lambda P_{et}.\ \lambda Q_{(e(st))}.\ \lambda w_s.\ \exists x(D(x) = P(x) = Q(x,w) = 1)$

The sister of *any* at surface structure is *[even$_{\prec}$ D]*, which is of type ((et)(st))(st). Its meaning corresponds to an appropriate cross-categorial characterization of *even* combined with the domain of *any* (cf. Rooth 1985, Ch. 4). In particular, *even* presupposes that the proposition obtained by combining the domain of *any* with the respective predicate over domains is ordered above the propositions obtained by pointwise combining the alternatives to the domain of *any* (= its subsets) with the predicate. The ordering relation, $\prec$, is determined by the context. It may be the entailment relation, a 'less-likely-than' relation, etc.; for our purposes, it is only crucial that logically weaker alternatives cannot be ordered above logically stronger ones. (We represent p being ordered above q with 'p$\prec$q'.)

(19) $[\![\text{even}_{\prec}\ D]\!] = \lambda P_{(et)(st)}\colon \forall D' \subset D(P(D') \neq P(D) \rightarrow P(D) \prec P(D')).\ P(D)$

Given its type, *[even$_{\prec}$ D]* cannot be the first argument of *any* at LF: appropriate type-shifting has to apply or the constituent has to move at LF to a position in which it is interpretable, leaving behind an (et)-type trace. The choice between these two options is ultimately not crucial for the purposes of this paper; for reasons of familiarity, we opt for the second approach.[6]

Unacceptable occurrences of *any*. The assumptions above suffice to explain the distribution and import of *any*. In particular, we obtain the prediction that *any* is unacceptable if it occurs in an upward-entailing environment. For example, the occurrence of *any* in (20a) is unacceptable. The LF of the sentence is provided in

6 Adopting a type-shifting approach, whatever is responsible for the disambiguating effects of the quantifier scope relations in the PD_A on ellipsis resolution could also be treated as responsible for the effects of PIs (*even*) in the PD_A on ellipsis resolution, analogously to our proposal in Section 3.

(20b): *[even$_{\prec}$ D]* moves to adjoin to the matrix clause, where it is interpretable. (For perspicuity, we represent indices on binders and bound variables but not on other assignment-sensitive elements, unless this is crucial. See Heim & Kratzer 1998 for details on interpreting such structures.)

(20) a. #John ate anything.
b. [even$_{\prec}$ D] [λ1 [John ate [any D_1] thing]]

The presupposition triggered by *even* in this structure, given in (21a), is inconsistent: namely, it holds that for any D'$\subset$D, that John ate something in D' entails that John ate something in D and must thus be ordered at least as high as it, contra (21a).

(21) a. #Prs: $\forall$D'$\subset$D: ^John ate something$_{D}$ $\prec$ ^John ate something$_{D'}$
b. As: ^John ate something$_{D}$

Acceptable occurrences of *any*. If *any* is base-generated in a DE environment, the presupposition triggered by *even* may be vacuous and, accordingly, *any* is predicted to be acceptable in this environment. For example, if the ordering relation of *even* is resolved to the entailment relation, a sentence like (22a) triggers a vacuous presupposition on the construal of *even* above negation, given in (22b): the presupposition, given in (23a), is vacuous because negation and other DE operators license inferences from supersets to subsets in their scope. Finally, the assertive import of *any* is identical to that of other indefinites, as shown in (23b).

(22) a. John didn't eat anything.
b. [even$_{\prec}$ D] [λ1 $\neg$ [John eat [any D_1] thing]]

(23) a. Prs: $\forall$D'$\subset$D: ^$\neg$(John ate something$_{D}$) $\prec$ ^$\neg$(John ate something$_{D'}$)
b. As: ^$\neg$(John ate something$_{D}$)

Thus, the proposed analysis of *any* derives the desirable prediction that *any* is acceptable in DE environments and unacceptable in upward-entailing environments.[7] Another desirable consequence of the proposal is that *any* may be acceptable in non-monotone environments as well (see Section 4 for discussion).

(24) *Prediction of the proposal:*
Any is acceptable in DE environments, unacceptable in upward-entailing environments, and potentially acceptable in non-monotone environments.

7 Obviously, we are ignoring the more intricate aspects of the distribution of PIs, in particular, the so-called Immediate Scope Constraint (Linebarger 1987).

2.2 Free choice items

The analysis of *any* sketched above appears to run into a problem with free choice occurrences of *any*, specifically, the fact that *any* is acceptable in existential modal environments. This problem would be avoided if *any* – or its domain, to be precise – could be shown not to be in an upward-entailing environment in these configurations. And, indeed, taking the paraphrases of the felicitous sentences with free choice *any* as a guide, it does not appear to be – e.g., what corresponds to the domain of *any* in the paraphrase of (25a), in (25b), is in a DE environment (the restrictor of *every*).

(25) a. John may/is allowed to eat any dessert.
b. ≈ Every dessert is such that John may eat it.

Deriving free choice inferences. Following Fox (2007) and Chierchia (2013), we assume that if the domain of an existential quantifier in an existential modal environment is an associate of two recursively embedded exhaustification operators, it gives rise to a free choice inference. For instance, consider (26), which contains a plain indefinite but may still convey a free choice inference (Chierchia 2013).

(26) John may/is allowed too eat a dessert.
Possible reading: Every dessert is such that John may eat it.

The free choice inference of (26) is derived from the structure in (27), where both *exh* operators associate with the domain of the existential quantifier, which in turn invokes its subsets as alternatives.

(27) [exh C'] [exh C] [◊ [John eat [a D] dessert]]

The contribution of *exh*, described in (29), is to negate all the alternatives of its prejacent that can be negated (specifically, all the alternatives that are "innocently excludable" relative to the the set of alternatives and the prejacent, see Fox 2007; we rely on an overly simplified representation of exhaustification in this paper).[8]

(28) $\text{exh}(C,p,w) = 1$ iff $\forall q \in C: q(w) = 1 \rightarrow p \rightarrow q$

The free choice inference that is generated by (27) is provided in (29): for every subset D' of D, which includes singleton sets, John may eat some dessert in D' (we omit the computation here and refer the reader to Fox 2007, Chierchia 2013).

8 In line with our simplified treatment of *exh* in the main text, we leave aside issues involving double exhaustification of domains of unembedded indefinites, which would *ceteris paribus* result in indefinites having universal meanings. These issues can be avoided in a variety of different ways and can be safely ignored for the purposes of this paper (see, e.g., Chierchia 2013, Singh, Wexler, Astle, Kamawar & Fox 2013, Bar-Lev & Margulis 2013).

(29) $[\![(27)]\!]$ = ^∀D'⊆D: ◇(John eat some$_{D'}$ dessert)

Finally, it is important to highlight that the recursive exhaustification in (27) is necessary: a representation of (26) that would contain a single exhaustification operator would not yield the free choice inference (see, e.g., Fox 2007).

PIs in existential modal environments. Returning to free choice *any*, if the sentence in (30a) is parsed as in (30b), where *[even$_{\prec}$ D]* takes scope above the two *exh* operators that associate with the domain of *any* (i.e., the trace of *[even$_{\prec}$ D]*), it triggers the presupposition in (31a) and has the assertive meaning in (31b).

(30) a. John may/is allowed to eat any dessert.
b. [even$_{\prec}$ D] [λ1 [[exh C'] [exh C] [◇ [John eat [any D_1] dessert]]]]

(31) a. Prs: ∀D'⊂D: ^∀D''⊆D: ◇(John eat some$_{D''}$ dessert)
$\prec$ ^∀D''⊆D': ◇(John eat some$_{D''}$ dessert)
b. As: ^∀D'⊆D: ◇(John eat some$_{D'}$ dessert)

The presupposition in (31a) is vacuous. A shortcut to recognizing this is by focusing on the occurrences of D and D' in (31a): they occur in the restrictor of a universal quantifier, which as a DE environment licenses inferences from supersets to subsets. Accordingly, if the ordering of *even* is resolved to entailment, the presupposition it triggers is a tautology. This explains the acceptability and context-independence of *any* in existential modal environments.

PIs in universal modal environments. We have observed that occurrences of *any* are not acceptable in the scope of universal modals.

(32) #John must/has to eat any dessert.

This state of affairs is predicted only partly by the proposal described above. Specifically, the sentence in (32) may have the representation in (33), where *exh* associates with the domain of *any*. The exhaustification of the domain of *any* leads to the proposition that John must eat some dessert and that every dessert is such that he is allowed to eat it, as stated in (34). Note that double exhaustification would not affect the meaning of the sentence (see Fox 2007).

(33) [even$_{\prec}$ D] [λ1 [[exh C] [□ [John eat [any D_1] dessert]]]]

(34) As: ^□(John eat some$_D$ dessert) & ∀D'⊆D: ◇(John eat some$_{D'}$ dessert)

The presupposition induced by *even* in (33), given in (35), is contradictory if the ordering relation of *even* is resolved to entailment: namely, the alternatives that we

obtain from the pointwise combination of the predicate over domains and the subsets of D are mutually exclusive and thus cannot be ordered according to entailment. This should *prima facie* suffice for explaining the markedness of (32).[9]

(35) Prs: $\forall$D'$\subset$D: $\hat{}\Box$(John eat some$_{\text{D}}$ dessert) & $\forall$D"$\subseteq$D: $\Diamond$(John eat some$_{\text{D"}}$ dessert) $\prec$ $\hat{}\Box$(J. eat some$_{\text{D'}}$ dessert) & $\forall$D"$\subseteq$D': $\Diamond$(J. eat some$_{\text{D"}}$ dessert)

However, recall that the ordering relation of *even* need not be resolved to entailment. In particular, if it is resolved to some other relation, say, a 'less-likely-than' relation, the sentence in (32) would *ceteris paribus* trigger a contingent presupposition. While this may be desirable – there may be felicitous occurrences of PIs in what can be characterized as universal modal environments (see Crnič 2013 for a preliminary discussion) –, we submit here that such presuppositions, which order mutually exclusive modal statements, are not easy to evaluate (satisfy, accommodate) in natural contexts. We suggest that for this reason PIs tend to be perceived as marked in universal modal environments. We hope to more fully address these issues in the future (see, e.g., Menéndez-Benito 2010, Chierchia 2013 for different takes on free choice *any* in universal modal environments).

Summary. We proposed that the resource domain of *any* is an argument of covert *even* (cf. Krifka 1995, Lahiri 1998). Accordingly, it cannot be interpreted *in situ*. We obtain a felicitous interpretation only if *even* combined with the domain of *any* moves to a position in which its presupposition can be satisfied. If the PI occurs in a DE environment, *even* has to take scope above the DE environment; if it occurs in a modal environment, *even* has to take scope above the modal and *exh* operators.

3 Parallelism and polarity

3.1 Sag's example

With the above account of polarity licensing in hand, let us revisit the standard example of polarity alternation in VP ellipsis:

(3) John didn't eat anything, but I did.

Given our proposal, the first sentence of the discourse has the structure in (22) and the interpretation in (23), repeated below. Its assertive meaning is simply that John did not eat a thing, while the presupposition induced by *even* is vacuous, at least if the ordering relation of *even* is resolved to entailment.

9 Note that if no exhaustification applies in (32), *even* will trigger a contradictory presupposition no matter what scope it takes since the PI is in an upward-entailing environment.

(22) a. John didn't eat anything.
b. [even$_{\prec}$ D] [λ1 $\neg$ [John eat [any D_1] thing]]

(23) a. Prs: $\forall$D'$\subset$D: $\hat{}\neg$(John ate something$_D$) $\prec$ $\hat{}\neg$(John ate something$_{D'}$)
b. As: $\hat{}\neg$(John ate something$_D$)

If the PD_A is the entire first sentence in (3), as in (36a), the focus value of the second sentence, with the focus on *I* and *did*, as in (36b), will contain the meaning of the PD_E, as stated in (37) (*did* may be less prominent than *I* at PF for independent reasons): namely, since the presupposition of *even* in the first sentence is vacuous, the import of the PI in the antecedent VP effectively corresponds to that of other indefinites, say, *something*.

(36) a. [$_{PD_A}$ [even$_{\prec}$ D] [λ1 $\neg$ [John eat [any D_1] thing]].
b. [$_{PD_E}$ did$_F$ [I$_F$ eat [some D] thing]]

(37) $[\![PD_A]\!] \in F(PD_E)$, i.e., $\hat{}\neg$(John eat something$_D$) $\in$ {$\hat{}$f(x eat something$_D$): f$\in D_{(st)(st)}$, x$\in D_e$}

This means that there is a derivation of (3) that satisfies Parallelism, which accounts for the felicity of Sag's examples. It is worth higlighting that this example illustrates that Parallelism can be satisfied even if not every element in the PD_A has a parallel counterpart in the PD_E (and *vice versa*). But this may obtain only if the import of the extra elements is vacuous, as is the case with *even* in (36).

3.2 Further data involving negative polarity items

Felicitous discourses. If the antecedent VP containing a PI is not embedded in the immediate scope of negation, but rather in the scope of a different DE operator, say, *surprise*, Parallelism will trivially be satisfied if the elided VP is embedded in the scope of an operator that has *surprise* as a focus alternative. This is the case in (38).

(38) I am surprised that John ate any dessert, because I expect that Sue did too.

A derivation of (38) that satisfies Parallelism is provided in (39). While in the PD_A *even* scopes above the DE operator and triggers a vacuous presupposition, no such operator needs to be present in the PD_E, where focus is on *Sue* and *expect*.

(39) a. [$_{PD_A}$ [even$_{\prec}$ D] λ1 [I am surprised that John ate [any D_1] dessert]]
b. [$_{PD_E}$ I expect$_F$ that Sue$_F$ ate [some D] dessert]

(40) $[\![PD_A]\!] \in F(PD_E)$, i.e., $\hat{}$I am surprised that John ate some$_D$ dessert $\in$ {$\hat{}$V(I, x ate some$_D$ dessert): V$\in D_{(st)(e(st))}$, x$\in D_e$}

Infelicitous discourses. If the elided VP is not embedded in the scope of expressions that have *John is surprised* as an alternative, the sentence is marked:

(41) #I am surprised that John ate any dessert, because Sue also did.

This is *ceteris paribus* unexpected on what we have said above. Specifically, there is a derivation of (41) on which the discourse should be felicitous. It is exemplified in (42): crucially, the bound domain variable and the domain argument of *even* in the PD_A are co-indexed with the domain of *any* in the PD_E.

(42) a. [even$_{\prec}$ D_9] [λ9 [I am surprised that [$_{PD_A}$ John ate [any D_9] dessert]]]
b. [$_{PD_E}$ Sue$_F$ eat [some D_9] dessert]

Due to the advantageous choice of indices, the antecedent VP and the elided VP have the same meaning in (42) (on every variable assignment). Accordingly, Parallelism is trivially satisfied and the discourse is incorrectly predicted to be felicitous.

(43) $[\![PD_A]\!] \in [\![PD_E]\!]$, i.e., ^John ate some$_D$ dessert$\in$\{^x eat some$_D$ dessert: x$\in D_e$\}

No Meaningless Coindexing. However, it has been independently observed that coindexing of the sort in (42) is problematic and must be ruled out. Namely, VPs containing bound variables are well-known for imposing special constraints on ellipsis resolution. For example, consider the example in (44a) on the bound reading of the pronoun in the first sentence. This binding configuration constrains the interpretation of the elided VP: roughly, the binder of the variable in the elided VP must be in a structurally parallel position to that of the quantifier in the first sentence.

(44) a. Every boy$_1$ allowed Sue to eat his$_1$ dessert. John did too.
b. Available reading: John$_2$ allowed Sue to eat his$_2$ dessert.
c. Unavailable reading: John$_2$ ate his$_2$ dessert.

If the sentences in (44a) had the representations in (45), and the VPs were chosen as the PDs, Parallelism would be trivially satisfied – namely, the VPs are identical.

(45) a. [Every boy λ1 [t$_1$ allowed Sue to [$_{PD_A}$ eat his$_1$ dessert]]].
b. [John λ1 [t$_1$ [$_{PD_E}$ eat his$_1$ dessert]]].
c. $[\![PD_A]\!] = [\![PD_E]\!] \in F(PD_E)$

To avoid this undesirable prediction, it has been stipulated that two variables may have the same index only if they are both free or they have the same binder:

(46) *No Meaningless Coindexing (Heim 1997)*:
If an LF contains an occurrence of a variable X bound by a node Z, then all occurrences of X must be bound by the node Z.

The state of affairs described in (44) can now be captured: the problematic representation in (45) is ruled out, and while a representation with different indices (say, *2* instead of *1* in (45b)) would be legitimate, it obviously would not satisfy Parallelism. This leaves only the representations in (47) as possible representations of (44a), yielding the observed reading (we assume that F(*John*) includes quantifiers).

(47) a. $[_{PD_A}$ Every boy $\lambda 1$ [t_1 allowed Sue to eat his$_1$ dessert]].
b. $[_{PD_E}$ John$_F$ $\lambda 2$ [t_2 allowed Sue to eat his$_2$ dessert]].
c. $[\![PD_A]\!] \in F(PD_E)$, i.e., ^every boy$_1$ allowed Sue to eat pro$_1$'s dessert $\in$ {^x_1 allowed Sue to eat pro$_1$'s dessert: $x \in D_{(e(st))(st)}$, $x \in D_e$}

To sum up: A consequence of No Meaningless Coindexing is that whenever an antecedent VP contains a bound variable, its binder must be contained in the PD_A, unless the elided VP contains a variable in a parallel position that is bound by the same binder; this in turn constrains the size and form of the PD_E. This consequence of No Meaningless Coindexing plays an essential role in our account.

Back to infelicitous discourses. Given No Meaningless Coindexing, representation (42) is ruled out: free and bound variables cannot share an index. Instead, all legitimate representations of discourse (41) have a form along the lines of (48), where the index on the bound variable, *1*, differs from that on the free variables, *9*.

(48) a. $[_{PD_A}$ [even$_\prec$ D_9] $\lambda 1$ [I am surprised that John ate [any D_1] dessert]]
b. $[_{PD_E}$ did$_F$ [Sue$_F$ ate [some D_9] dessert]

On the assumption that *did* does not have *John is surprised* as an alternative, which seems plausible, the focus value of the second sentence of (41), given in (48b), fails to contain the meaning of the PD_A, in violation of Parallelism.[10] Accordingly, we correctly predict that the discourse in (41) will be infelicitous.

(49) $[\![PD_A]\!] \notin F(PD_E)$, i.e., ^I am surprised that John ate some$_D$ dessert $\notin$ {^f(x ate some$_D$ dessert): $f \in D_{(st)(st)}$, $x \in D_e$}

Summary. We have shown that together with Parallelism and No Meaningless Coindexing, an analysis that takes PIs to have a component that is interpreted *ex situ*, first, correctly accounts for the original examples by Sag and, second, leads to novel predictions that appear to be borne out.

10 If *did* were to have *John is surprised* as an alternative (cf. Han & Romero 2004), Parallelism could be satisfied. Indeed, the prediction of our account is that to the extent a speaker can accommodate *John is surprised* as an alternative to *did*, they will find the discourse in (41) acceptable.

3.3 Data involving free choice items

Felicitous examples. Consider the following discourse, repeated from above:

(50) John may/is allowed to eat any dessert. Bill is also allowed to.

This discourse is trivially predicted to be acceptable. For instance, take the derivation in (51): the PD_A contains *even* and two *exh* operators that associate with the domain of *any*; the PD_E contains two *exh* operators that associate with the domain of *some*.

(51) a. $[_{PD_A}$ [even$_{\prec}$ D] [λ1 [[exh C'] [exh C] [$\Diamond$ [John eat [any D_1] dessert]]]]]
b. $[_{PD_E}$ [exh C'] [exh C] [$\Diamond$ [Bill$_F$ eat [some D] dessert]]]

Since the import of *even* is vacuous in (51a), these structures satisfy Parallelism (i.e., an occurrence of *even* in the PD_E is optional and undetectable):

(52) $[\![PD_A]\!] \in F(PD_E)$, i.e., ^$\forall$D'$\subseteq$D: $\Diamond$(John eat some$_{D'}$ dessert)) $\in$ {^$\forall$D'$\subseteq$D: $\Diamond$(x eat some$_{D'}$ dessert): x$\in D_e$}

Infelicitous examples (universal modals). An elided VP that occurs in the scope of a universal modal and whose antecedent contains free choice *any* is marked:

(53) #John may/is allowed to eat any dessert. Bill must/has to.

This may at first seem to be unexpected on our proposal. Namely, the discourse in (53) could be assigned the derivation in (54). On this derivation, the second sentence contains two *exh* operators associating with the domain of the indefinite in the elided VP; as discussed in the preceding section, its meaning is consistent – Bill has to eat some dessert and every dessert is such that Bill may eat it.

(54) a. $[_{PD_A}$ [even$_{\prec}$ D] [λ1 [[exh C'] [exh C] [$\Diamond$ [John eat [any D_1] dessert]]]]]
b. $[_{PD_E}$ [exh C'] [exh C] [$\Box_F$ [Bill$_F$ eat [some D] dessert]]]

Since the subject and the universal modal are focused in (54b), Parallelism is satisfied. (We are not representing all the focus alternatives of (54b) in (55) for brevity.)

(55) $[\![PD_A]\!] \in F(PD_E)$, i.e., ^$\forall$D'$\subseteq$D: $\Diamond$(John eat some$_{D'}$ dessert) $\in$ {^$\forall$D'$\subseteq$D: $\Diamond$(x eat some$_{D'}$ dessert), ... : x$\in D_e$}

However, the structure in (54b), which is required by Parallelism, is ruled out for independent reasons. In particular, as we alluded to in the preceding section, the second exhaustification operator is vacuous in this structure: since the subdomain alternatives to the structure with a single *exh* are all mutually exclusive, their negation is trivially entailed by the structure with a single *exh*.

(56) $[\![$[exh C'] [exh C] [$\Box_F$ [Bill$_F$ eat [a D] dessert]$]\!]$
= $[\![$[exh C] [$\Box_F$ [Bill$_F$ eat [a D] dessert]$]\!]$

Now, structures in which *exh* is vacuous have been argued by Fox & Spector (2009) and others to be illicit: they run afoul of the Economy Condition on the distribution of *exh* (see Fox & Spector 2009 for a stronger statement of the condition).

(57) *Economy Condition:*
An occurrence of *exh* is licit only if it is contained in a constituent whose meaning is distinct from the meaning of its counterpart without *exh*.

Thus, the parse of the second sentence in (53) that is required by Parallelism, given in (54b), is unavailable. The licit structures with a single *exh* operator or without any *exh* operator, on the other hand, do not satisfy Parallelism. Namely, the meaning that we obtain by a double exhaustification of the domain of *any* in an existential modal environment, which is required in the first sentence of (53), is not identical to the meaning that we obtain by a single or no exhaustification, as captured in (58) (see esp. Fox 2007). Accordingly, we are forced to conclude that Parallelism cannot be satisfied in (53) without violating an independent principle of grammar, which explains its infelicity.

(58) $\hat{}\forall$D'$\subseteq$D: $\Diamond$(John eat a dessert in D')
$\notin$ F([exh C] [$\Box_F$ [Bill$_F$ eat [a D] dessert]])
$\notin$ F([$\Box_F$ [Bill$_F$ eat [a D] dessert]])

Infelicitous examples (no embedding). An identical state of affairs obtains if the elided VP is unembedded, as shown in (60): the only configuration that could satisfy Parallelism violates the Economy Condition. Specifically, in order for its focus value to contain the meaning of the PD$_A$, the PD$_E$ would have to contain two *exh* operators associating with the domain of the indefinite, given in (59b). However, both *exh* operators would be vacuous in such a configuration (see also fn. 8).

(59) #John may/is allowed to eat anything. Bill (already) did.

(60) a. [$_{PD_A}$ [even$_\prec$ D] [λ1 [[exh C'] [exh C] [$\Diamond$ [John eat [any D$_1$] dessert]]]]]
b. [$_{PD_E}$ [exh C'] [exh C] [did$_F$ [Bill$_F$ eat [a D] dessert]]]

Summary. Since free choice *any* requires *even* that accompanies it to scope above two *exh* operators in existential modal sentences, both PD$_A$ and PD$_E$ will have to contain two *exh* operators. The PD$_E$ will be licit if the elided VP is embedded below an existential modal, but not if the elided VP is embedded below a universal modal or is unembedded – namely, in the latter case, the structure with two *exh* operators will violate the Economy Condition. We thus obtain the generalization in (61), where a

PI is 'licensed' in an environment iff *even* that takes the PI's domain as an argument triggers a presupposition that is satisfied in the context.

(61) *Generalization:*
If the antecedent of VP ellipsis contains a PI, the PD_A must dominate a constituent in which the PI is licensed, which constrains PD_Es.

4 Some predictions

The proposal has many predictions. However, due to space limitations, we will only explore some of those here, namely, those pertaining to examples in which an antecedent VP containing a PI is in a non-monotone environment.

PIs in non-monotone environments. In all the examples that we have looked at so far, the presupposition of *even* accompanying a PI was trivial. But this need not always be the case. In particular, it is not the case if the PI occurs in a non-monotone environment (see, e.g., Linebarger 1987, Rothschild 2006, Crnič 2014 for discussion of PIs in non-monotone environments). An example of a felicitous occurrence of *any* in such an environment is provided in (62).

(62) Exactly 2 congressmen read anything (at all) last year.

The presupposition induced by *even* is not vacuous in (62). The structure and the meaning of (62) are provided in (63), where the ordering relation of *even* is plausibly resolved to a 'less-likely-than' relation. The presupposition is satisfied in natural contexts because, roughly, while we may expect a small number of congressmen to read something from a subset D' of D, we expect a bigger number of congressmen to read something from the set D itself (see Crnič 2014 for extensive discussion).

(63) a. [even$_{\prec}$ D] $\lambda 1$ [exactly 2 congressmen read [any D_1] thing]
b. Prs: $\forall D' \subseteq D$: ^exactly 2 congressmen read something$_D$
$\prec$ ^exactly 2 congressmen read something$_{D'}$.

Predictions (simple felicitous examples). If an antecedent VP contains a PI and occurs in a non-monotone environment, the presupposition induced by *even* in the PD_A will thus not be vacuous. Accordingly, Parallelism can be satisfied only if *even* occurs also in the PD_E (otherwise the focus alternatives of the PD_E will fail to trigger the presupposition triggered by the PD_A). Consider (64).

(64) Exactly 2 congressmen read anything last year. Exactly 4 did this year.

The discourse is predicted to be felicitous on the derivation in (65), where both the PD_A and the PD_E contain *even* and where the numeral (and the temporal modifier) is

focused – the meaning of the PD_A is thus clearly contained in the focus value of the PD_E. Moreover, the presupposition induced by *even* is felicitous in both sentences.

(65) a. $[_{PD_A}$ [even$_\prec$ D] $\lambda 1$ [exactly 2 congressmen read [any D_1] thing]]
b. $[_{PD_E}$ [even$_\prec$ D] $\lambda 2$ [exactly 4_F congressmen read [some D_2] thing]]

Predictions (simple infelicitous examples). If we replace the subject of the second sentence in (64) with a proper name, the prediction is that the discourse will become marked. This seems to be case, as suggested by the contrast in (66).

(66) a. Exactly 2 congressmen read a novel last year. Sue did too.
b. Exactly 2 congressmen read any novel last year. #Sue did too.

Parallelism would be satisfied in (66b) on the derivation in (67), where *Sue* would induce *exactly two congressmen* as an alternative and where, again, *even* is contained in both the PD_A and the PD_E.

(67) a. $[_{PD_A}$ [even$_\prec$ D] $\lambda 1$ [exactly 2 congressmen read [any D_1] thing]]
b. $[_{PD_E}$ [even$_\prec$ D] $\lambda 2$ [Sue$_F$ read [some D_2] thing]]

However, as we have seen in Section 2, the presupposition of *even* in (67b) is unsatisfiable, resulting in the unacceptability of the sentence. On the other hand, if the PD_E were generated without *even*, it would not induce an alternative that would correspond to the PD_A, since *even* in the PD_A induces a contingent presupposition.

Predictions (complex felicitous examples). We conclude the section by looking at discourses like the ones above but in which the elided VP is embedded in a DE environment. In such cases, the presuppositions of potential occurrences of covert *even* in the second sentence can be satisfied and so the discourses are predicted to be felicitous. This indeed seems to be the case:

(68) a. Exactly 2 congressmen read any novel last year. No one else did.
b. Exactly 2 congressmen read any novel last year. Sue, of course, didn't.

We illustrate the prediction on (68a): the discourse may be assigned the derivation in (69), where both the PD_A and the PD_E contain *even* and where *no one* has *exactly 2 congressmen* as an alternative.

(69) a. $[_{PD_A}$ [even$_\prec$ D] $\lambda 1$ [exactly 2 congressmen read [any D_1] thing]]
b. $[_{PD_E}$ [even$_\prec$ D] $\lambda 2$ [no one$_F$ read [some D_2] thing]]

The structures in (69) satisfy Parallelism, and the presupposition of *even* in (69b) is met in natural contexts ($\prec$ must be resolved to a 'less-likely-than' relation).

Summary. We explored some predictions of our proposal involving antecedent VPs that contain a PI and occur in a non-monotone environment. In such cases, *even* induces a contingent presupposition. Parallelism then necessitates *even* to be present in the PD_E as well. This may result in a felicitous interpretation of the PD_E only if the elided VP occurs in the scope of an appropriate non-monotone or a DE operator.

5 Conclusion and outlook

If parts of PIs must be interpreted *ex situ*, we expect the import of PIs in ellipsis licensing to be similar to that of bound variables. We argued that this expectation is borne out and can be detected with occurrences of PIs whose licensing environments are larger than the minimal clauses in which they occur. In the following, we mention some of the issues that we hope to investigate in the future.

Variation across languages and PIs. We focused solely on the behavior of *any* in this paper. The predictions of the proposal with respect to other PIs depend on the syntactic and semantic properties of these items. For example, it has been noted that some PIs are more restricted than *any* in both their distribution and their behavior in ellipsis contexts. This is illustrated by the following contrast in the behavior of *any* and that of *in ages* and *all that smart* (Collins & Postal 2014).

(70) a. A: Nobody talked to anyone here. B: John did.
b. A: Nobody talked to Sue in ages. B: #John did.
c. A: Nobody here is all that smart. B: #John is.

There is a variety of possible responses to such data. For example, it is possible that *in ages* and *all the smart* do not have non-PI alternatives, or that they may induce presuppositions that are not vacuous in DE environments and thus need to be generated in PD_Es, etc. While we cannot explore these options here, we hope to do so elsewhere. Similarly, the distribution of different kinds of PIs in ellipsis licensing contexts should be investigated cross-linguistically, potentially shedding new light on both the nature of PIs in those languages and the nature of ellipsis.

Accommodation. As pointed out above, the predictions of our proposal obtain to the extent that the alternatives to the elements in PD_Es are restricted in the way we assumed (say, that focus on *did* does not induce *John is surprised* as an alternative). While our assumptions may be plausible and appear to obtain with the native English speakers we consulted (and our reviewers), some speakers may be able to accommodate appropriate, more complex objects as alternatives. The behavior of these speakers would then be expected to differ from that of other speakers.

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