

Deep properties of a surface anaphor: on the contextual restriction of sluicing sites

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This paper is dedicated to the memory of Luis Vicente

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Abstract

Two apparently disparate aspects of sluicing (i.e., Barros effects and inheritance-of-content effects) could be unified if the relevant sluices were derived from deletion of an underlying cleft or copular clause. However, such cleft/copular sources are demonstrably unavailable in many of the relevant cases. We resolve this paradox by implementing the hypothesis that ellipsis sites are necessarily associated to a free contextual variable. This approach allows us to recreate the relevant parts of the semantics of clefts and copular clauses without invoking their syntax. Given that contextual variables are deep anaphors, our proposal supports Elbourne's conjecture that surface anaphors invariably contain a deep-anaphoric component.

1 Introduction: two puzzles in sluicing and a common solution

1.1 Puzzle #1: Barros effects

A flurry of studies over the last two decades has provided strong crosslinguistic support for the idea that clefts and copular clauses can underlie certain instances of clausal ellipsis (see, among many others, Merchant 1998, Potsdam 2007, Rodrigues et al. 2009, van Craenenbroeck 2010, Hiraiwa & Ishihara 2012, Paul & Potsdam 2012, Gribanova 2013, Barros 2014, Gribanova & Manetta to appear, and references). Among these studies, Barros 2012 stands alone in developing a purely semantic argument in favor of a cleft source. His argument is based on the observation that the incongruence of the non-elliptical wh-question in (1a) disappears under sluicing (1b). We will refer to this particular repair-by-ellipsis effect as a *Barros effect*.

- (1) Jack kissed Sally, and he also kissed someone else. . .
 - a. # . . . but I don't know who he kissed.
 - b. . . . but I don't know who.

The source of incongruence in (1a) is easy to pinpoint. If one says *I don't know who Jack kissed*, one is asserting ignorance of the identity of all of the people that Jack kissed (Romero 1998 and references); but this is inconsistent with the speaker's previous assertion, that *Jack kissed Sally*, which commits the speaker to knowing the identity of at least one such person. The congruence of the minimally different (2) supports this analysis: here the assertion that I know some of the people Jack kissed is not contradicted by the subsequent assertion of Peter's ignorance.

- (2) I know that Jack kissed Sally, and that he then kissed someone else, but Peter doesn't know who Jack kissed.

To explain why ellipsis repairs the incongruence of (1a), Barros proposes that (1b) doesn't stem from deletion of (1a), but rather from deletion of the cleft in (3), which is independently grammatical and congruent. In turn, (3) is congruent because it is possible to write a semantics for *it* roughly paraphraseable as “the person other than Sally that Jack kissed”.

- (3) Jack kissed Sally, and he also kissed someone else, but I don't know who it is.

Barros's proposal, while intuitive, lacks generality: Lipták (2013) and Saab (2015) show that paradigms analogous to (16) can be constructed in environments where a cleft source like (3) is not available. In both cases, this is accomplished by using sluicing remnants that are illicit cleft pivots. Saab, for example, exploits the distribution of Spanish DPs bearing the differential object marker *a*. Examples (4a) and (4b) are analogous to (1a) and (1b), respectively, and need no additional comment. The interesting example is (4c), which shows that *a*-marked objects may not function as cleft pivots. The ungrammaticality of (4c) then implies that (4b) cannot stem from deletion of an underlying cleft.

- (4) Juan besó a María, y también besó a alguien más...
 Juan kissed DOM María and also kissed DOM someone else

- a. # ... pero no sé a quién besó.
 but not know.1SG DOM who kissed
- b. ... pero no sé a quién.
 but not know.1SG DOM who
- c. * ... pero no sé a quién es.
 but not know.1SG DOM who is

Additionally, the Barros effect in (4b) cannot be analyzed in terms of a covert *else* modifier. Borrowing an argument from Lipták (2013), we note that the unsluiced version of such a sentence, given in (5), has a different meaning —i.e., one where the *wh*- phrase alludes to a third person that Juan kissed, in addition to María and the unspecified *alguien más* of the antecedent.

- (5) Juan besó a María y también besó a alguien más, pero no sé
 Juan kissed DOM María and also kissed DOM someone else but not know
 a quién más besó.
 DOM who else kissed
 “Juan kissed María, and he also kissed a second person, but I don’t know which
 third person he kissed”

Importantly, the paradigm in (4) is not a quirk of Spanish. As Saab himself points out, it can be replicated across languages with any type of phrase that constitutes a licit sluicing remnant but not a licit cleft pivot. The paradigm in (6), from Lipták (2013), illustrates this pattern with Hungarian accusative-marked objects (6), and the one in (7) does so with German PPs.

- (6) Mari meg hívta Jánost, és meg hívott még valaki...
 Mari PV invited Janos.ACC and PV invited also someone.ACC

- a. # ... de nem tudom kit hívott meg.
but not know.1SG who.ACC invited PV
- b. ... de nem tudom kit.
but not know.1SG who.ACC
- c. * ... de nem tudom kit volt az.
but not know.1SG who.ACC was that

(7) Hans hat mit Maria gesprochen, und er hat auch mit jemand anderem
Hans has with Maria talked and he has also with someone else.DAT
gesprochen...
talked

- a. # ... aber ich weiß nicht, mit wem er gesprochen hat.
but I know not with who.DAT he talked has
- b. ... aber ich weiß nicht, mit wem.
but I know not with who.DAT
- c. * ... aber ich weiß nicht, mit wem es ist.
but I know not with who.DAT it is

It is also worth noting that the Barros effects in (4) through (7) cannot be accommodated by assuming that sluicing exceptionally licenses otherwise illicit cleft pivots, as Elliott & Murphy (2015) propose for sluices embedded under *egal* ‘no matter’ in German. This line of attack would fail to account for the fact that Barros effects also obtain in Romanian, which lacks clefts entirely (Dobrovie-Sorin 1990, 1994).

(8) Ivan a tucat-o pe Maria, a tucat și pe altcineva...
Ivan has kissed-CL ACC Maria has kissed and ACC someone.else

- a. # ... dar nu știu pe cine Ivan a tucat.
but not know.1SG ACC who Ivan has kissed

- b. ... dar nu știu pe cine.
but not know.1SG ACC who

1.2 Puzzle #2: inheritance of content

The hypothesis that underlies this paper is that Barros effects are part of a larger class of sluices that exhibit a cleft- or copular-like interpretation, even in languages and environments where such underlying clefts and copular clauses are demonstrably unavailable. Consider now *inheritance of content*, i.e., the fact that sluicing remnants inherit the restriction of their indefinite correlates, even if wh- items in the corresponding unsluiced questions do not (Ginzburg 1992, Chung et al. 1995). The unsluiced question in (9a) means that Jack didn't see any of the people who left the party early, whether they were students or not. In contrast, the sluice in (9b) means that Jack didn't see any of the students that left early, without any assertion as to whether he failed to see any non-student early-leavers.

- (9) Some students left the party early. . .
- a. . . . but Jack didn't see who left the party early.
- b. . . . but Jack didn't see who. [Barros 2014:160]

Jacobson (2013) and Weir (2014) discuss an analogous pattern with fragment answers. Just as above, the non-elliptical reply in (10B) doesn't entail that the Germans dancing in the quad were students (if anything, this meaning is a conversational implicature); in contrast, the fragment in (10B') necessarily comes with this entailment. For conciseness, we will focus on the sluicing case and assume that our analysis carries over to fragments (this much is uncontroversial under an analysis of fragments along the lines of Merchant 2004 and Weir 2014, where the fragment moves to a left-peripheral position prior to TP deletion, just as wh- words do under sluicing).

- (10) A: Which students were dancing in the quad?

B: Some Germans were dancing in the quad.

B': Some Germans.

It is tempting to analyze inheritance of content by requiring (9b) to stem from a copular clause like (11), which is also a question exclusively about students. Here, *they* is acting in the same way as *it* in (3), i.e., it gives us a meaning paraphraseable as “the students just mentioned”.

(11) Some students left the party early, but Jack didn't see who they were.

This analysis, however, suffers from the same lack of generality as Barros's cleft-based account of Barros effects. To begin with, it forces us to say that (11) is the only possible source for (9b)—if (9a) could also be a source, (9b) would not exhibit an obligatory inheritance-of-content effect. However, while English does allow copular clauses along the lines of (11) to be sluicing sources, it does not restrict sluices to just these sources (see especially Merchant 2001:§4.2). Moreover, we can use the same line of argumentation we deployed in (4) through (8) to show that inheritance of content is not contingent on the availability of an underlying cleft or copular source. The Spanish examples (12a) and (12b) have the same meanings as (9a) and (9b), respectively; however, they cannot be derived from a copular clause because *a*-marked phrases are illicit copular pivots (12c). Just as is the case with Barros effects, comparable examples in other languages can be constructed with any phrase that is a licit sluicing remnant and an illicit cleft/copular pivot.

(12) Juan vio a unos estudiantes en la fiesta...

Juan saw DOM some students in the party

a. ... pero Pedro no sabe a quién(es) vio Juan en la fiesta.

but Pedro not knows DOM who.PL saw Juan in the party

[= Pedro doesn't know who (whether student or not) Juan saw at the party]

- b. ... pero Pedro no sabe a quién(es).
but Pedro not knows DOM who.PL
[= Pedro don't know which students Juan saw at the party]
- c. * ... pero Pedro no sabe a quién(es) eran.
but Pedro not knows DOM who.PL were

1.3 The common solution

To recap: we have described two patterns of sluicing whose interpretation seems to correspond to what an underlying cleft (or copular clause) would give us. However, this interpretation persists even in cases where such an underlying structure is demonstrably unavailable. This pattern suggests an obvious solution, i.e., dissociating the relevant part of the *semantics* of clefts (specifically, their anaphoric properties) from the *syntax* of clefts, so that one can have the first without necessarily invoking the second.¹ In the following section, we will discuss a way to implement this idea and then show how it accounts for Barros effects and inheritance of content.

To introduce our proposal, it is instructive to go back to Barros's (2012) account of Barros effects in English, which is based on the fact that *it* in (3) can be assigned a meaning paraphraseable as “the person other than Sally that Jack kissed”. To achieve this effect, Barros assumes that pronouns can be decomposed into a definite determiner and a free contextual variable that the assignment function maps to some discourse-salient meaning. In this particular example, Barros argues, the contextual variable can be mapped to the

¹Lurking here is the potential misunderstanding that this paper is an argument against cleft-based sluices in general. This is not correct, as we still accept the existence of such sluices (for example, the English data discussed in the previous sections, where there is no direct evidence against an underlying cleft, are in principle ambiguous between a cleft-based analysis and one based on contextual restriction). At best, the argument we are constructing here is one against specific arguments in favor of cleft-based sluices, namely, those based exclusively on the anaphoric properties of clefts.

function $\lambda x \in D_e.[\text{Jack kissed } x \wedge x \neq \text{Sally}]$, where $[x \neq \text{Sally}]$ reflects the contribution of *else* (cf. Barros's paper and §2.1 for details); composing this function with the definite determiner gives us the desired meaning for *it*.

Independently of Barros's proposal, Elbourne (2008) argues that contextual variables can also be exploited to treat certain analytically difficult types of VP and NP ellipsis;². We will exploit Elbourne's idea, although our implementation differs considerably from Elbourne's. In a few words, we propose that Barros effects and inheritance of content are accounted for once one assumes that elliptical sentences have a deep anaphor component that tracks the meaning of its antecedent in a way to be specified below. It is this deep ingredient which gives us both Barros effects and IoC. The specific details of the proposal are discussed at length in section §2. In section §3, we show that deep anaphora in general have the same recoverability condition that Merchant (2001) has proposed for surface anaphora and sluicing in particular, namely mutual entailment (or e-GIVENness). This will account for the mandatory presence of IoC in regular cases of sluicing and, at the same time, for the absence of IoC in cases of contrast sluices (see, Merchant 2001). Given that, by hypothesis,

²Properly, Elbourne is making two separate claims (and so are we, by extension): first, that ellipsis sites need to be contextually restricted; and second, that contextual restriction is best implemented through a syntactically independent variable. In principle, one can accept the first claim and yet implement contextual restriction without invoking such variables. Hardt (1999) proposes an analysis along these lines for VP ellipsis, where I^0 (the functional head that embeds the VPE site) is a deictic element containing a variable that tracks discourse salient information. More recently, Weir (2014) analyzes inheritance of content in fragments (see (10) above) by defining an identity condition that requires ellipsis sites to take discourse objects (rather than syntax/LF structures) as their antecedents. While the intuition behind these proposals is effectively the same as ours, we have chosen not to pursue the technical implementations they develop. For Hardt 1999, we refer the reader to the discussion in Elbourne 2008:§3.2. For Weir 2014, we will only note that his proposal is finely tailored to fragments and (unlike Elbourne's) it remains unclear how well it scales to other types of ellipsis (e.g., Weir requires fragments to be licit answers to a salient Question under Discussion (QUD, as in e.g., Roberts 2012); the discussion in Miller & Pullum 2013 suggests that this requirement doesn't extend to VP ellipsis).

surface anaphora comes equipped with a deep anaphor, we suggest that mutual entailment, besides appearances, is actually a condition on this deep anaphoric component and not a condition on E-sites, which must be resolved by syntactic means. Section §4 contains the conclusion and outlook. But before entering into the specifics of our analysis, let us briefly consider a caveat for our general proposal.

1.4 A caveat

Before moving into the main part of the paper, we want to address a set of data pointed out to us by one of the reviewers of this paper. These data at face value seem to contraindicate an analysis of the patterns in §§ 1.1–1.2 in terms of contextual restriction of the ellipsis site. We argue here that this is not so.

The reviewer in question provides the following examples, which show that inheritance of content and Barros effects can arise in unsluiced questions.

(13) A: We already know that Pete kissed Mary at the party, but I hear that he also kissed someone else.

B: Aw c'mon, don't be a tease! Tell me who Pete kissed!

A: Sorry, I don't know who Pete kissed. I'm just reporting a rumor.

(14) A: (Among other people,) I saw a famous phonologist at the party.

B: Oh really? Who did you see?

A: Morris Halle.

[cf. A: # Morris Halle, Jim McCloskey, and Luigi Rizzi]

It is noteworthy that, unlike in sluices, contextual restriction in unsluiced questions is clearly not obligatory —if it were, the unsluiced examples we introduced in §§1.1–1.2 would be felicitous. The reviewer himself acknowledges this much, agreeing with the judgments we provide for the English examples in the previous sections. The question, then, is why Barros effects and inheritance of context (*qua* effects of contextual restriction) are obligatory under sluicing, but not in unelided questions. Here, it is remarkable that (13) and (14) require very specific contextual setups. To quote from Cappelen & Lepore's (2004:39) discussion of the context sensitivity of non-indexicals.

“It involves a *complex imaginative activity*. It requires conjuring up interesting scenarios, making these scenarios vivid (to yourself and to your audience), and then in some way empathizing in the most literal fashion with the participants in these imagined scenarios. It requires, so to speak, placing yourself imaginatively into the shoes of a participant in these imaginative scenarios.”

In other words, many expressions can exhibit context sensitivity, provided that the right discourse conditions are met. This is an observation that speaks directly against the idea that

contextual restriction is invariably grammatically encoded.³ What we are proposing is that ellipsis sites are true context sensitive expressions, in that contextual restriction is grammatically encoded in a dedicated variable,⁴ whereas (13)/(14) and comparable examples are not; in the latter, context sensitivity effects must be derived non-grammatically, through Cappelen & Lepore’s “complex imaginative activity” or some equivalent pragmatic process (e.g., a conversational implicature).

At this point, we have to defer a proper analysis of the discourse conditions that license (13)/(14) to a future paper.

2 The analysis: From E-type anaphora to contextually restricted ellipsis

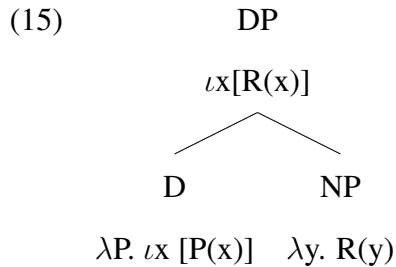
2.1 Ellipsis and E-type pronouns: Barros’ strategy

This subsection provides a quick sketch of the analysis of E-type pronouns that forms the basis of Barros’s (2012) analysis of Barros Effects, which in turn forms the basis of our analysis. This analysis is based on the fact that E-type pronouns like those found in cleft constructions can be consistently paraphrased with definite descriptions containing a relative clause that tracks the meaning of the clause that contains the antecedent of the pronoun (Cooper 1979, Evans 1980, Heim 1990, Neale 1990, Heim & Kratzer 1998, Elbourne 2005). This is done by the variable R which tracks and picks up salient properties in the

³A good analogy here is the distinction between binding and coreference. For one coreference with a local antecedent is obligatory with anaphors (*Jack_i criticized himself_{i/*k}*) but not with pronouns (*Jack_i said that Sally criticized him_{i/k}*). This asymmetry suggests that coreference with anaphors is a grammatical process (anaphoric binding, subject to familiar syntactic restrictions), whereas coreference with pronouns is a discourse/pragmatic process, which can be manipulated with well-crafted contexts.

⁴As has been independently argued for other expressions. See, for example, the claims by von Stechow 1994, Stanley 2000, Martí 2003, and others to the effect that strong quantifiers also carry a comparable variable. We need to note here that some of the claims in this particular line of research, e.g., Barros’s 2013 claim that wh- words themselves are hosts of contextual variables, cf. §2.2.2) are incompatible with our analysis. For space reasons, we cannot explore the proper distribution of contextual variables here.

discourse. R will compose with the determiner and hence the entire DP will denote the unique individual that has that salient property. This is shown in (15).



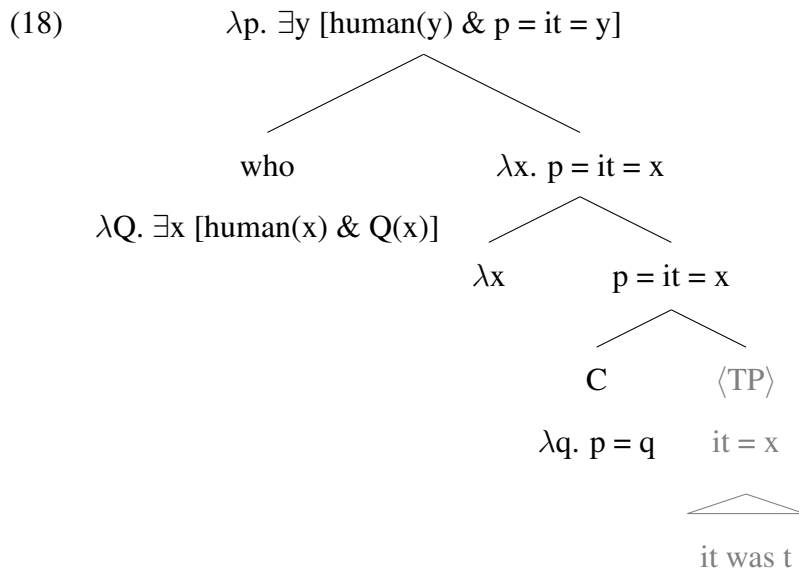
Let us take the antecedent sentence from (16) (repeated below).

(16) Jack kissed Sally, and he also kissed someone else...

Given this antecedent R would denote the property in (17a). That is the property of being kissed by Jack and, assuming an exceptive semantics of *else*, the property of not being Sally. Embedding that property into the structure of the pronoun in (15) will yield the meaning in (17b), that is a unique individual that Jack kissed and is not Sally.

- (17) a. $\lambda x. [x \neq \text{Sally} \ \& \ \text{Jack likes } x \ \& \ \text{human}(x)]$
 b. $\iota x [x \neq \text{Sally} \ \& \ \text{Jack likes } x \ \& \ \text{human}(x)]$

Barros then assumes the LF for the elided cleft in (18) for Barros sentences, adopting a standard Hamblin/Karttunen semantics for questions.



Once we plug in the meaning of the cleft pronoun, we end up with (19) which is paraphrasable as ‘Who the unique non-Sally human that John likes is.’

(19) $\lambda p. \exists x [\text{human}(x) \ \& \ p = \iota z [z \neq \text{Sally} \ \& \ \text{John likes } z \ \& \ \text{human}(z)] = x]$

Now let us compare this to the full structure clause below that is infelicitous. Remember that this continuation is unacceptable because it imposes inconsistent knowledge states on the speaker; the speaker both denies knowledge of the question “who John likes” while committing herself to knowing a partial answer (that John likes Sally) in the same breath.

(20) # John likes Sally, and he likes someone else too, but I don’t know who John likes.

When we have the cleft question, however, R picks up the property contributed by *else* (the property of being distinct from Sally); hence we are claiming we don’t know the answer to the question ‘who is the non-Sally individual that John likes?’ and then the inconsistency does not arise.

From the above discussion, it is clear that the ability of R to pick out salient properties in the discourse plays a crucial role in the cleft analysis of Barros sentence. In the below section, we will build off this insight by building R directly into the licensing of ellipsis.

This allows us to have the critical semantics of the cleft analysis, while still maintaining a full structured elided clause, hence accounting for the interpretation and connectivity effects simultaneously.

2.2 *A cleft semantics without a cleft syntax*

In the previous section, we showed that the crucial part of Barros's analysis of Barros effects was the R variable that was part of the denotation of the cleft pronoun. The problem with such an analysis, however, was, it cannot account for Barros effects in sluices that are demonstrably not from a cleft source. To remedy this problem, we propose that R is not only part of the denotations of pronouns like the ones in cleft constructions, but is also a crucial and obligatory piece of ellipsis licensing. This will allow us to have the necessary component of the cleft semantics without the need for a cleft syntax.

2.2.1 *Deriving Barros effects*

To implement this idea, we follow Merchant (2001) and much subsequent work in assuming that ellipsis is licensed by the presence of an E-feature. We follow the standard assumptions given below for the E-feature. Syntactically, the sluicing E-feature has uninterpretable Q and *wh* features that must be checked by merging onto an appropriate C head. We also assume that the E-feature instructs the phonology to not pronounce its complement (i.e., TP), as is standardly assumed. The novel innovation of this analysis is that in addition to these constraints on the E-feature, it obligatorily introduces the R variable. Our denotation is given below. The E feature is of type $\langle\langle t, t \rangle, \langle t, t \rangle\rangle$. It will take the interrogative C (type $\langle t, t \rangle$) as its argument and return something of the same type while adding the R variable.

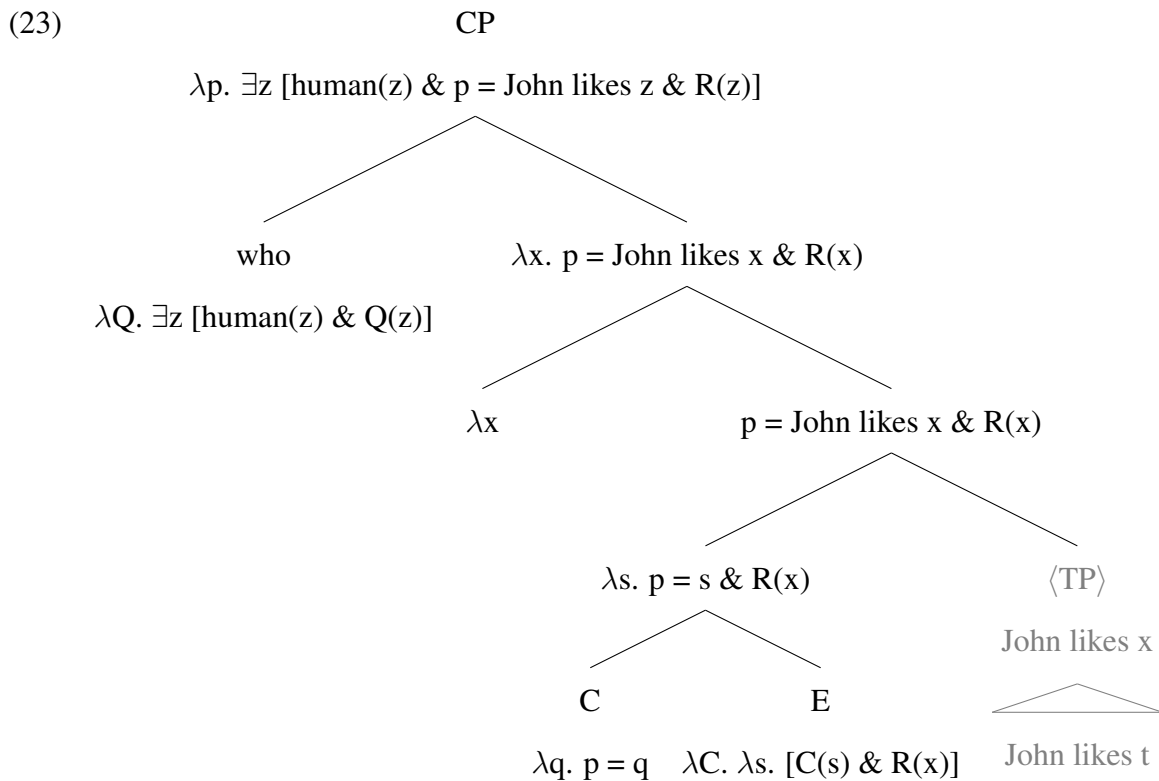
$$(21) \quad \llbracket E_{Q,wh} \rrbracket^g = \lambda C. \lambda s. [C(s) \ \& \ R(x)]$$

Just as R picked out a salient property when it was part of the denotation of the pronoun in Barros's analysis, it will now be able to do so as part of the E-feature. Let us return to the

basic Barros example repeated below.

(22) John likes Sally, and he also likes someone else, but I don't know who.

The LF of the sluiced clause is given in (23):



If we take the antecedent of the Barros example, R again would have the denotation below.

(24) $\lambda x. [\text{John likes } x \ \& \ \text{human}(x) \ \& \ x \neq \text{Sally}]$

If we feed this denotation into the LF in (23), we end up with the denotation in (25), which is close to identical to the denotation produced by the cleft analysis, and crucially includes $\neq \text{Sally}$ introduced by R. This means that the infelicitousness of the non-sluiced full structured clause does not appear here.⁵

⁵We collapse logically redundant propositions in our LFs. Both “human(z),” and “John likes z,” for instance, enter the computation twice due to R’s contribution, so that (25) actually ends up equivalently as (i) below (R’s contribution is underlined):

(25) $\lambda p. \exists z [p = \text{John likes } z \ \& \ \text{human}(z) \ \& \ z \neq \text{Sally}]$

Since we no longer are dealing with an elided cleft, we can still account for the connectivity effects in a straightforward manner. This allows us to account for the apparent paradox of these examples: sluiced clauses have full syntactic structure, so that Case can be assigned normally, but they also come with an R variable which gives them a cleft-like meaning.

We close off this subsection by comparing our analysis of Barros effects to Saab's (2015), who proposes that the sluicing site takes the entire coordinate structure in (4) as its antecedent, with the *wh*- phrase undergoing asymmetric extraction from the second conjunct (26). We refer readers to Saab's paper for a detailed discussion of the semantics of this structure. Note that the syntax in (26) should yield a CSC violation: this is not lost on Saab, who goes on to argue that the grammaticality of (4b) qualifies as an argument in favor of the hypothesis that ellipsis can repair locality violations (*contra* the conclusions of Abels 2011, Barros et al. 2014, and especially Merchant 2001:§5.4.3 for the narrow case of CSC violations).

(26) no sé [a quién]_i [[Juan besó a María] y [besó *t_i* también].
not know.1SG DOM who Juan kissed DOM María and kissed also

There are various reasons to consider alternatives to Saab's proposal. For one, it doesn't offer a way to group Barros effects together with inheritance of content as different instantiations of a more general phenomenon (see especially §2.2.2 below for evidence that this grouping is desirable). A more serious problem stems from Saab's implicit hypothesis that the congruence of (4b) is contingent on the congruence of (26). Consider, in this light, (27B), which a number of speakers (including the first author of this paper) find congruent under the indicated reading.⁶

(i) $\lambda p. \exists z [\text{human}(z) \ \& \ p = \text{John likes } z \ \& \ \underline{\text{John likes } z \ \& \ \text{human}(z)} \ \& \ z \neq \text{Sally}]$

⁶Those speakers who do not accept the indicated reading interpret (27B) as a denial of (27A), i.e., "it is

(27) A: Juan besó a María, y también besó a alguien más.

Juan kissed DOM María and also kissed DOM someone else

B: Sólo a Susana.

only DOM Susana

[= Susana is the only person besides María that Juan kissed]

Under Saab's analysis, (27B) would be derived from deletion of (28B). Notably, (28B) is incongruent: one cannot assert that Juan kissed María and then follow up with an assertion that he only kissed Susana. Given that the contradiction inherent to (28B) is not a locality problem, one would have to assume a semantic repair mechanism on top of the island repair mechanism that Saab already assumes.

(28) A: Juan besó a María, y también besó a alguien más.

Juan kissed DOM María and also kissed DOM someone else

B: # Juan besó a María y besó sólo a Susana

Juan kissed DOM María and kissed only DOM Susana

A contextual restriction account, on the other hand, doesn't encounter this problem. The indicated reading of (27B) can be derived in the same manner as (4b), i.e., by deletion of *Juan besó sólo a Susana*, where R inherits the property of being someone other than María that Juan kissed. This results in the restriction of Susana's focus alternatives in (27B) to non-María alternatives, yielding the intuitively correct interpretation, where the only non-María individual that Juan additionally kissed was Susana.

2.2.2 *Deriving inheritance of content*

We move on now to inheritance-of-content effects, which we argue can be treated in the same terms as Barros effects. For convenience, we repeat the Spanish paradigm in (12), not the case that Juan kissed María and someone else; the only person he kissed at all was Susana". We do not have anything interesting to say as to why this division exists.

and reiterate that the presence of the differential object marker *a* in the remnant precludes an analysis in terms of an underlying cleft or copular clause.

(12) Juan vio *a* unos estudiantes en la fiesta...

Juan saw DOM some students in the party

a. ... pero Pedro no sabe *a* quién(es) vio Juan en la fiesta.

but Pedro not knows DOM who.PL saw Juan in the party
[= Pedro doesn't know who (whether student or not) Juan saw at the party]

b. ... pero Pedro no sabe *a* quién(es).

but Pedro not knows DOM who.PL
[= Pedro doesn't know which students Juan saw at the party]

c. * ... pero Pedro sabe *a* quién(es) eran.

but Pedro not know DOM who.PL were

The parallelism between (4) and (12) should be apparent: in (4b), we had to ensure that *a quién* reflected the meaning of its *a alguien más* correlate and ranged only over non-María individuals; in (12b), we have to ensure that *a quién* reflects the meaning of its *a unos estudiantes* correlate and ranges only over individuals that are students. Note, additionally, that *exactly*-modification triggers an inheritance-of-content effect in unsluiced questions (29). Dayal & Schwarzschild (2010), from whom this observation originates, attribute it to the hypothesis that *exactly* is an anaphoric expression that tracks the restriction of a discourse-salient expression.

(29) a. Jack saw a phonologist, but I don't know who he saw exactly.

b. Juan vio *a* un fonólogo, pero no sé *a* quién vio exactamente.

Juan saw DOM a phonologist but not know DOM who saw exactly

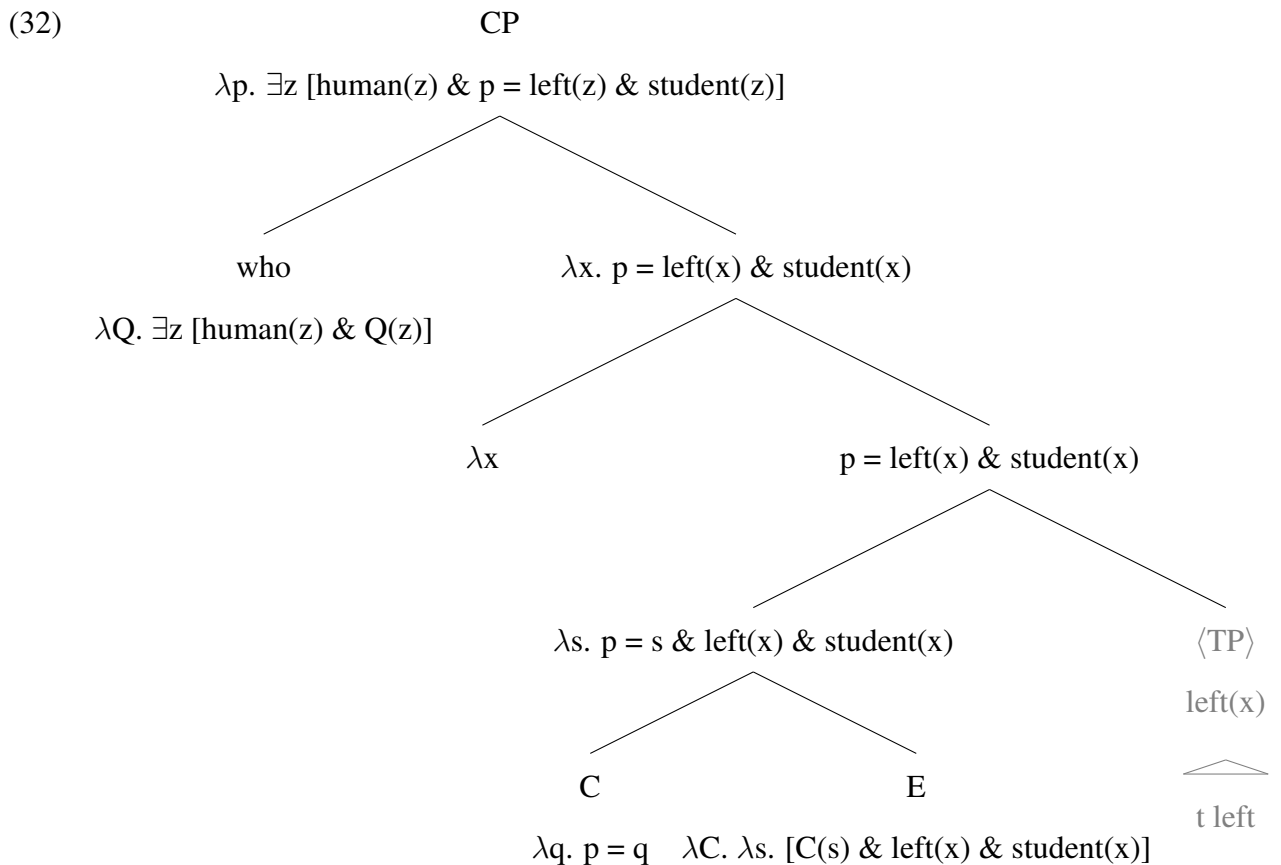
These parallellisms suggest very strongly that (12b) should be treated in the same way as (4b), i.e., by contextually restricting the sluicing site. Recall, the basic example of inheritance of content repeated below.

(30) Some students left, but I did not see who.

Here the remnant of the sluice appears to be restricted to students, a restriction that is absent from the full structured non-sluiced clause (i.e., ... *but I did not see who left*). Under our analysis, this restriction is again introduced by R. Given the antecedent in (30), then R would pick up the property in (31), namely the property of being a student that left.

(31) $\lambda x. \text{left}(x) \ \& \ \text{student}(x)$

If we plug this denotation of R into the LF in (32), then we get the denotation in (33), which gives us the proper restriction to students that we want.



(33) $\lambda p. \exists z [\text{human}(z) \ \& \ p = \text{left}(z) \ \& \ \text{student}(z)]$

Our solution is arguably superior to the one advanced by Romero (1998) and Barros (2013), who take the remnant itself (rather than the sluicing site) to be the target of contextual

restriction—cf. Barros’s (2013:208) characterization of R as an NP modifier. We agree that this line of attack does derive inheritance of content effects under sluicing. The downside is that, by treating contextual restriction as a property of *wh*- items rather than ellipsis sites, it predicts (incorrectly) that inheritance-of-content effects will also arise freely in unelided sentences, so long as suitably salient antecedent is available. Although this is true on occasion (see §2.1), the effect is clearly not as pervasive as Romero’s and Barros’s proposals seem to predict.⁷ Our approach, in contrast, doesn’t suffer from this shortcoming.

2.3 *Inheritance of content meets Barros effects*

By treating inheritance of content and Barros effects as different manifestations of the same underlying phenomenon, we predict the existence of Barros-like effects in inheritance-of-content environments. That is, more broadly, we predict that sluicing can rescue incongruent questions even in environments where the correlate is not modified by *else*, as in the following pairs. The discussion in the rest of this subsection applies here too.⁸

(34) Jack saw Sally, and then he saw a colleague. . .

- a. # . . . but I don’t know who he saw. b. . . . but I don’t know who.

⁷Romero (1998:§1.4) considers whether inheritance of content could be forced on sluices by appealing to other requirements of ellipsis (e.g., the Focus Condition of Rooth 1992) and comes up with a negative answer. She eventually proposes that inheritance of content follows from the entailments of questions embedded under *know* (cf. Karttunen 1977b *et seq.*). This, however, is an incomplete solution on two counts; first, it doesn’t cover inheritance-of-content effects in sluices that are not embedded under *know* (most prominently, matrix sluices); and second, it incorrectly predicts that inheritance-of-content effects will also arise in unsluiced questions, so long as they are embedded under *know* or predicates that give rise to similar entailments.

⁸An anonymous reviewer notes that (34a) is only mildly degraded for them (assigning a question mark), and suggests that perhaps some speakers (including themselves) allow for a kind of “covert adverbial” to be accommodated in the non-elliptical question. For (34a), this could be something with an interpretation like “*then*,” or “*on that second occasion*,” the semantics of which would render (34a) congruent and felicitous.

(35) Juan vio a María y luego vio a un colega. . .

Juan saw DOM María and then saw DOM a colleague

- | | | | |
|----------------------|---|----------------------|---|
| a. # ... pero no se | a | b. ... pero no sé | a |
| but not know.1SG DOM | | but not know.1SG DOM | |
| quién vio. | | quién. | |
| who saw | | who | |

We submit that the following Spanish examples, with a first person subject for *know*, instantiate this pattern. The unsluiced question in (36a) is incongruent because the antecedent already constitutes a partial answer, just as in the Barros examples discussed in §§1.1;⁹ example (36b) shows that sluicing can repair this incongruence; and (36c) shows that the felicity of (36c) cannot be attributed to deletion of an underlying cleft. Under our proposal, we can cover the repair effect in (36b) by having R track the restriction of the indefinite correlate. This gives us a congruent meaning paraphraseable as “I don’t know the identity of the individual *x*, *x* a phonologist, that Juan saw”.

(36) Sé que Juan vio a un fonólogo. . .

know.1SG that Juan saw DOM a phonologist

- | | | |
|---------------------|---|----------------------|
| a. # ... pero no sé | a | quién vio. |
| but not know DOM | | who saw |
| b. ... pero no sé | a | quién. |
| but not know DOM | | who |
| c. * ... pero no sé | a | quién fue (que vio). |
| but not know DOM | | who was that saw |

⁹Dayal & Schwarzschild (2010:108) provide a comparable example (*Joan was talking to a phonologist, but I don’t know who (exactly) she was talking to*) and claim it is felicitous. The speakers we have consulted disagree with this judgment, although the infelicity of this example seems to be less strong than that of (36a). We have nothing to say as to why English and Spanish judgments differ in this way.

Similarly, consider the following contrast, modelled after (2) in §1.1 (the following judgments also hold for English). Example (37a) is grammatical for the same reason as (2), i.e., the assertion that I know the identity of some of the people that Juan kissed is not contradicted by Pedro’s ignorance. Note, however, that this example means that Pedro is unaware of the identity of any of the people Juan kissed; whereas the sluiced counterpart (37b) means that Pedro is unaware of the identity of the non-María individual that Juan kissed. Again, this asymmetry can be accounted for by assuming that the sluice comes with a contextual variable that tracks the meaning of a salient antecedent; as in the prototypical Barros effects examples, this allows us to derive a meaning for (37b) paraphraseable as “Pedro doesn’t know the identity of the individual x , where x is not María, such that Juan kissed x ”.

- (37) Sé que Juan besó a María y que también besó a alguien
 know.1SG that Juan kissed DOM María and that also kissed DOM someone
 más...
 else
- a. ... pero Pedro no sabe a quién besó Juan.
 but Pedro not knows DOM who kissed Juan
- b. ... pero Pedro no sabe a quién.
 but Pedro not knows DOM who

In conclusion, the examples in this subsection support our proposal that inheritance of content and Barros effects are simply different manifestations of the same general phenomenon.

There are, however, some remaining issues regarding the way in which our deep anaphoric component is semantically resolved. In (37b), for instance, it is crucial that R tracks the meaning of the salient property of kissing some non-María individual, rather than just kissing anyone. Notions of congruence arguably fail to enforce this result, given that the un-

sluiced question (where the assertion is that Pedro doesn't know who Juan kissed at all) is itself congruent. In other words, inheritance is obligatory under ellipsis, but why?

But there is more. Our theory must ensure that introducing R above the E-site doesn't introduce any semantic clash in well-known cases of contrast sluicing (see Merchant 2001):

(38) She has five CATS but I don't know how many DOGS <she has *t*>.

Here, it seems we need to prevent IoC. There is no sense in which the sluiced question is interpreted as being about cats or numbers of cats.

In the following section, we present our solution to these two puzzles. First, we contribute the observation that well established deep anaphors behave like surface anaphors when given linguistic antecedents. That is, both elided VPs, and pronominal VPs are subject to e-GIVENness in the same linguistic contexts.

This will lead us to a reconsideration of recoverability in ellipsis in general. In our view, the fact that both deep and surface anaphors seem to obey the same recoverability condition (in the presence of an antecedent) follows from our assumption that surface anaphors (E-sites) always come equipped with a deep anaphoric ingredient. In a nutshell, we will end up with a view of recoverability in ellipsis that assumes (a) it is only deep anaphors that are subject to e-GIVENness (and only when there is a linguistic antecedent), and (b) surface anaphora independently requires a syntactic antecedent.

3 On the recoverability condition for deep anaphora

In order to give a more explicit account of the workings of our deep anaphoric component we turn our attention to the recoverability condition that is at play in the realm of deep anaphora. We focus only on those cases in which deep anaphors have a linguistic antecedent. For these cases, it seems that what is at stake is the same condition that Merchant (2001) has proposed for sluicing and surface anaphora in general, i.e., mutual entailment

between an antecedent and ellipsis site (see also Barros & Kotek (2019)). Here is Merchant's relevant conditions and associated definitions:

Focus condition on ellipsis

(39) A constituent α can be deleted only if α is e-GIVEN.

e-GIVENness

(40) An expression E counts as e-GIVEN iff E has a salient antecedent A and, modulo \exists -type shifting,

(i) A entails the Focus closure of E (written F-clo(E)), and

(ii) E entails F-clo(A)

(41) F-clo(α), is the result of replacing F-marked parts of α with \exists -bound variables.

As it is well-known, Merchant (2001)'s e-GIVENness is less liberal than Schwarzschild (1999)'s GIVENness, which only requires clause (39i). Merchant's original motivation for this division was to account for the different behavior of ellipsis and deaccenting regarding certain inferential patterns in purely semantic terms, i.e., without imposing any syntactic isomorphism condition on E-sites.

(42) a. Abby was reading the book while BEN *was reading*.

b. Abby ate a sandwich after BEN *ate*.

c. Abby left the party because BEN *left*.

d. Abby sang her hymn louder than BEN *sang*.

(43) a. Abby called Chuck an idiot after BEN *insulted him*.

b. Abby ate a sandwich after BEN *had lunch*.

c. Abby left the party because BEN *took off*.

Merchant (2001), (12)–(13), pg. 15

All that is needed in order to obtain the right result for this entire set of examples is that A entails the focus closure of deaccented material (i.e., that deaccented material be GIVEN). Thus, for an example like (42a), deaccenting is licensed if *Chuck = him*, under some variable assignment:

(44) *Abby called Chuck an idiot* entails $\exists x.x$ *insulted him*.

Merchant (2001), (15) pg. 16

This asymmetric entailment doesn't work when deaccented material is replaced by elliptical VPs:

(45) a. Abby was reading the book while BEN was.

b. Abby ate a sandwich after BEN did.

c. Abby left the party because BEN did.

d. Abby sang her hymn louder than BEN did.

(46) a. Abby called Chuck an idiot after BEN did.

b. Abby ate a sandwich after BEN did.

c. Abby left the party because BEN did.

Merchant (2001), (18)–(19), pg. 17

It is clear that, for instance, for (44a) to be true it has to be the case that Ben also called Chuck an idiot and not just insulted him. There are two ways of proceeding. Either an additional syntactic condition is imposed on E-sites (see, for instance, Rooth (1992), Fiengo & May (1994) and Romero (1998), among others) or GIVENness is constrained in the appropriate way for E-sites. Merchant's Mutual Entailment is a concrete implementation of the latter. Clause (39ii), thus, ensures the right result for each elliptical sentence in (45) and (46).

Perhaps surprisingly, it appears that mutual entailment is also operative in the domain of deep anaphora *when* the deep anaphor has a linguistic antecedent. Consider in this respect the following examples involving *do it*:

- (47) a. John talked to a phonologist and then I did it/that.
 b. Abby called Chuck an idiot because BEN had done it.

Consider first (47a), the occurrence of *do it* in (47a) must mean that I talked to a phonologist and not just that I talked to some person. Finally, *do it* must also entail the meaning of the antecedent VP in (47b), i.e., it has to be the case that Ben called Chuck an idiot and not just that he insulted him.

We end up with a situation where, while both pronouns and deaccented material do not require linguistic antecedents, and ellipsis does, another dimension along which these forms of redundancy reduction differ arises whenever there is an antecedent. That is, both elided structures and pronouns are interpreted as e-GIVEN in such cases, whereas, as we've seen in (42) and (43), deaccented material is only subject to GIVENness.

An important question arises about the above examples of deep anaphora: if deep anaphors in principle can allow for non-linguistic antecedents, what is blocking them from doing so in (47)? If it were possible for *do it* to pick up a non-linguistic antecedent, we might expect *do it* in (47) to have an interpretation akin to its available deaccented cousin *insulted her*. It appears that there is a constraint that blocks deep anaphors from picking up non-linguistic antecedents when a linguistic antecedent is present.¹⁰

If deep anaphora does indeed obey mutual entailment in the presence of a linguistic antecedent, then we have a direct answer as to why, as mentioned in the previous section, IoC effects are compulsory in non-contrast sluices, and not just an option:

- (48) Sally talked to a phonologist, but Chris doesn't know who.

¹⁰Merchant (2010) suggests a similar constraint for ellipsis. We leave the exact nature of this blocking constraint as a matter of future research.

Here, as in example (47b), our variable R (a deep anaphor), among the properties that could be salient in the discourse, must track the property of being a phonologist who Sally talked to, as asserted in the antecedent. Put differently, the right result obtains if the antecedent and $R(x)$ are mutually entailing, which is the case after the relevant replacements are made. Thus, first, the antecedent entails the Focus closure of $R(x)$, after \exists -closure of the argument variable, which gives us the following result:

$$(49) \quad \llbracket_A \text{Sally talked to a phonologist} \rrbracket = \exists y[\text{Sally talked to } y \ \& \ \text{phonologist}(y)] \\ \text{F-clo}(\exists x(R(x))) = \exists x[\text{Sally talked to } x \ \wedge \ \text{Phonologist}(x)]$$

Likewise, existential closure of $R(x)$ entails $\text{F-clo}(A)$, since there is no F-marking in the antecedent, and mutual entailment is therefore met. Note that, if R had picked up a weaker property instead (e.g., the property of being just *someone* that Sally talked to, and not necessarily a phonologist), mutual entailment would not have gone through. This implies that given a set of salient properties in a given discourse, R will pick up the property that ensures mutual entailment for $R(x)$.¹¹

One perhaps surprising consequence of our structural assumptions (as outlined in, e.g., (31)), is that, if we were to subject the elided category itself (namely, TP, in sluicing) to e-GIVENness, e-GIVENness fails to go through in examples like (48). This is simply because at the level of TP, R has not yet been composed. The sluiced TP at this stage

¹¹In some of the more recent implementations of semantic identity in ellipsis, Merchant's (2001) e-GIVENness is replaced by a condition requiring semantic equivalence between the sluiced question and whatever QuD the antecedent raises or makes salient. Under such approaches, whichever QuD it is that the antecedent raises can be seen as providing the relevant property that R picks up as its value. Perhaps this is most naturally implemented under a structured-meanings approach to QuD meanings (as argued for most recently to our knowledge in Weir 2018), where questions have predicate-like meanings (functions into truth values), as restricted by the wh-term's content (Krifka, 2001), allowing for a direct comparison between the value of R and the antecedent QuD. We leave exploring such an implementation any further aside here, as the nature of the semantic identity condition is tangential to our claims. (Though see Barros & Kotek (2019) for a systematic attack on QuD-type theories, in defense of the more traditional e-GIVENness.)

would fail to entail the Focus closure of the antecedent, and would not be e-GIVEN.

$$(50) \quad \llbracket_{TPE} \text{Sally talked to } t_i \rrbracket = \exists y[\text{Sally talked to } y]$$

$$\not\models \text{F-clo}(A) = \exists x[\text{Sally talked to } x \wedge \text{Phonologist}(x)]$$

Therefore, we are led to conclude that mutual entailment is not a condition for E-sites. If a deep component is always present in ellipsis sites, then we can attribute mutual entailment effects to such a deep ingredient and not to E-sites, which must be resolved by other means. We suggest that something along the lines of Hankamer & Sag's original 1976 characterization of surface anaphora as "syntactically controlled" (read: requiring a linguistic antecedent) may suffice for our purposes.¹² In other words, ellipsis sites are surface anaphors - requiring syntactic antecedents (perhaps subject to some syntactic identity condition). Ellipsis sites entail the presence of R(x), a deep anaphor. Since deep anaphors are subject to e-GIVENness when they have an antecedent, inheritance of content effects follow.

Before concluding this section, let us return to the putative problem contrast sluices pose to our analysis. Recall example (38), repeated below:

$$(51) \quad \text{Sally has five CATS but I don't know how many DOGS } \langle \text{she has } t \rangle.$$

Here, it seems as if we need to ensure that R does not inherit any property having to do with cats or numbers of cats, since the sluiced question is not interpreted as being about cats. As Merchant notes, reference to F-marking and mutual entailment between F-closed expressions is crucial when it comes to the resolution of contrast sluices. Contrast between the remnant of the E-site and the correlate in the antecedent forces F-marking in the correlate, which, after Focus closure, results in the following:

$$(52) \quad \text{F-clo}(IP_A) = \exists x.\text{she has } x$$

¹²The nature of a syntactic identity condition is orthogonal to our concerns in this paper, so we leave exploring this and related issues aside for future work.

Given that \exists -type shifting for the *wh* variable inside the elliptical TP will end in the same result, mutual entailment is ensured.

$$(53) \quad IP_E = \exists x. she \text{ has } x$$

Importantly, the focused correlate is replaced by an existentially closed variable. It is this property, then, that is inherited ($\lambda x. she \text{ has } x$). This is the expected result. In other words, IoC still takes place, it is just that F-marking effectively bleaches the inherited property of the correlate's content. \exists -closure of $R(x)$ after such inheritance gives us precisely the meaning in (52) and (53).

In other words, under our analysis, we obtain the same results as Merchant, if $R(x)$, not the E-site, entails the focus closure of the antecedent. Again, this is expected if deep anaphora is subject to mutual entailment under focus closure (when a linguistic antecedent is present). Therefore, there is no IoC-blocking in contrast sluices; this is an illusion that vanishes once F-marking in the correlate is taken into account.

These examples illustrate one of the core properties of R. As discussed above while R may be anaphoric to a number of discourse-salient properties, some restrictions are still apparent. Specifically, in (37b), it is crucial that R tracks the meaning of the salient property of kissing some non-María individual, rather than just kissing anyone. Notions of congruence arguably fail to enforce this result, given that the unsluiced question (where the assertion is that Pedro doesn't know who Juan kissed at all) is itself congruent.

4 Conclusions and outlook

We have seen that a number of apparently unconnected properties of sluicing can be unified if sluicing sites (and ellipsis sites in general) are necessarily contextually restricted. Barros (2012, 2014) already hints at a solution along these lines by claiming the relevant sluices as stemming from a cleft built around a contextually restricted *it* pronoun. However, his analysis lacks generality, given that the relevant effects persist even in cases where cleft

sources are demonstrably unavailable. This suggests that contextual restriction needs to be dissociated from the specific syntax of a cleft.

This basic claim doesn't rely on our particular implementation being correct. In principle, the same results can be attained with a different implementation of contextual restriction, so long as one accepts that the obligatory contextual restriction of sluices is not tied to the presence of an underlying cleft. This result highlights an important methodological moral, i.e., that comparing the *meanings* of sluiced and unsluiced questions is not a reliable heuristic to determine what the underlying *syntax* of the sluicing site is. This is, remarkably, the same insight that Saussure had over a century ago:

“The very word *ellipsis* has a meaning which should give pause for thought. Such a term suggests that we know at the outset how many terms a sentence *should* be made up of, and that by comparing the actual terms it contains we work out the shortfall. But if a term is infinitely extendable in its meaning, the calculation we are trying to establish using *n* ideas and *n* terms is clearly quite ridiculous, and moreover perfectly arbitrary.” [Saussure 2014:67]

The particular approach to sluicing (and ellipsis in general) we have defended here has a number of additional consequences. Consider, for example, the status of the surface vs. deep anaphora distinction, which independent work (e.g., Baltin 2012, Thompson 2014) has already argued is blurrier than Hankamer & Sag (1976) originally envisioned. Our contextual variable R is effectively a deep anaphor rather than a transformation (deletion) applying to a morphosyntactic object. The hypothesis that R is an integral component of ellipsis types routinely classified as surface anaphors (i.e., sluicing, plus VP and NP ellipsis, as analyzed in Elbourne 2001) suggests that at least some surface-anaphoric ellipses contain an irreducibly deep-anaphoric component.

Second, it suggests that identity conditions on ellipsis need to be reconsidered. As articulated by Rooth (1992), Schwarzschild (1999), Merchant (2001), and others, identity

requires that certain types of entailments hold between the ellipsis site and its antecedent. Our work should be taken as an indication that this could be just a side effect of the contribution of R, and not of E-sites. As suggested in the previous section, an option would be to treat identity for E-sites as a morphosyntactic isomorphism relation (cf. Chung 2013, Merchant 2013, Thoms 2015) and then treat semantic identity effects as a by-effect of the relation between R and the antecedent. We will leave careful investigation of this idea for another occasion.

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