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Ellipsis licensing and redundancy reduction: A focus-based approach

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The focus of this paper is the characterization of the identity condition on sluicing. While the formulation of this condition remains an open issue, recent work suggests that sluices are anaphoric to an implicit question or issue that the antecedent raises in the discourse (Q-equivalence approaches, Ginzburg & Sag 2000; AnderBois 2011; 2014; 2016; Barros 2014; Weir 2014; Kotek & Barros 2018). We highlight several challenges to Q-equivalence accounts, and argue instead for a return to focus-based accounts (Rooth 1992a; Romero 1998; Fox 2000; Merchant 2001). Under such an approach, antecedents are importantly not responsible for raising any particular issue/question themselves, a point we show to be a critical challenge to Q-equivalence accounts. We propose instead that sluicing is possible provided that the antecedent and sluice have the same focus-theoretic propositional content. We show that this account is similar to, but improves upon, Merchant's (2001) influential e-GIVENness account. We extend this account to cases of VP ellipsis, and moreover argue in support of the idea that the theory of ellipsis licensing should be integrated into a more general theory of redundancy reduction. In other words, that the semantic condition on identity in ellipsis is the same as the semantic condition on deaccenting (Rooth 1992a; Tancredi 1992). We propose a generalized condition on redundancy reduction, which may replace Schwarzschild's (1999) GIVENness condition.

1 Introduction

Sluicing is clausal ellipsis in a *wh*-question, leaving only the *wh*-phrase overt (Ross 1969; Chung et al. 1995; Merchant 2001, among others), as in (1a). For concreteness, we adopt the standard analysis in (1b), where sluicing involves *wh*-movement followed by PF-deletion/non-pronunciation of TP (Merchant 2001 and many others).[1] Following Merchant, we refer to *wh*-phrases left overt in sluicing as *remnants*. Remnants typically correspond to some indefinite XP in the antecedent, the remnant's *correlate*. (Throughout, ~~strikethrough~~ represents unpronounced material. Here, the correlate is *someone* and the remnant is *who*.)

(1)   **A simple example of sluicing in English:**
       a.   Sally called someone, but I don't know who.
       b.   Sally called someone, but I don't know who$_i$ [$_{TP}$ ~~Sally called t_i~~].

Ellipsis is a form of *redundancy reduction* (Rooth 1992a), one of several mechanisms provided by natural language to mark linguistic material as redundant/recoverable

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[1] Although what we say below will be largely independent of this assumption.

(alongside pronominalization and prosodic reduction, i.e., *deaccenting*). Intuitively, the missing content in an ellipsis construction must be, in some sense, identical to some salient *antecedent* in the immediately preceding discourse (Hankamer & Sag 1976). In (1), the string *Sally called* in *Sally called someone* makes this same string redundant in the sluiced continuation, licensing its omission. In this paper we explore the properties of this *identity* licensing condition on ellipsis.

Despite the appeal of this intuitive description of the licensing condition, there is currently no consensus on its precise nature (Chung 2013; Barros 2014; Weir 2014, inter alia). Some authors propose to formulate this condition in terms of semantic equivalence, where the literal interpretations of the antecedent and the elided clause are synonymous in some sense (Hardt 1993; Ginzburg & Sag 2000; Merchant 2001; Barros 2014, a.o.). Others state this condition in terms of syntactic equivalence, where the elided structure must match that of its antecedent (Ross 1969; Chung et al. 1995; Chung 2006; Merchant 2013, a.o.). Others yet propose a hybrid condition, involving some degree of syntactic identity alongside a semantic identity condition (e.g. Rooth 1992a; Romero 1998; Chung 2006; 2013; Chung et al. 2010; AnderBois 2011; 2014; 2016; Merchant 2013; Weir 2014).

A growing consensus is that a hybrid condition is needed, such that a limited degree of syntactic identity is required,[2] alongside some semantic condition (Merchant 2005; Chung 2006; 2013; AnderBois 2011; Weir 2014, a.m.o.).[3] Starting with AnderBois (2011), the literature has increasingly adopted the view that the correct semantic condition is one where sluicing is anaphoric to some abstract *question* or *issue* that the antecedent raises in discourse (Ginzburg & Sag 2000; AnderBois 2011; 2014; 2016; Barros 2014; Weir 2014; Kotek & Barros 2018). The basic idea behind the AnderBoisian (henceforth Question-equivalence or Q-equivalence) approach is that sentences with indefinites or disjunctions introduce implicit questions into the discourse, which may then serve as semantic antecedents for a sluiced sentence. In (1), *Sally called someone* implicitly raises to salience the question *Who did Sally call?*. This implicit question is similar enough to the sluiced question *Who sally called?*, licensing the ellipsis in (1).

In this paper, we focus on the semantic component of the identity condition on ellipsis. Our main claim is that a proposal along the lines of Merchant's (2001) focus-theoretic approach to ellipsis licensing is on the right track. We offer our own formulation of such a focus-theoretic approach, which we believe improves on Merchant's original proposal. We argue against the increasingly popular Q-equivalence approaches on empirical as well as conceptual grounds. While we do not conclusively show that such accounts cannot be rescued, we argue that they lack motivation and face substantial problems. Finally, we entertain the idea that the theory of ellipsis licensing should be assimilated into the theory of redundancy reduction more broadly, focusing on a comparison with deaccenting.

In the remainder of the paper, we first spell out our focus-based proposal in §2, which is similar in spirit and coverage to Merchant's (2001) influential e-GIVENness proposal. We concentrate in particular on sluicing, as our starting point. In §3 we argue that there is no empirical motivation for Q-equivalence approaches, and additionally highlight several conceptual challenges for such approaches. We show that our focus-based approach is not susceptible to these challenges. In §4, we discuss Merchant's (2001) account and compare it to our own. We highlight a challenge to Merchant's proposal from sluicing with quantified correlates, which our proposal can better handle. In §5, we generalize our account to cases of VP-ellipsis, where we illustrate along the way another advantage of our account

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[2] In other words, an exact match between the structure of the antecedent and the structure of the elided material is *not* required.
[3] See Lipták (2015) for a survey of the literature in this domain.

over Merchant's. We conclude by suggesting that the theory of ellipsis licensing should be assimilated into the theory of redundancy reduction more broadly—specifically, that the semantic condition on identity in ellipsis is the same as the semantic condition on identity in deaccenting. We propose a generalized condition on redundancy reduction, building on our proposal in §2, and suggest that it may replace Schwarzschild's (1999) GIVENness condition.

2 A focus-based proposal

We begin by presenting the main proposal that we defend in this paper. This is a focus-theoretic account of identity for ellipsis licensing, inspired by similar proposals by Schwarzschild (1999) and Merchant (2001) et seq. Our main goal in this paper is to argue for a focus-based approach and against Q-equivalence ones. We spell out our variant of the focus-based approach here for concreteness, focusing on sluicing to allow for direct comparison with Q-equivalence accounts. We extend our discussion to VP-Ellipsis and deaccenting in §5.

2.1 Background: Modeling questions and propositions

Our focus-based account is based on the *Alternative Semantics* account of the compositional semantics of focus (Rooth 1985; 1992b; Hamblin 1973). Under this approach, items such as *wh*-words and F(ocus)-marked elements introduce alternatives into the derivation. *Focus-semantic values* $[\![\cdot]\!]^f$ are computed for each node in the syntactic derivation alongside their *ordinary value* $[\![\cdot]\!]^o$. Focus-sensitive operators such as *only* can then use alternatives to different effects.[4]

(2)   **Alternatives can be used by focus-sensitive operators (Beaver & Clark 2008):**
  a.   David **only** wears a bow-tie when [*teaching*]$_F$.
       ≈ David doesn't wear a bow-tie when doing anything else.

  b.   David **only** wears [*a bow-tie*]$_F$ when teaching.
       ≈ David doesn't wear anything else when teaching.

Our goal in this paper is to provide an account of the identity condition on sluicing in examples such as (1), repeated from above, where a declarative antecedent and a question continuation must somehow be semantically identical.

(3)   Sally called someone, but I don't know who$_i$ [$_{TP}$ ~~Sally called t_i~~].   (= 1)

We adopt the view that questions denote sets of propositions that are possible answers to the question (Hamblin 1973; Karttunen 1977). In (4a), the *wh*-word *who* acts as a source of alternatives, here corresponding to relevant individuals in the context (see Hamblin 1973; Ramchand 1997; Kratzer & Shimoyama 2002; Beck 2006; Cable 2010; Kotek 2019), as shown in (4b). The question denotation is given in set form and in function form in (4c–d).

(4)   **The denotation of a *wh*-question:**
  a.   Who did Sally call?
  b. $[\![\text{Who}]\!]^f = \{x_e : x \in \text{human}\}$
  c.   { Sally called Abby, Sally called Betty, Sally called Cathy, … }
  d. $\lambda p \,.\, \exists x \,(p = \lambda w \,.\, \text{Sally called } x \text{ in } w)$

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[4] Italics in numbered examples indicates accented/F-marked material.

We furthermore adopt the standard assumption that propositions denote sets of worlds that satisfy certain truth conditions:

(5)   **The denotation of a proposition:**
        $[\![\text{Sally ran}]\!]^o = \lambda w$. Sally ran in w
        ⤳ the collection of all of the worlds in which Sally ran.

Finally, we introduce a union operation over propositions, ∪. This operation will be useful when we present our proposal in (8) below.

(6)   **The denotation of the ∪ operator:**
        $[\![\text{Sally ran}]\!]^o$ or $[\![\text{Mary ran}]\!]^o =$
        $[\lambda w$. Sally ran in $w] \cup [\lambda w$. Mary ran in $w]$
        ⤳ the collection of all of the worlds in which either Sally ran or Mary ran
        (or both).

2.2 Proposal

Our generalized proposal, which will be motivated in greater detail in §5, is given in (7).

(7)   **A generalized licensing condition for redundancy reduction:**
        XP_E may be reduced (elided or deaccented) provided that it has a salient antecedent, XP_A, and $\cup[\![XP_E]\!]^f = \cup[\![XP_A]\!]^f$.

We will argue for this proposal stepwise, by first closely examining the licensing conditions on sluicing, and then expanding our discussion to VP ellipsis and to deaccenting. In Sections 2–3 we concentrate specifically on sluicing. We propose that sluicing is licensed provided the antecedent and sluice have the same focus-theoretic propositional content:

(8)   **Ellipsis licensing condition (sluicing, to be expanded):**
        Sluicing may apply in CP_E provided CP_E has a salient antecedent, CP_A, and the set of worlds used to construct the alternatives in $[\![CP_E]\!]^f$ ↔ the set of worlds used to construct the alternatives in $[\![CP_A]\!]^f$.

For most purposes, this amounts to the following:[5]

(9)   **The licensing condition on sluicing, in brief:**
        $\cup[\![CP_A]\!]^f \leftrightarrow \cup[\![CP_E]\!]^f$

This proposal is similar in spirit to Weir's (2014) licensing condition on sluicing, reproduced in (10), although for Weir, the licensing condition crucially makes reference to a *Question under Discussion* (QuD) raised by the antecedent. As we will show at length in §3, a QuD account will struggle to account for the data we will discuss in this paper. It will moreover fail to generalize to other types of ellipsis and redundancy reduction, as we will do with our proposal in §5.

(10)   **Weir's (2014: 85) licensing condition on sluicing:**
        $\cup QUD \leftrightarrow \cup[\![CP_E]\!]^f$

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[5] Things are more complex in two cases: contrast sluicing (see e.g. Merchant 2001) and multiple sluicing (e.g. Lasnik 2014; Kotek & Barros 2018). We discuss these cases further below.

We now illustrate how our proposal handles sluicing, using our simple example with an indefinite correlate (11). First, note that condition (a) of our proposal is met: CP_E has a salient antecedent CP_A, as illustrated in (12). Condition (b) of our proposal is also met, as we can demonstrated that the focus-semantic values of the antecedent clause and of the sluice are equivalent: $\cup[\![CP_A]\!]^f \leftrightarrow \cup[\![CP_E]\!]^f$, (13).

(11) $[_{CP_A}$ Sally called someone $]$, BIDK[6] $[_{CP_E}$ who ~~Sally called~~$]$. $(= 1)$

(12)   **Condition (a) of (8) is met in (11):**
   a.   Sluiced clause CP_E: who$_i$ ~~Sally called t_i~~
   b.   Antecedent clause CP_A: Sally called someone

(13)   **Condition (b) of (8) is also met in (11):**
   a. $[\![[_{CP_E}$ Who ~~Sally called~~$]]\!]^f = \lambda p \,.\, \exists x \, (p = \lambda w \,.\, $ Sally called x in $w)$
   b. $\cup[\![[_{CP_E}$ Who ~~Sally called~~$]]\!]^f = \lambda w \,.\, \exists x \, ($ Sally called x in $w)$
   c. $[\![[_{CP_A}$ Sally called someone$]]\!]^f = \{ \, \lambda w \,.\, \exists x \, ($ Sally called x in $w) \, \}$[7]
   d. $\cup[\![[_{CP_A}$ Sally called someone$]]\!]^f = \lambda w \,.\, \exists x \, ($ Sally called x in $w)$
   e.   (13b) $\leftrightarrow$ (13d)

Note that in this simple case, sluicing would also be licensed by simply making reference to the ordinary semantic value of the antecedent, as opposed to its focus value. As will become evident in §3.4.5, we will need to make reference to the focus semantic value of focused material in order to account for contrastive sluices, and therefore we generalize here, as well.

   Consider next the phenomenon of *sprouting,* a sub-case of sluicing, in which the remnant lacks an explicit linguistic correlate (Chung et al. 1995, a.o.). Such cases will become important in our argumentation against Q-equivalence approaches below. As example (14) shows, we find cases of both argument and adjunct sprouting. In particular, example (14b) demonstrates sprouting's flexibility:

(14)   **Argument and adjunct sprouting:**
   a.   Sally ate, but I don't know what.

   b.   Sally left, but I don't know $\left\{ \begin{array}{l} \text{when, with whom, in which car,} \\ \text{why, how, where to,...} \end{array} \right\}$

Our proposal can easily capture examples of sprouting. Consider first examples of argument sprouting, as in (14a). Example (15) illustrates how such cases are captured by our analysis:[8]

(15)   **Accounting for argument sprouting:**
   $[_{CP_A}$ Sally ate $]$, BIDK $[_{CP_E}$ what ~~Sally ate~~$]$.
   a. $[\![$what ~~Sally ate~~$]\!]^f = \lambda p \,.\, \exists x \, (p = \lambda w.$ Sally ate x in $w)$
   b. $\cup[\![$what ~~Sally ate~~$]\!]^f = \lambda w \,.\, \exists x \, ($ Sally ate x in $w)$
   c. $\cup[\![$Sally ate$]\!]^f = \lambda w \,.\, $ Sally ate in w
   d.   (15b) $\leftrightarrow$ (15c)

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[6] BIDK = But I don't know…
[7] Following Rooth (1985; 1992b), the focus-semantic denotation of non-focused material is a singleton set containing its ordinary value.
[8] Starting here, we do not explicitly show that condition (a) of our proposal in (8) is satisfied. This can be easily verified to hold in all of the examples under consideration in this paper.

Importantly here, notice that if Sally ate in w, then she necessarily ate a certain thing x in w. As a consequence, the set of worlds described by the sluice in (15b) and the set of worlds described by the antecedent (15c) must be identical:

(16)   ⟦Sally ate⟧ = { w : Sally ate in w} = ∪ {λw . Sally ate x in w | $x \in D_e$ }

Consider next examples of adjunct sprouting, as in (14b). Example (17) illustrates how our proposal works for the adjunct *when*.

(17)   **Accounting for adjunct sprouting:**
          [$_{CP_A}$ Sally left], BIDK [$_{CP_E}$ when ~~Sally left~~].
          a.   ⟦When ~~Sally left~~⟧^{f} = λp . $\exists t$ (p = λw . Sally left at time t in w)
          b.   ∪⟦When ~~Sally left~~⟧^{f} = λw . $\exists t$ (Sally left at time t in w)
          c.   ∪⟦Sally left⟧^{f} = λw . Sally left in w
          d.   (17b) ↔ (17c)

As in the case of argument sluicing in (15), it is important here that if Sally left in w, then she necessarily left at a certain time t in w. As a consequence, the set of worlds described by the sluice in (17b) and the set of worlds described by the antecedent (17c) must be identical:

(18)   **Leaving events always involve a time of leaving:**
          ⟦Sally left⟧ = { w : Sally left in w } = ∪ { λw . Sally left at time t in w | $t \in D_s$ }

Matters are more complex in other cases of adjunct sprouting, such as … *with whom* or … *in which car* in (14b). As a general rule, not every event of Sally leaving must involve a companion or a car:

(19)   **Leaving events don't always involves a companion:**
          a.   Sally left, but I don't know who ~~Sally left~~ with.
          b.   { w : Sally left in w} ≠ ∪ { λw . Sally left with x in w | $x \in D_e$ }

Here, we appeal to a process of accommodation, much like the one appealed to by other accounts of sprouting in the literature.[9] For concreteness, we adopt the definition of accommodation in (20). This allows the antecedent to entail the sluiced question's existential presupposition.

(20)   **Accommodation (Lewis 1979: 340):**
          If at time t something is said that requires presupposition P to be acceptable,
          and if P is not presupposed just before t, then, ceteris paribus and within certain
          limits, presupposition P comes into existence at t.

In (19), the sluice presupposes that all relevant *Sally-leaving worlds* are *Sally-leaving-with-someone* worlds. We assume that accommodation of the sluice's presupposition removes from consideration worlds in the context set that are inconsistent with the sluice's presupposition. For (19b), worlds where Sally did not leave with anyone are irrelevant, yielding equivalence between the denotation of the sluice and the antecedent proposition,

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[9] See Rooth (1992a) and Fox (1995; 2000) for discussion of accommodation in deaccenting and ellipsis licensing. Cf AnderBois's (2011) discussion of Issue Bridging, also mentioned in §3.3.

correctly predicting sprouting to be licensed in these cases once accommodation is taken into account.

   We take this solution to provide an answer to a related challenge from Chung et al. (2010) to (then-extant) semantic identity approaches in general, and in particular to the proposal in Merchant (2001). Some examples are given below:

(21)   **Challenge to semantic equivalence from Chung et al. (2010):**
   a.   Jack finished his homework, but I don't know with whose help ~~he finished his homework~~.
   b.   She went to the movies, but I don't know who with ~~she went to the movies~~.
   c.   He put in a bid, but I don't know on who's behalf ~~he put in a bid~~.

In none of the examples in (21) is it clear that the antecedent renders the ellipsis clause GIVEN in the sense required by Merchant's account (see §4). For example, finishing one's homework does not entail doing so with someone's help. However, such data can be straightforwardly explained by our semantic approach, provided that we allow accommodation of the sluiced question's existential presupposition, along similar lines to our explanation for (19).

   In general, we propose that the nature of the remnant is behind whether any sort of accommodation is required. Remnants like *when* and *where* correspond to implicit arguments in the denotation of an eventive antecedent, since events must happen at certain times and places in any world. Likewise for *what* in (14): every eating event presumably includes an object of eating. Sprouting remnants with contentful head nouns like *what time last Tuesday* or *in which room*, on the other hand, require some accommodation, for the reasons discussed above: not every event will necessitate such a component, and therefore, unless already provided by the prior discourse, such information will need to be accommodated.[10]

   To summarize our proposal, in this section we sketched a focus-based account, where sluicing is possible provided that the antecedent and sluice have the same focus-theoretic propositional content. In §4 we will compare this proposal with Merchant's (2001) influential e-GIVENness account, which is also focus-theoretic. We will show that in many cases, the two accounts achieve similar results, but that our account allows for wider overall coverage of data.

   In the following section, we show in detail that Q-equivalence approaches to identity in ellipsis licensing face serious obstacles. In the process of making this case, we will introduce more complex cases of sluicing and sprouting. We will show how our proposal captures these cases below.

3 Revisiting Q-equivalence

In this section, we argue that there is little motivation for the move to Q-equivalence approaches. We demonstrate this by first revisiting the empirical motivations in AnderBois (2011), and recap the results reported in Collins et al. (2015) that challenge AnderBois's 2011 data. We then consider an additional argument for Q-equivalence from Barros (2013), and present novel data challenging Barros's 2013 conclusions. Our conclusion is that Q-equivalence approaches are empirically unmotivated.

   Importantly, Q-equivalence approaches, following AnderBois (2011), would have it that sluicing (and following especially Weir 2014, clausal ellipsis more generally) is subject to a distinct semantic identity condition from VP ellipsis and NP ellipsis that makes crucial

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[10] We choose not to show these details of event semantics in our denotations for ease of presentation.

reference to question meanings (a *two-pronged* approach).[11] This much is intuitive on an analytical level; sluices are questions, so perhaps it makes sense that their antecedents should also be questions.[12] However, a unified theory of semantic identity in ellipsis in general (encompassing clausal ellipsis, VP ellipsis, and NP ellipsis) is more parsimonious on its face, and the idea that clausal ellipsis shares the same character as other (*smaller*) kinds of ellipsis also has intuitive purchase. We argue that in the absence of empirical motivations that force us to adopt a two-pronged approach, any theory that successfully provides a unified account of the data is to be preferred on (at least) conceptual grounds.

That this state of affairs obtains is what we show in this section. After demonstrating that Q-equivalence approaches lack empirical motivation, we proceed to highlight new empirical and conceptual challenges to such approaches. Importantly, we do not suggest that Q-equivalence approaches cannot be modified, elaborated, or complicated, to meet these challenges. We even suggest ways in which Q-equivalence approaches may be modified to meet some of these challenges (though we refrain from fully fleshing out such suggestions for space reasons).

We show, below, that it remains the case that there are no compelling empirical arguments supporting a split in semantic identity conditions for ellipsis—one for clausal ellipsis/sluicing, on one hand, and another for VP ellipsis and NP ellipsis, on the other. We moreover show that our account can be further extended to account for deaccenting. As such, complications of Q-equivalence approaches, elaborations, or modifications thereof, amount to empirically unmotivated moves to save a conceptually unnecessary analysis in the face of a conceptually and empirically better motivated alternative: our proposal here.

3.1 On empirical motivations for Q-equivalence

3.1.1 AnderBois (2011) vs. Collins et al. (2015)

Collins et al. (2015) presents results that challenge AnderBois's (2011) empirical motivations for Q-equivalence. They nonetheless adhere to Q-equivalence as a means of licensing sluicing—despite stripping the force of AnderBois's empirical arguments, their experimental results undermining those arguments at every turn—for reasons that are orthogonal to our aims and which we will not repeat here. Here we will use the results in Collins et al. (2015) as undermining the empirical motivation for Q-equivalence, and providing support for our claim that a unified focus-theoretic semantic approach to ellipsis identity should be favored on conceptual grounds.

In empirically motivating Q-equivalence, AnderBois (2011) takes as a starting point the proposal in Merchant (2001), where the sluice is licensed provided it is e-GIVEN. The definition of e-GIVENness is provided below. (See additional discussion of Merchant's 2001 e-GIVENness in §4.)

(22)   **Focus Condition on Ellipsis (FCE, Merchant 2001: 26)**
  a.   A constituent E can be deleted iff E is e-GIVEN.
  b.   An expression counts as e-GIVEN iff E has a salient antecedent A and, modulo ∃-type shifting,
    i.   A entails F-clo(E), and
    ii.   E entails F-clo(A)
  c.   F-clo(α) is the result of replacing F-marked parts of α with ∃-bound variables.

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[11] AnderBois (2011) in particular assumes that a Merchant (2001)-style e-GIVENness account applies for VP- and NP-ellipsis.

[12] Similarly, fragment answers are answers to questions. Given the similarity in meaning between the focus semantic value of an answer in the Roothian sense and a Hamblin/Karttunen question meaning, the promise of a unified theory of semantic identity for clausal ellipsis seems attractive.

(23) **Deriving simple sluicing using Merchant's FCE:**
[TP$_A$ Someone left], but I don't know who$_i$ [TP$_E$ t_i ~~left~~].
TP$_A$ = F-clo(TP$_A$) = $\exists x$ [human(x) & left(x)]
TP$_E$ = F-clo(TP$_E$) = $\exists x$ [human(x) & left(x)]

AnderBois (2011) makes the claim that the reliance on truth conditional semantics in Merchant's system makes the wrong prediction when it comes to antecedents with double negation. (Judgements as in AnderBois 2011.)

(24) a. *Sally didn't see no one, but I don't know who ~~Sally saw~~.
      b. *It's not the case that no student left, but I don't know which student ~~left~~.

e-GIVENness predicts such cases to be licensed, because double negation is truth conditionally vacuous in dialects where each negation is a separate logical negation. The resulting truth conditions for (24a) are thus:

(25) a. Sally didn't see no one   antecedent
          $\exists$-clo/F-clo(TP$_A$) = $\neg\neg\exists x[$*Sally saw x*$]$ = $\exists x[$*Sally saw x*$]$

      b. Who ~~Sally saw~~   sluice
          $\exists$-clo/F-clo(TP$_E$) = $\exists y[$*Sally saw y*$]$
          F-clo(A) = F-clo(E) and vice versa. Therefore, e-GIVENness is met. (24a) is predicted to be grammatical, contrary to fact.

This is a misprediction of Merchant's (2001) proposal. AnderBois (2011) uses such data as an empirical motivation for Q-equivalence. Specifically, AnderBois makes use of the fact that in the Inquisitive Semantics framework (Groenendijk & Roelofsen 2009), double negation is not semantically vacuous. Section 3.2 will spell out this proposal in greater detail.

   Indeed, if the data in (24) really do bear on the analysis of sluicing, AnderBois's analytical move counts as an empirically well motivated one. However, Collins et al. (2015) report experimental results where participants rated sluices with doubly negated antecedents poorly, and importantly, just as poorly as those same examples without sluicing,[13] so that AnderBois's reported judgements with double negation do not bear on sluicing at all, but instead have to do with the oddness of double negation more generally.

   Another sort of data AnderBois (2011) brings to bear on the issue of the semantic identity condition on sluicing comes from appositives. AnderBois highlights the following paradigm, where in (26a), sluicing fails when its antecedent (in brackets) is contained inside an appositive. In (26c), on the other hand, VP ellipsis is possible.

(26) **VPE, but not sluicing antecedents may be contained in appositives**
      a. *Joe, [who once killed a man in cold blood], doesn't even remember who
          ~~he killed in cold blood~~.   (Sluicing)
      b. Joe once killed a man in cold blood and he doesn't even remember who
          ~~he killed in cold blood~~.
      c. Joe, who [murdered a man in cold blood], convinced Bill to
          ~~murder a man in cold blood~~ too.   (VPE)

e-GIVENness fails to predict this asymmetry, as nothing about being contained in an appositive influences the truth conditional content of the antecedent in examples like

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[13] We refer the reader to results as reported in Collins et al. (2015) for discussion.

(26a). AnderBois (2011) capitalizes on the observation, going back to Potts (2005), that appositive content is not *at-issue*, and assumes that non-at-issue content is *non-inquisitive* (i.e. has no issue-raising capacity). In other words, antecedents contained in appositive relative clauses fail to raise a question which can serve as a Q-equivalent sluicing antecedent. VPE, on the other hand, is claimed to be subject to a distinct licensing condition, taken to be e-GIVENness in AnderBois (2011).

Collins et al. (2015) reports on the results of an experimental study that showed that sluicing was in fact possible when the antecedent was contained in an appositive. An important factor in predicting acceptability is whether the indefinite correlate and *wh*-remnant have the same *informativity* status (to borrow the term from Collins et al. 2015). Syntactically, if the correlate has a contentful head NP (and is not just an indefinite pronoun, such as *someone*, for instance), then the *wh*-remnant should have one as well (or they should both lack such a contentful head noun). (This generalization is independently made in Dayal & Schwarzschild 2010.)

Examples like those in (27) were rated significantly more acceptable by experimental participants than those like AnderBois's (2011) (26a), where the sluicing remnant and its correlate mismatch in informativity. (See Collins et al. 2015 for further details on the results of the study.)

(27) a. My cousin Joni, who spent the night with a Beatle in 1962, can't remember which Beatle.
      b. My cousin Joni, who spent the night with someone in 1962, can't remember who.

In other words, once the preference for matching in informativity across remnants and correlates is controlled for, sluicing becomes acceptable with appositive-contained antecedents.

Collins et al. (2015) take their results as evidence that appositive clauses do, in fact, (contra AnderBois 2011) have the capacity to raise issues/questions, which may then serve as antecedents for sluices, provided that informativity is controlled for.[14] Here, we adopt an alternative understanding of these results. Specifically, we argue that Collins et al.'s (2015) results undermine AnderBois's (2011) empirical arguments for positing a split in the identity conditions between VPE and sluicing, opening up an alternative understanding of the facts surrounding antecedents contained in appositives.

3.1.2 Barros (2013) and the Answer Ban

In this section we highlight an additional argument put forth in Barros (2013) for Q-equivalence, and present novel empirical evidence that challenges it.

Barker (2013) describes a generalization dubbed The Answer Ban, where the sluicing antecedent cannot provide an answer to the sluiced question. In (28), the antecedent *Jack left* provides an answer to the sluiced question *who left?*, and therefore sluicing is ruled out:

(28) *Jack left, but Sally doesn't know who ~~left~~.

Barros (2013) argues that the Answer Ban follows from Q-equivalence approaches. Following Roberts (2012), *Questions under Discussion* (QuDs) are *live questions* in discourse, which interlocutors are committed to answering. Once a question is answered, it is no

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[14] Collins et al. (2015) report on the results of an additional experiment, where sluicing with appositive antecedents is improved provided the appositive additionally engages with prior discourse.

longer a live QuD. If sluicing requires anaphora to QuDs (i.e., if sluices must be semantically identical to QuDs), it follows that the antecedent cannot have already answered the question raised by the sluice—because in that case there would be no live QuD for the sluice to be anaphoric to. Consequently, Answer Ban violations are correctly ruled out on the grounds that the sluice lacks a semantically identical antecedent. Data supporting the Answer Ban, then can be seen as additional empirical evidence in favor of Q-equivalence.

We present new data here that undermines this argument. Example (29) shows that sluicing may obtain even when the required QuD has, in fact, already been answered in the discourse. Instead, what seems to be important is that the antecedent itself cannot address the sluiced question, but prior discourse may. Note, importantly, QuDs are only live questions if they have not yet been answered. Consequently, there can be no semantically equivalent QuD at the time of sluicing in the discourse in (29). (In Roberts's 2012 terms, such a QuD has been "popped off the stack.") Nonetheless, this example is judged as grammatical.

(29)   Jack left at 5 PM, so we know both that someone left, and who.

Barker's Answer Ban generalization remains intact, since the antecedent doesn't answer the sluiced question. Nonetheless, Barros's explanation of the Answer Ban as stemming from Q-equivalence fails, insofar as QuDs must be askable questions in the relevant discourse, as per Roberts (2012). This is explicit in Roberts (2012), and Q-equivalence approaches such as AnderBois (2011), Barros (2014), and Weir (2014).[15]

Under our approach, on the other hand, in making no reference to QuDs, sluicing is correctly predicted to go through in examples like (29), and ruled out in examples like (28). In (28), $\cup[\![\text{antecedent}]\!]^f \not\leftrightarrow \cup[\![\text{sluice}]\!]^f$. This will be the case whenever the antecedent answers the sluice:

(30)   **Deriving the Answer Ban:**
         *Jack left, but Sally doesn't know who ~~left~~.
         a. $\cup[\![\text{Jack left}]\!]^f = \lambda w$. Jack left in w
         b. $\cup[\![\text{who left}]\!]^f = \lambda w$. $\exists x$ (x left in w)
         c.   (30a) $\not\leftrightarrow$ (30b)

On the other hand, examples such as (29) are predicted to be acceptable, because the sluice and antecedent are equivalent in our terms:

(31)   **Deriving Answer Ban violations:**
         Jack left at 5 PM, so we know both
         [$_{\text{CP}_\text{A}}$ *that* someone left at 5 PM], and [$_{\text{CP}_\text{E}}$ who ~~left at 5 PM~~].
         a. $\cup[\![\text{someone left at 5PM}]\!]^f = \lambda w$. $\exists x$ (x left at 5PM in w)
         b. $\cup[\![\text{who left at 5PM}]\!]^f = \lambda w$. $\exists x$ (x left at 5PM in w)
         c.   (31a) $\leftrightarrow$ (31b)

What's important in our approach is that an antecedent with an indefinite correlate is semantically identical to the sluiced question. As we've defined the relevant notion of semantic identity, this is achieved.

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[15] An anonymous reviewer suggests an appeal to a QuD's salience rather than its status as answered in the discourse. We address this potential solution as well as a related issue of *else*-modification in sentences such as (28) in §3.4.1. In short, we believe that this solution isn't easy to implement, and will have wide-reaching implications for the theory of QuDs in general.

3.2 Issues and QuDs: A closer look at Q-equivalence

In this section we give a more detailed description of the two main approaches to Q-equivalence, those based on *issues* raised by the Inquisitive denotation of a sentence, and those based on *Questions under Discussion* in the sense of Roberts 1996/2012.

Q-equivalence approaches take as their starting point the intuition that antecedents with expressions such as indefinites and disjunctions implicitly raise questions as to which alternative holds. For instance, in (32), an assertion like *Sally ate something* intuitively raises the question *What did Sally eat?*. Likewise, *Sally ate either a hamburger or a hotdog* raises the question *Which of the two did Sally eat?*. Relevantly, assertions with indefinites and disjunctions make for natural sluicing antecedents, with the indefinite or disjunction serving as the remnant's correlate, (33):[16]

(32)　**Indefinites and disjunctions intuitively raise questions:**
　　　a.　Sally ate something.
　　　　　⤳ What did Sally eat?

　　　b.　Sally ate either a hamburger or a hotdog.
　　　　　⤳ which of the two did Sally eat?

(33)　**Indefinites and disjunctions serve as natural correlates:**
　　　a.　Sally ate something, BIDK what ~~Sally ate t~~.
　　　b.　Sally ate either a hamburger or a hotdog, BIDK which one ~~Sally ate t~~.

Sluicing is possible when the question denoted by the sluice is equivalent to the question raised by the antecedent (Ginzburg & Sag 2000; AnderBois 2011; Barros 2014; Weir 2014; Kotek & Barros 2018). The goal, then, is to determine precisely what question is raised by the antecedent.

We find two types of ways to approach this issue. For AnderBois (2011) et seq, the question raised by the antecedent is its Inquisitive-Semantic inquisitive denotation (called an *issue*, Groenendijk & Roelofsen 2009). This is the most explicit implementation of Q-equivalence, as it provides an explicit semantics in the Inquisitive Semantics framework, where antecedent assertions have compositionally derived question-like meanings.

In Inquisitive Semantics, a sentence is a proposal to update the common ground, and may be inquisitive, informative, or both. The informative contribution of a sentence, S, is its classical denotation, whereas a sentence's inquisitive contribution, [S], is a multi-alternative proposal, raising an *issue* as to which alternative that it proffers we should update the common ground with. AnderBois (2011) provides the following semantics which achieves inquisitive denotations of this sort for sentences with indefinites (e.g., sluicing antecedents).[17]

(34)　**AnderBois's (2011) inquisitive semantics:**
　　　a.　Atomic Formulas:
　　　　　$[\![R^n(x_1, \ldots, x_n)]\!]^{M,g,w} =$
　　　　　$\text{ALT}\{p \subseteq W \mid \forall w' \in p[\ \langle [\![x_1]\!]^{M,g,w'}, \ldots, [\![x_n]\!]^{M,g,w'}\rangle \in [\![R^n]\!]^{M,g,w'}\ ]\ \}$

　　　b.　Existential Quantification:
　　　　　$[\![\exists x\phi]\!]^{M,g,w} = \text{ALT}\{\ p \subseteq W \mid \exists d \in D_e[\exists q \in [\![\phi]\!]^{M,g^{[x/d]},w}[p \subseteq q\ ]\ ]\ \}$

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[16] We will not comment in this paper on the choice of *wh*-word in the remnant. See Dayal & Schwarzschild (2010) and Barros (2013) for a discussion of Antecedent-Correlate Harmony.

[17] ALT operates on sets of propositions and returns only maximal and non-overlapping alternatives, see AnderBois (2011) for discussion on why this should be necessary.

In a toy model with two individuals, *a* and *b*, a sentence like *someone left* has the following inquisitive denotation: { that *a* left, that *b* left }. This is the same as the inquisitive denotation of a *wh*-question of the form *Who left?*.

Inquisitive mutual entailment is proposed as the relevant semantic condition on sluicing, requiring that the inquisitive denotation of the antecedent and the sluice be mutually entailing. Given two sentences, A, and E, A entails E if for every alternative, α, in [A], there is some alternative, β in [E] that α entails.

(35) **Symmetric inquisitive entailment condition on sluicing:**

Given a structure:

$$\text{CP}_E$$
$$\overset{\diagup\diagdown}{\text{C}^0 \qquad \text{TP}_E}$$
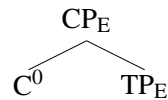
TP_E can only be elided if there is some salient antecedent CP_A such that:
a. $\text{CP}_E \mid= \text{CP}_A$, and
b. $\text{CP}_A \mid= \text{CP}_E$

Of course, if two inquisitive denotations are identical, they will be mutually entailing, so sluicing is predicted to go through given a simple antecedent/sluice pair like *Someone left, but I don't know who.*

Alternatively, and more commonly, the question raised by the antecedent might be the QuD relevant in the context, in the sense of Roberts 1996/2012 (cf Büring 2003; Barros 2012; 2014; Weir 2014). Following Roberts (2012), we take QuDs to be semantico-pragmatic objects—live questions in a discourse with interrogative force. Their role in discourse is to shape the flow of information exchange, as interlocutors engage in the cooperative task of addressing the QuD. The QuD may be made salient implicitly or explicitly (e.g., by asking a direct question).

However, implementations of QuD-based accounts are largely proof of concept, often taking a particular QuD for granted, but failing to address how the QuD actually comes about. An exception is Barros (2014), which provides an explicit algorithm for calculating the current QuD raised by an antecedent in an ellipsis construction:[18]

(36) **A QuD-calculation algorithm (Barros 2014):**
a. Replace the indefinite/disjunction with the corresponding *wh*-phrase.
b. Front the *wh*-phrase.
c. The result is the QuD raised by the antecedent.

This algorithm can apply in simple cases to derive semantic identity and correctly predict licit cases of sluicing:

(37) **Applying Barros's (2014) algorithm to a simple example of sluicing:**
[$_{\text{CP}_A}$ Sally ate something], BIDK [$_{\text{CP}_E}$ what ~~Sally ate *t*~~]   (= 33a)
a. [$_{\text{CP}_A}$ Sally ate what]   step (36a)
b. [$_{\text{CP}_A}$ what$_i$ Sally ate __$_i$]   step (36b)
c. The QuD raised by CP_A: What Sally ate?   step (36c)

The QuD raised by the antecedent CP_A in (33a) is calculated to be as in (37c): 'What Sally ate?' Q-equivalence then requires that this question meaning be identical to the meaning of the sluiced question CP_E. This is indeed the case in (33a), and therefore sluicing

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[18] Barros's (2014) algorithm is an extension of Büring's (2003) algorithm for computing a family of questions QuD based on contrastive topics.

is correctly predicted to be acceptable in this case.[19] However, heuristic approaches are explicitly so—they go a step further than intuitionistic approaches, but are just heuristics after all, sidestepping important questions as we will see.

Despite the intuitive appeal of these approaches, in what follows we raise a conceptual challenge and further empirical challenges to Q-equivalence. These ultimately lead us to reject these approaches to semantic identity, and advocate for a return to a focus-theoretic approach.

3.3 A conceptual challenge

Recall again the case of sprouting: sluicing which takes place in the absence of a correlate.

(38)　**Argument and adjunct sprouting:**   (= 14)

      a.　Sally ate, but I don't know what.

      b.　Sally left, but I don't know $\begin{cases} \text{when, with whom, in which car,} \\ \text{why, how, where to,…} \end{cases}$

In these examples, there is no indefinite or disjunction correlate with an issue raising capacity in the antecedent. Moreover, different *issues* or *QuDs* must be raised by the antecedent to license ellipsis in each one of the cases illustrated in (38a–b). We must therefore ask how the antecedent makes salient or raises any of these (possibly infinitely many) imaginable issues.

For AnderBois (2011) et seq, this is done through the process of *issue bridging*, which is explicitly designed to allow different issues to be relevant, depending on the nature of the sprouted continuation. Issue Bridging is a form of accommodation, where the sprout determines what the relevant issue or question must have been to license the sluice.[20] AnderBois (2011) appeals to existential quantification over events in these cases, so that a sentence like *Sally left,* has an inquisitive denotation consisting of alternatives varying with respect to values for an event variable.

(39)　[Sally left] =
      { e_1 is an event of Sally leaving, e_2 is an event of Sally leaving, … }

A subsequent sprout of the form *when* ~~Sally left~~ determines that the relevant issue is one whose alternatives vary with respect to choices of times at which Sally may have left. Accommodation of this issue allows the alternatives in (39) to be re-sorted along the relevant dimension, yielding an issue sufficiently similar to the sluice to license ellipsis:

(40)　[Sally left] = (post bridging)

      $\begin{cases} e_1 - e_7 \text{ are events of Sally leaving at 5 PM,} \\ e_8 - e_{20} \text{ are events of Sally leaving at 5:30 PM,…} \end{cases}$

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[19] Notice that this question meaning is represented here by a sentence that is not grammatical in English, since we have abstracted away from the additional *do*-support step that applies in English questions. The precise status of this step is immaterial to the discussion—all that matters is that if we apply it in the QuD, we must also apply it in the sluice, or that we show that it does not affect the meaning of the question, since Q-equivalence requires equivalence of meaning but not structure. Since in the one case we are deriving a discourse object and in the other an object which is unpronounced, either solution would derive the desired result.

[20] See Barker (2013: §6.3) for additional discussion of this challenge for Inquisitive Semantics based approaches.

Barros (2014) adopts a similar set of assumptions in a QuD approach to Q-equivalence, where the accommodated presuppositions of a particular sprout on a case-by-case basis have consequences for the interpretation of the antecedent, with corresponding consequences for which QuDs the antecedent may raise.

At this point, the reader may suspect that this process of accommodation/Issue Bridging is not unlike the proposal for accommodation we have argued for in §2.2 for examples such as (19) and (21). However, here we highlight a crucial distinction between the two views.

Importantly, in both AnderBois's Inquisitive implementation, and in QuD implementations, what is accommodated is a particular discourse structure—one where the antecedent *in context* did in fact manage to raise the accommodated QuD or issue. Only once this state of affairs is accommodated, has the antecedent managed to raise a QuD or issue capable of serving as the antecedent for the sprout.[21]

We argue that this seems intuitively incorrect when it comes to sprouting. There is no sense, for instance, in (38b), that the antecedent is at all responsible for raising the question of when Sally left. In AnderBois's (2011) Inquisitive approach, issue bridging renders the inquisitive denotation of the antecedent equivalent to a question about when Sally left, but such a hypothesized inquisitive denotation is at odds with intuitions about whatever issues (if any) the sentence *Sally left* may raise.

Instead, we argue that it is the sprout, and not the antecedent, that is responsible for raising the relevant issue.[22] This raises the following question:

(41)   **A crucial question:**
        To what extent is *the antecedent* responsible for raising any particular issue/QuD, which can then serve to license ellipsis?

Our response to this question is that **the antecedent is in fact not responsible for raising any questions/issues at all**.

More precisely, although it is clearly *possible* for antecedents to raise issues—as is the case in sentences containing indefinites and disjunctions—we argue that they *need not* necessarily be responsible for raising the sluiced issue. This follows if sluicing is simply not anaphoric to QuDs/issues or any question-like meanings.[23] As a consequence, Q-equivalence theories contain a fatal flaw: they crucially rely on an object—the issue/QuD raised by the antecedent—that may not always exist at all, or in the right form.

(42)   **A crucial conclusion:**
        There is no compelling empirical evidence in favor of adopting Q-equivalence approaches to semantic identity for sluicing. An alternative unified focus-theoretic semantic identity condition capable of handling VPE and sluicing is conceptually and empirically more attractive.

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[21] Some authors have suggested that there is no actual sprouting. Instead, such antecedents have implicit correlates (Fortin 2007; 2011; Barros 2014), which are present in the syntax even if they are not pronounced. Even if so, something more is needed to determine which implicit correlate is present in each example.

[22] In our presentation of this material, various audiences have also reported the same intuition, that the antecedent doesn't appear to be responsible for raising the sluiced issue in sprouting.

[23] Although clearly, the issue raised by the sluice is constrained by the antecedent in some way. This may follow more generally from the nature of discourse coherence, where prior discourse constrains and guides later utterances.

In the next section, we discuss five cases in which the antecedent cannot or should not be thought of as raising a salient issue/QuD which can then be used to calculate semantic identity, but nonetheless sluicing is possible. We conclude that any approach that ties ellipsis licensing to a particular question/issue raised by the antecedent faces very serious challenges.

3.4 Five empirical challenges

3.4.1 The Answer Ban and else modification

In §3.1.2, we challenged Barros's (2013) empirical argument from Barker's (2013) Answer Ban in favor of Q-equivalence approaches by providing novel evidence showing that Q-equivalence approaches fail to predict the acceptability of sluicing in examples like (29), repeated below.

(29)   Jack left at 5 PM, so we know both that someone left, and who.

The acceptability of sluicing in (29) is surprising under the view that the sluice must be semantically identical to some QuD that the antecedent makes salient; the first clause in (29) answers the would-be QuD, thereby precluding the question *who left?* from being a QuD in the discourse since it has been answered. As we showed in §3.1.2, focus-theoretic implementations of semantic identity do not run into this issue.

Here, we highlight that this challenge to Q-equivalence approaches is particularly problematic for QuD-based accounts that rely on Roberts's (2012) definition of what it means for a question meaning to count as a QuD in discourse: QuDs must be *askable* questions in discourse, and answered questions cannot be asked. As we alluded to in footnote 15 above, an anonymous reviewer suggests that it may be possible to re-cast Q-equivalence in terms of pure salience, so that even answered questions may be made salient enough to license sluicing. While such an analysis would circumvent the challenge our data in (29) raises, it would mark a significant departure from the standard assumptions in Q-equivalence treatments thus far. Such a proposal would hopefully lead to other novel empirical predictions for ellipsis licensing quite generally, as it would be important to motivate such a move beyond the need to deal with the Answer Ban. We will not attempt to pursue such an amendment or spell out its implications here.

Next, notice that in addition to (29), *else*-modification can also rescue would-be Answer Ban violations:

(43)   **Else-modification can rescue Answer Ban violations:**
        Chris knows that Jack left, but Sally doesn't know who *else* ~~left~~.

Following Romero (1998),[24] *else* introduces an additivity presupposition into the discourse: the question in the sluice in (43) presupposes that there is some answer to the question *Who left?*, other than *Jack left*, that is true, and is a request for the hearer to provide that true answer. When this additive presupposition is explicitly denied, a subsequent *else*-question is unacceptable, as shown in (44).

(44)   **Else-*wh*-questions have an additive presupposition:**
        *$Jack_i$ didn't leave. Who $else_i$ left? (cf. $Jack_i$ left. Who $else_i$ left?)

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[24] See von Fintel (1993), Culicover & Jackendoff (1995), and Barros (2014) for further discussion of *else* and exceptive modification in questions.

In the discourse in (43), accommodating the sluiced question's presupposition ensures that only worlds where Jack wasn't the only leaver are considered.[25] In terms of our focus-based proposal, this ensures equivalence between the union of the sluiced question (i.e., *the set of worlds such that Jack left, and someone other than Jack also left*) and the antecedent proposition (i.e. *that Jack left*). These meanings are spelled out in (45a–b), correctly predicting that (43) is grammatical:

(45)   **After accommodation, equivalence holds in (43)**:
     a. $\cup \lambda p. \exists x \ [p = \lambda w \ . \ x$ left in $w \wedge$ Jack left in $w \wedge x \neq$ Jack]
     b. $\lambda w \ . \ \exists x \ [x$ left in $w \wedge$ Jack left in $w \wedge x \neq$ Jack]
     c.   (45a) $\leftrightarrow$ (45b)

For Q-equivalence approaches, however, we again encounter a problem: to account for cases such as (43), the antecedent, *Chris knows that Jack left*, must somehow raise the QuD 'Who other than Jack left?'. Likewise, Issue Bridging would require us to accommodate that all Jack-leaving events are Jack-leaving-with-someone events. This is, of course, possible, but we claim again that there is no sense in which the *antecedent* is responsible for triggering this accommodation process, or raising the relevant issue.

3.4.2 Cross-speaker sprouting

A second challenge to Q-equivalence approaches comes from cases where sluicing/sprouting happen across speakers. That is, speaker A may utter an assertion, which speaker B may then treat as an antecedent for a sluice. This is possible in both sprouting and non-sprouting sluices.

(46)   **Cross-speaker sluicing:**
     a.   A: Sally met someone.
           B: Who ~~did Sally meet~~?

     b.   A: Sally left.
           B: When ~~did Sally leave~~?

In our presentation of this material, audiences report the intuition that it seems entirely up to speaker B to choose which issue to sluice, and furthermore, that there is no requirement that speaker A share speaker B's intention to raise this issue at the time of utterance. Once speaker A accepts speaker B's discourse move (raising the sluiced issue), then the QuD can be said to have been raised, but this falls short of the expectations of Q-equivalence approaches, where the antecedent must raise the relevant issue with which the sluice must be semantically identical.

   Facts like those in (46) cast doubt on the notion that the antecedent assertion/speaker A is somehow responsible for raising the relevant QuD. Instead, it seems as if it is the sluiced question that raises the relevant QuD. In other words, the sluicer/asker is responsible for the issue raised.

   An appeal to accommodation will not easily get around this problem. To see this, consider what such an accommodation account would have to look like. The discourse in (46b) fails to provide the necessary ingredients in the right order in order for sluicing to go through. For sluicing to go through, there must be an antecedent, which must raise

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[25] In Harris (2014) and Theiler (2018) (see also references therein), this accommodation step is in fact the *semantic* contribution of *else*. If so, we do not need to appeal to pragmatic accommodation as in (20), but instead the formal semantic meaning of the sluice and antecedent are immediately predicted to be equivalent, once the contribution of *else* is factored into the meaning of the sentence. We refer the reader to these works for more details.

an issue, which can then be sluiced. An appeal to accommodation in (46b) might look as follows: even though, according to our intuitions about discourses like that in (46b), the antecedent fails to raise the sluiced issue, we must nonetheless retroactively assume that the antecedent did, in fact, raise this issue. Once this is achieved, sluicing may go through provided the sluice is identical semantically to this issue. We find to be this a very strange sort of accommodation, and one which is additionally empirically unmotivated given our intuitions about the exchange in (46b).

The issue of speaker intentions in making discourse moves seems relevant here. In a simpler case of non-sprouting with an antecedent like *Sally met someone*, where there is an indefinite or some expression with an issue-raising capacity, we can imagine that the speaker intends to raise the corresponding issue: *Who she met?*, which may then license a sluice downstream. In the discourse in (46b), however, and perhaps in sprouting more generally, there is an intuition in which it is speaker B (the sluicer), instead, who is responsible for and intends to ask the sluiced issue explicitly, and no such corresponding intuition about speaker A's intentions at all.[26]

In support of this point, notice that speaker A may explicitly raise a specific issue with an antecedent, but speaker B is not then limited to sluicing that issue:

(47)   **Sluicing is not constrained by the QuD raised by the antecedent:**
        A: Sally left. Do you know how long ago she left? I don't care about who she left with.
        B: No, sorry, I only know who with ~~she left~~.

On the other hand, our account can deal with such cases without any difficulty. Under our proposal, the union of the sluiced question's meaning must be equivalent to the set of worlds denoted by the antecedent. With example (46a), this is straightforward and follows the procedure we introduced in §2. The antecedent is a set of worlds where Sally met someone. The sluice is a set of propositions of the form *That Sally met x*, where x is a member of the domain in the model. The union of this set of propositions is the set of worlds where Sally met someone. Semantic equivalence is straightforwardly met. The procedure similarly goes through in (46b), under the assumption that if Sally left in w, then she left at a certain time t in w (see our discussion of (17) and the discussion of accommodation in (19)).

3.4.3 Antecedent sharing

A third challenge to Q-equivalence approaches comes from cases that we dub Antecedent Sharing. In (48), we observe a single antecedent followed by a sluiced continuation as well as a sprouted continuation:

(48)   **Sluicing with antecedent sharing:**
        Sally met someone, BIDK who ~~she met~~, or when ~~she met them~~.

Q-equivalence accounts struggle to explain the availability of cases such as (48). Examples like the above require that antecedents be associated with multiple issues/questions simultaneously—one for each sluice. However, current proposals don't allow for more

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[26] As an anonymous reviewer notes, a theory of QuDs as in Onea (2016), which decouples QuDs from speaker intentions, may fare better here. Nonetheless, no appeal to speaker intentions is required to see that the antecedent in (46b) does not intuitively raise the sluiced issue, nor must it be retroactively construed as having done so through accommodation in order for sluicing to go through. Additionally, such an approach would still face challenges with antecedent sharing, as in §3.4.3 and cannot be adopted wholesale without change.

than one question/issue to be raised to salience at a time, since it's the antecedent that must raise the question/issue.

On a QuD-based account, there can only be one current QuD that interlocutors strive to resolve at a time, since the QuD is modeled as a stack (Roberts 1996/2012).[27] An alternative proposal, where the sluice is responsible for raising the question that licenses the sprout, is also not viable—the QuD raised by a question is the question itself. No QuD theory we are aware of allows a *who* question to raise a *when* QuD; a *who* question instead always raises a *who* QuD.

Alternatively, on an Inquisitive Semantics based account, if we follow the common assumption that any given antecedent has one single inquisitive denotation, this denotation must somehow be one that licenses both a *who* issue and a *when* issue simultaneously; but there is no way to do this in a way that matches the interpretations of each independent sluice in the current theory. Specifically, in (48), the sprouted inquisitive denotation is a set of events sorted by times, whereas the non-sprouted inquisitive denotation has alternatives sorted by individuals met. These are, then, two distinct denotations that must at the same time match the inquisitive denotation of a single antecedent sentence—a contradictory requirement.

Under our approach, on the other hand, antecedent sharing is no different than any other case of sluicing/sprouting. We can easily show that equivalence holds between the denotation of the antecedent and that of both sluices, provided that meeting x in w necessitates meeting x at some time t in w (cf 17):

(49)   **Deriving antecedent sharing:**
        Sally met someone, BIDK who ~~she met~~, or when ~~she met them~~. (= 48)
        a.   ∪⟦Sally met someone⟧^{f} = λw . $\exists x$ (Sally met x in w)
        b.   ∪⟦who ~~Sally met~~⟧^{f} = λw . $\exists x$ (Sally met x in w)
        c.   ∪⟦when ~~Sally met (them)~~⟧^{f} = λw . $\exists t \exists x$ (Sally met x at t in w)
        d.   (49a) ↔ (49b) ↔ (49c)

An anonymous reviewer notes that Q-equivalence approaches may circumvent this problem by appealing to the idea that perhaps sentences may be associated with a number of QuDs or issues (call them potential QuDs). In Inquisitive Semantics terms, sentences would be associated with multiple inquisitive denotations, a subset of which may be explicitly taken up/made salient by interlocutors in subsequent discourse. We agree with the reviewer that this would be one way to understand the phenomenon of antecedent sharing in a Q-equivalence approach, but once again highlight the fact that it is not clear how this modification of Q-equivalence theories makes any new empirical predictions that would help us distinguish them from a focus-theoretic approach like the one defended here.

3.4.4 Non-issue antecedents

A related challenge can be identified when we consider examples such as in (50a–c), where the sentences themselves explicitly state that the would-be issue/QuD raised by the

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[27] We take Roberts's system to be one in which there is only one QuD at the top of the stack. The alternative tree model may fare slightly better, but this model, too, only entertains one question at a time as the current QuD. See Rojas-Esponda (2014). As an anonymous reviewer notes, however, a model that allows QuDs to be an ordered set of unordered sets of questions—that is, one that allows the top QuD to be a set of questions—would not run into this problem. See Ginzburg (1994) for such a model. To our understanding, this view hasn't been adopted in more current writing on QuDs. In particular, QuD approaches which calculate a single QuD deterministically, such as AnderBois (2011) and Barros (2014) do run into the problem described here.

antecedent (under the Q-equivalence approach) is **not** relevant or not interesting. Despite this fact, sluicing and sprouting are licensed:

(50)　　**Non-issues can license sluicing:**
　　　　a.　Jack would date anyone, it doesn't matter who!
　　　　b.　(Lucas Champollion p.c.)
　　　　　　There's going to be another faculty meeting, but no one cares what about.
　　　　c.　Someone, anyone, needs to make sure the plants get watered daily, it doesn't matter { who, when }.

As discussed above, issues/QuDs are discourse moves, accepted by conversational participants, who have agreed to collaboratively address the issue. However, when we consider (50a), does the antecedent really raise a *who* question, despite the fact that the sentence explicitly asserts that any person *x* we might choose would verify the predicate *Jack would date x*? Likewise, in (50b), we would have to accommodate that the antecedent raises a *what about* question—i.e., that *what about* matters, despite our explicit denial of this fact.

　　Here one might argue that the issues or questions raised by the antecedents in (50a–c) are salient, even if the speaker explicitly opts out of asking them. See Onea (2016) for such an attempt (see also footnote 26 above). Nonetheless, we note that this goes counter to the idea that QuDs should be accepted by conversational participants as salient and relevant issues, which they together seek to resolve (Roberts 2012), and will still face some of the other criticisms we have raised in this section.

3.4.5 Contrast sluicing
Contrast sluices are sluices where the remnant and correlate are contrastively focused ((51a) from Merchant 2001: 36).

(51)　　**Contrast sluicing:**
　　　　a.　She has five *cats*$_F$, but I don't know how many *dogs*$_F$ ~~she has~~.
　　　　b.　I know which *books*$_F$ she read, but not which *articles*$_F$ ~~she read~~.

It is not clear how Q-equivalence approaches handle antecedents as in (51a–b). The antecedent clearly doesn't raise the sluiced issue/question needed to license the sluice on its own, since it explicitly raises a different issue/question. In (51a), the intuition is not that the antecedent itself is raising the subsequent sluiced issue, but that the antecedent utterance and the sluice, together, address some superordinate question paraphrasable as *How many pets/cats or dogs does she have*?

　　Here we present one attempt to account for such cases in a Q-equivalence approach, along the lines of Barros (2014): In a context where Mary's pets are discussed, we can imagine a QuD with sub-QuDs such as in (52) guiding the conversation, and licensing ellipsis:

(52)　　**A discourse strategy for generating an appropriate QuD for (51a):**
　　　　How many **pets** does she have?
　　　　a.　How many **cats** does she have?
　　　　b.　How many **dogs** does she have?

Given this assumption, we are able to use the context and focus structure of the antecedent to generate the right QuD to license our sluice, predicting (51a–b) to be available.

However, we argue that such an explanation is in danger of over-generating QuDs, which would license unwanted sluices. Consider the examples in (53–54) below (from Jason Merchant, p.c.). It seems plausible to assume that *Sally didn't call ALEX*$_F$ in (53) raises the QuD *Who did Sally call?*. Yet this QuD cannot license sluicing in this example.[28] A similar concern affects example (54). How would QuDs be constrained to rule these examples out?

(53)   **Ungrammatical sluices which Q-equivalence over-generates:**
        # Sally didn't call *Alex*$_F$ { but, and } I dont know who ~~Sally called *t*~~.

(54)   A: Did(n't) Sally call *Alex*$_F$?
        B: # I dont know who ~~Sally called *t*~~.

Our approach can handle such cases. Take (51b), for instance. We assume that the denotation of a *wh*-question with a contrastively focused remnant is a family of questions (that is, set of questions, see Büring (2003); Kotek (2019), among others).[29]

(55)   **A family of questions denotation for contrast sluices:**

        a. $[\![\text{which books}_F \text{ she read}^f]\!] = \left\{ \begin{array}{l} \text{which books she read,} \\ \text{which magazines she read,} \\ \text{which articles she read,}\dots \end{array} \right\}$

        b. $[\![\text{which articles}_F \text{ she read}]\!]^f = $ (55a)

The union of both questions in (55a) and (55b) is an identical set of propositions, as shown in (56a). The union of this set is a set of worlds, as in (56b). Since, again, this set is identical for (55a) and (55b), we predict sluicing to be allowed in (51b). Notice that we had to take the union of each question twice to yield a set of worlds—since our proposal compares sets of worlds, not sets of propositions.[30] Once this move is granted, we correctly predict these examples to be acceptable.

(56)   **Deriving contrast sluicing:**
        a. $\cup(55a) = \cup(55b) = \{ p : \exists x \, (p = \lambda w \, . \text{ she read } x \text{ in } w) \}$
        b. $\cup(56a) = \lambda w \, . \, \exists x \, (\text{she read } x \text{ in } w)$

3.5 Interim summary

To summarize the discussion in this section, Q-equivalence approaches attribute ellipsis licensing to QuDs/Issues *raised by the antecedent*. We began this section by surveying two empirical arguments which have been proposed in the literature in favor of Q-equivalence, from sluicing with doubly-negated antecedents (AnderBois 2011) and from the

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[28] A reviewer finds the presluiced version of (53) unacceptable as well. To our ears and to our consultants, this issue rests on the prosody associated with the sentence, and there is a prosody with which the presluiced sentence is felicitous. Note further that this concern does not extend to example (54).

[29] Example (51a) would receive a similar account, where the collected worlds of the focus semantic values of the antecedent and sluice clause would be roughly paraphrasable as the proposition *Sally has some number of things* (perhaps with *things* contextually restricted to types of pets/animals).

[30] An alternative proposal might be to generalize our analysis to comparing sets of any kind. We prefer the double-application of the union operation we employ here, since to the best of our knowledge, this is the only exception to the generalization that sets of worlds must be compared.

Answer Ban (Barros 2013). We diffused both arguments and concluded that neither in fact motivates Q-equivalence.[31,32]

We additionally raised several new empirical challenges to Q-equivalence: We showed that non-issue antecedents can license sluicing, resolved questions can license sluicing, and a single antecedent can license multiple sluices. We moreover spelled out challenges from *else* modification and from contrast sluicing. In each of these cases, extant Q-equivalence approaches run into trouble.

We acknowledge that it may be possible to address some—or perhaps even all—of these challenges by amending the current Q-equivalence approaches in some way or another.[33] For example, Onea's (2016) view of QuDs, which decouples them from speaker intentions, may account for cross-speaker sprouts and non-at-issue antecedents. Alternatively, if we adopt Ginzburg's (1994) view of QuDs, more than one QuD may be simultaneously available in the context, explaining antecedent sharing. Issue Bridging, within AnderBois's (2011) Inquisitive Semantic account, may account for some cases of sprouting. However, no one current Q-equivalence account possesses all of these properties, and we do not see an obvious way to extend one account to meet all of the challenges we have posed.

Moreover, we have argued, on conceptual grounds, that Q-equivalence makes irrecoverably bad predictions about the shape of the discourse: it is simply not the case that antecedents must raise a question or issue, which then licenses a sluice. This was especially clear in cases of sprouting, where the question is intuitively accommodated posthoc, once the sprout is uttered, and in cases of cross-speaker sluicing, but we argue that this is true for all cases of sluicing. That is, we have argued that we shouldn't necessarily place the burden of raising an issue/question on the antecedent, contra the very foundation of Q-equivalence approaches.

At the same time, we showed how our focus-based proposal (8), repeated below, accounts for all of the data and challenges presented here.

(57) **Ellipsis licensing condition (sluicing, to be expanded):** (= 8)
Sluicing may apply in CP_E provided CP_E has a salient antecedent, CP_A, and the set of worlds used to construct the alternatives in $\llbracket CP_E \rrbracket^f$
$\leftrightarrow$ the set of worlds used to construct the alternatives in $\llbracket CP_A \rrbracket^f$.

Crucially for our account, whether it is the antecedent or the sluice that is responsible for raising the relevant issue/question—indeed, whether a relevant issue/question has been raised at all—is an orthogonal question to whether ellipsis can be licensed in the clause.

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[31] Recently, Griffiths (2018) proposes an account of MaxElide effects in ellipsis that fails to predict that sluicing should ever be possible. He takes this result to support the claim that sluicing must be subject to distinct licensing conditions and other kinds of ellipsis. However, we believe that more work is required in order to therefore conclude that Q-equivalence is the right condition for clausal ellipsis licensing. In particular, Griffiths (2018) does not tackle the issues for Q-equivalence approaches that we have highlighted here, since his aims lie elsewhere. Another possible conclusion from this work might be that an alternative account of MaxElide, consistent with our theory, is therefore required. However, pursuing such an account is beyond the scope of this paper.

[32] An anonymous reviewer points out that another argument in favor of Q-equivalence comes from cases of antecedentless ellipsis (see in particular Weir 2014). How would our account, which makes explicit reference to the focus-semantic value of the antecedent as part of the licensing condition on sluicing, deal with the absence of such an antecedent? Here, we follow Merchant (2004; 2010) in assuming that in contexts in which antecedentless ellipsis is licensed, the elided material is trivially recoverable. We can therefore see at least two answers to the puzzle the reviewer raises: our identity condition might not be invoked in such cases at all, since the elided material is trivially recoverable; or, trivially recoverable elided material might automatically satisfy our condition without reference to an explicit linguistic antecedent. We leave adjudicating the issue for future research.

[33] We are especially thankful to three anonymous reviewers for spelling out some of these solutions and discussing them with us in detail.

Like others, our account must resort to accommodation to explain some cases of sprouting. However, we argue that this is implemented in our account in a principled way: accommodation is triggered by a contentful head noun in a remnant, which was not supported by previous context. Unlike Issue Bridging or the QuD-based version of this account, there is crucially no need to assume post-hoc that the accommodated meaning was somehow already raised by the antecedent. We take this last step, which must be assumed by Q-equivalence accounts but not by focus-based ones, to be a fatal flaw in the former type of accounts, regardless of any details of the accounts.

We conclude that a unified theory of semantic identity in ellipsis, encompassing clausal ellipsis, VP ellipsis, and NP ellipsis, is both better motivated and more parsimonious than the alternative, and therefore to be preferred. In §5 we show how our proposal in (8) extends to VP ellipsis, and, more generally, to deaccenting.

4 A return to a focus-based approach

4.1 Merchant's (2001) truth conditional mutual entailment

Having argued against Q-equivalence approaches, we now return to Merchant's (2001) influential focus-theoretic implementation of semantic identity in ellipsis. As we noted above, our proposal (8) is inspired by—and is very similar to—Merchant's account. In this section, we show that Merchant's proposal runs into trouble in a subset of sluices which are handled straightforwardly by our account. A second challenge for Merchant's (2001) account, from VP-ellipsis with relational opposite predicates, will be discussed in §5.

Merchant's (2001) proposal builds on theories of focus and deaccenting (prosodic reduction). Following Rooth (1992a), ellipsis can be seen as a form of radical deaccenting—that is, deaccenting and ellipsis form a natural class, as two cases of redundancy reduction.[34] As a form of redundancy reduction, therefore, conditions on deaccented material would be expected to apply to ellipsis constructions, as well. However, Rooth shows that the conditions on deletion appear to be stronger than those relevant for prosodic deaccenting. To account for this, Rooth proposes two distinct redundancy relations; one which applies to both ellipsis and deaccenting, and one which applies only to ellipsis, essentially requiring syntactic identity between the elided structure and some linguistic antecedent (in the spirit of e.g., Fiengo & May 1994, among others).

Merchant (2001) defends the claim that there is no syntactic parallelism condition at work in ellipsis, and proposes, instead, a semantic parallelism condition on ellipsis which is stronger than that for deaccenting.[35] Instead of having a syntactic condition that applies only to ellipsis, and a semantic parallelism condition that applies to both deaccenting and ellipsis, we end up with two semantic parallelism conditions: a weaker one for deaccenting, and a stronger one for ellipsis.

Merchant adopts the theory in Schwarzschild (1999), where a constituent, XP_E, may be deaccented provided it is GIVEN. GIVENness is defined in (58):

(58) **GIVENness:**
      XP_E is GIVEN whenever it has a salient antecedent, XP_A, and modulo ∃-type shifting, XP_A entails the existential focus closure of XP_E (F-clo(XP_E)).

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[34] See also Tancredi (1992). See Romero (1998) for an extension of Rooth's (1992a) theory to explain a variety of constraints on sluicing remnants and their correlates. Romero additionally compares Rooth's Alternative Semantic proposal to that of Schwarzschild (1999), demonstrating that they make identical predictions.

[35] Since Merchant (2001), many authors, including Merchant himself, have scaled back this claim empirically, showing that some degree of syntactic identity appears to be at work in constraining Merchant's (2001) proposal from over-generation. See e.g. Merchant (2005; 2013); Chung (2006; 2013); Chung et al. (2010); AnderBois (2011); Weir (2014); Barros (2014), among many others.

(59)   **Existential Focus Closure:**
       F-clo(XP_E) is the result of replacing F-marked parts of XP_E with variables of the same type, and existentially closing the result.

For example, VP_A in (60b) counts as GIVEN, since VP_A entails F-clo(VP_E). (Deaccenting is represented throughout in small font.)

(60)   **Using GIVENness to license deaccenting:**
       a.   Bill was [$_{VP_A}$ reading a book], and Sally was [$_{VP_E}$ reading] too.
       b. $\exists x \exists y$ [reading(x,y) $\wedge$ book(y)] $\models \exists x$ [reading(x)]

The condition on ellipsis is dubbed e(lliptical)-GIVENness, and essentially requires GIVENness to be checked twice; first, the ellipsis constituent must be GIVEN with respect to its antecedent, and likewise, the antecedent must also be GIVEN with respect to the ellipsis constituent.

(61)   **Focus Condition on Ellipsis (FCE, Merchant 2001: 26):**
       a.   A constituent E can be deleted iff E is e-GIVEN.
       b.   An expression counts as e-GIVEN iff E has a salient antecedent A and, modulo $\exists$-type shifting,
            i.   A entails F-clo(E), and
            ii.   E entails F-clo(A)

Merchant treats traces of *wh*-phrases in sluiced TPs as $\exists$-bound variables (see also Schwarzschild 1999). For a simple sluice like that in (62), F-clo(TP_E) entails its antecedent TP_A, and F-clo(TP_A) entails TP_E, satisfying the FCE.[36]

(62)   **Deriving simple sluicing using Merchant's FCE:**
       [$_{TP_A}$ Someone left], but I don't know who$_i$ [$_{TP_E}$ t_i ~~left~~].
       TP_A = F-clo(TP_A) = $\exists x$ [human(x) & left(x)]
       TP_E = F-clo(TP_E) = $\exists x$ [human(x) & left(x)]

4.2 e-givenness reconsidered

Taking the union of the Roothian focus-semantic value of some XP, as we propose in §2, comes very close to Merchant's (2001) appeal to Existential Focus Closure.[37]

(63)   **Our proposal and e-GIVENness will often achieve the same results:**
       a. $\cup [\![$Who left?$]\!]^f = \lambda w \,.\, \exists x$ (x left in w)
       b.   F-clo(Who left?) $= \lambda w \,.\, \exists x$ (x left in w)

For the most part, e-GIVENness will achieve the same results as our account has. However, e-GIVENness falls short for sluices with quantified correlates.

Consider first cases of multiple sluicing (Takahashi 1994), where more than one remnant survives ellipsis. In (64a–b) we see examples of multiple sluicing in Russian and English, respectively. See Lasnik (2014) and Kotek & Barros (2018) for a discussion of the felicity of English multiple sluicing.

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[36] In calculating F-clo(A/E), we assume that the remnant's trace in TP_E contributes its restriction to $\exists$-clo(E)/F-clo(E). We stick to trace-theoretic representations for ease of exposition, although a copy-theoretic account may be needed to derive this result.

[37] See Weir (2014) for this observation with Fragment Answers.

(64) **Multiple sluicing in Russian and English:**
   a. (Grebenyova 2009)
   Každyj   priglasil kogo-to   na tanec, no ja ne pomnju,   kto kogo.
   everyone invited   someone to dance but I   not remember who whom
   'Everyone invited someone to dance, but I don't remember who invited
   whom to dance.'

   b. Every boy likes some girl, BIDK which boy which girl.

Examples (64a–b) involve a quantified antecedent on its surface scope ($\forall > \exists$) reading, with a pair-list multiple question in the sluiced continuation. These antecedent/sluice pairs in pair-list multiple sluices fail to be mutually entailing with their quantified antecedents. We show this here for example (64a):

(65) **The FCE incorrectly predicts multiple sluicing to be ruled out:**
   a. $[_{TP_A}$ Everyone invited someone to dance $]$ $\hspace{2cm}$ ($\forall > \exists$)
   $TP_A = \text{F-clo}(TP_A) = \forall x[\text{person}(x) \to \exists y\ [\text{person}(y)\ \&\ \text{invited-to-dance}(x,y)]]$

   b. … BIDK who$_i$ whom$_j$ $[_{TP_E}$ t_i ~~invited t_j to dance~~ $]$
   $TP_E = \text{F-clo}(TP_E) = \exists x \exists y\ [\text{person}(x)\ \&\ \text{person}(y)\ \&\ \text{invited-to-dance}(x,y)]$

The same holds true for any pair-list multiple sluice whenever the antecedent has a wide-scope universal: $\exists$-closure or Focus closure of *wh*-traces in TP_E, as assumed by Merchant (2001), will inevitably lead to a failure of mutual entailment.[38]

   We entertain next a possible solution to this problem under Merchant's account, which we show faces problems of its own: if we take quantifiers in examples (64a–b) to be F-marked, we predict sluicing to go through. In that case, all we need is to be able to find quantifiers to plug in in place of *everyone* and *someone* in the antecedent (65a), which can lead to semantic identity with the clause in (65b)—a task that we are easily able to perform. However, this approach faces two problems.

   First, there is no cue in the prosody suggesting that quantifiers in the antecedent are F-marked. (Or, in other words, that all such sluices are necessarily contrastive.) Worse, this proposal leads to over-generation. There is nothing stopping this procedure from going through in examples involving inverse scope in the antecedents, such as (66–67) from Grebenyova (2009) and Kotek & Barros (2018), respectively. These are ungrammatical but would be predicted to be acceptable under this account.[39] See Kotek & Barros (2018) for a detailed recent account of this restriction.

(66) **Superiority in sluicing (correlates must match remnants):**
   Každyj   priglasil kogo-to   na tanec, …
   everyone invited   someone to dance

   a. … no ja ne pomnju   kto$_1$ kogo$_2$.
   but I   not remember who whom $\hspace{2cm}$ (cf 64a)

   b. *… no ja ne pomnju   kogo$_2$ kto$_1$.
   but I   not remember whom who

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[38] More specifically, entailment only goes through in one direction: (65a) entails (65b), but the reverse does not hold.

[39] An alternative possible solution to the problem we have raised here may involve exceptional QR of all quantifiers out of TP in the multiple sluicing examples presented here. However, such QR would be unmotivated under standard scope economy considerations (Fox 2000), and lead to problems of over-generation. See Kotek & Barros (2018) for a detailed argument against this strategy.

(67) a. Every boy likes some girl, BIDK which boy which girl.   (cf 64b)
      b. *Some boy likes every girl, BIDK which boy which girl.

The problem of quantified antecedents extends beyond multiple sluicing to sluices with unambiguously quantificational correlates. We show this in example (68), where e-GIVEN-ness is not met, and hence sluicing is incorrectly predicted to be impossible. This problem will extend to any remnant with a non-existential correlate.

(68) **Sluicing with quantificational correlates:**
      She read most of the books, but we don't know which ones ~~she read~~.
      a. TP_A entails F-clo(TP_E) (there are books that Sally read), but
      b. TP_E does not entail F-clo(TP_A).

Under our approach, the multiple sluicing facts and those with quantified correlates are predicted. We adopt the approach to pair-list questions in Dayal (1996) (see also Kotek 2019): pair-list questions denote families of questions.[40]

(69) **Representing multiple questions:**
      Everyone was dancing with someone, but I can't recall who ~~was dancing~~ with whom.

$$\text{Who } \cancel{\text{was dancing}} \text{ with whom} = \begin{cases} a \text{ and } b \text{ danced and } c \text{ and } d \text{ danced,} \\ a \text{ and } c \text{ danced and } b \text{ and } d \text{ danced,} \\ a \text{ and } d \text{ danced and } b \text{ and } c \text{ danced,} \end{cases}$$

As we can see, each alternative in the set is a graph of the dance-with relation. This is the set of worlds where a, b, c, and d each danced with someone. The union of the multiple sluice meaning, then, is equivalent to the union of the proposition everyone danced with someone, $\cup[\![\text{Everyone danced with someone}]\!]^f$. As a result, we correctly predict multiple sluicing to be possible in (64a–b).[41]

This adds to existing arguments against a characterization of the semantic condition on sluicing in terms of truth conditional mutual entailment. In the next section, we see how the FCE leads to an over-generation problem, following observations in Hartman (2009). We show that our proposal does not face the same problem.

To account for the data, we entertain the idea that the semantic licensing condition on ellipsis is exactly the same as the condition on deaccenting. This is not a novel claim, but the consensus in the literature, following Rooth (1992a) and Merchant (2001), is that the semantic conditions on ellipsis and deaccenting are distinct. Fox (2000), on the other hand, holds that the semantic conditions on deaccenting and ellipsis are the same. Here, we defend this claim, and illustrate how our proposed semantic condition in (8) may function as a general condition on redundancy reduction, encompassing both ellipsis and deaccenting.

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[40] More specifically, families of questions keyed on the first element in the pair. This becomes important in cases in which the domain denoted by the two *wh*-phrases are distinct; here we take *dance* to be a recipro-cal predicate, and hence the domains of *who* and *whom* in (69b) are identical. In cases such as *tell me which student read which book*, the pair-list answer must pair each student with a book, but some books may not be read by anyone. See Dayal (1996) for further discussion.

[41] For cases of quantificational correlates such as (68), alternatives must be *most of the books* alternatives (with different choices of books). This can be achieved via global accommodation, given the antecedent's context-change potential and its effect on the context when the sluice happens. See also the discussion of accommodation surrounding example (19) above.

5 Ellipsis and redundancy reduction

5.1 A generalized account of ellipsis licensing

Q-equivalence approaches imply a conceptually unattractive conclusion about identity in ellipsis: that VP-ellipsis and sluicing must be subject to independent licensing conditions (Chung et al. 1995; 2010; AnderBois 2011). Conversely, focus-based accounts as in Merchant (2001) have broad empirical coverage, deriving VP-, NP-, and TP-ellipsis from the same principles.[42] In this section we show how to extend our proposal to achieve similar coverage, and in fact improve on, e-GIVENness.

Here we extend our proposal to VP-ellipsis, and demonstrate how it accounts for a puzzle noted in Hartman (2009). Hartman points out a set of cases where, for VP-ellipsis, e-GIVENness over-predicts identity when *relational opposites* (such as *beat* and *lose*) are involved.[43]

(70)   **e-GIVENness over-generates VP-ellipsis with relational opposites:**
        *Mary will [$_{VP_A}$ beat someone at chess], and
        John will ~~[$_{VP_E}$ lose to someone at chess]~~ (too).
        a. VP_A = F-clo(VP_A) = $\exists x,y$ (x beat y at chess)
        b. VP_E = F-clo(VP_E) = $\exists x,y$ (x lose to y at chess)

e-GIVENness is met in (70a–b), since it is always the case that if someone lost to someone at chess, then someone beat someone at chess, and vice versa.[44] Ellipsis is therefore incorrectly predicted to be possible in (70).

Hartman appeals to *semantic equivalence* to prevent these cases. (See Hartman 2009 for details.) Comparing the denotations of VP_A and VP_E rules out VP-ellipsis, since the two are not semantically equivalent:

(71)   **VP-ellipsis with relational opposites explained by semantic equivalence:**
        a. VP_A = λx . x won at chess
        b. VP_E = λx . x lost at chess
        c. VP_A $\neq$ VP_E

Our approach in (8) can be generalized to cover VP-ellipsis in the same way as Hartman's proposal. We provide this generalized condition on ellipsis in (72):

(72)   **Ellipsis licensing: A general condition (to be expanded)**
        XP_E may be elided provided that it has a salient antecedent, XP_A, and $\cup[\![XP_E]\!]^f$ = $\cup[\![XP_A]\!]^f$.

This generalized proposal can explain Hartman's examples, as shown in (73):[45]

(73)   **The generalized condition can explain Hartman's examples:**
        a. $\cup[\![$ [$_{VP_E}$ lost at chess] $]\!]^f$ = $\cup\{$ λx . x lost at chess $\}$ = λx . x lost at chess
        b. $\cup[\![$ [$_{VP_A}$ won at chess] $]\!]^f$ = $\cup\{$ λx . x won at chess $\}$ = λx . x won at chess

Since the denotations in (73a–b) are not equivalent, our generalized condition achieves the same results as Hartman's account. Our proposal, then, achieves the same coverage

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[42] Merchant (2004) shows that this approach also works for fragment answers as a form of TP-ellipsis.

[43] Two predicates, P1 and P2, are relational opposites if $P1(x,y)$ entails $P2(y,x)$, and vice versa. The predicates *beat/lose* are an example: 'beat(Mary, John)' entails 'lose-to(John, Mary),' and vice versa.

[44] Putting aside for the sake of argument in this section the irrelevant possibility that the individual in question lost to a computer chess program.

[45] Following Hartman, note that we assume that these VP denotations include an implicit agent.

as e-GIVENness—and improves on it by dealing with relational opposites, by virtue of making reference to non-propositional content.[46]

5.2 A theory of redundancy reduction

Can we go even further? Hartman (2009) claims that while ellipsis with relational opposites is impossible, deaccenting in parallel cases appears to be possible, providing the evidence in (74). Consequently, he argues that the licensing conditions on ellipsis are stronger than those on deaccenting, where semantic equivalence is an ellipsis-specific requirement that deaccenting is not subject to.

(74) **Deaccenting with relational opposites (Hartman 2009: ex. (14–15))**
  a. *I own the bracelet. And the *necklace* does ~~belong to me~~ too.
  b.   I own the bracelet. And the *necklace* belongs to me also.
  c. *First Mary beat me at chess. And then *John* did ~~lose to her~~.
  d   First Mary beat me at chess. And then *John* lost to her.

We agree with Hartman that there is a sharp contrast in acceptability between the elliptical and deaccented versions of the sentences in (74). This is consistent with the Roothian idea that the parallelism conditions on ellipsis are both distinct from and stronger than those on deaccenting—a claim we argue against below. However, to our ear, (74d) is not fully acceptable, as deaccenting the relationally opposite predicate *lost* strikes the hearer as surprising. We concede that deaccenting in (74b) is better than in (74d), but suspect this is because in (74b), the deaccented predicate *belong to* is not in relational opposition to its antecedent *own*.

  We turn now to explaining why this is relevant to acceptability of deaccenting in our account of the differences between deaccenting and ellipsis. When we cast the empirical net more widely, it does not appear to be the case that, in general, deaccenting with relational opposites yields acceptable results:

(75) **Hartman's problem also affects deaccenting (contra Hartman):**
  a. *Mary will beat someone at chess, and John will lose to someone at chess.
  b. *Mary is older than someone, and Bill is younger than someone (too).
  c. *Mary is taller than her sibling, and Jack is shorter than his sibling (too).

One way to account for the data in (75) is to assume that the semantic parallelism condition on ellipsis is also active in deaccenting (contra Hartman). This is precisely what is proposed in Fox (2000).[47] Our condition in (72) can be easily extended to deaccenting:

(76) **A generalized licensing condition for redundancy reduction:**
  XP_E may be reduced (elided or deaccented) provided that it has a salient antecedent, XP_A, and $\cup[\![XP_E]\!]^f = \cup[\![XP_A]\!]^f$.

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[46] More recently, Merchant (2018) points out that e-GIVENness does not need to be stated in terms of Schwarzschildian existential focus closure, and proposes a Roothian Alternative-Semantic version which sidesteps Hartman's challenge by making reference to non-propositional VP meanings, much like our proposal.

[47] Here we are concerned with the semantic parallelism condition on ellipsis and redundancy reduction in general. On the other hand, in Fox (2000), parallelism must be both structural and interpretive. That is, the identity condition on redundancy reduction requires that reduced linguistic material have an antecedent LF available in the discourse with which it is structurally and semantically isomorphic. If such an antecedent is missing, but an appropriate trigger is present in the speech signal, such an LF will be accommodated. Despite this technical and theoretical difference in implementation, we defend Fox's idea that the conditions on both deaccenting and ellipsis are the same, and the apparent differences that led Schwarzschild and Merchant to posit distinct conditions may be derived via appeal to accommodation.

The puzzle is why deaccenting with relational opposites, while generally unacceptable, is nonetheless more acceptable than ellipsis under the same conditions.

In terms of Fox's (2000) proposal, this follows from constraints on accommodation. Specifically, redundancy reduction requires an antecedent. When a suitable antecedent for some deaccented or elided phrase is missing in the context, as in the cases of relational opposites above, such an antecedent can be accommodated. Importantly, accommodation must be *triggered* (to adopt Fox's terminology) by *overt* phonetically reduced material. In the case of deaccenting, the presence of overt reduced material that lacks a parallel antecedent triggers the requisite process of accommodation. In ellipsis, on the other hand, the trigger is missing from the speech signal. As a result, accommodation does not take place, leading to unrecoverability/unacceptability. We spell this constraint out in (77):

(77)   **Constraint on accommodation (following Fox 2000):**
        In the absence of an antecedent, one can be accommodated, provided that there is an overt *trigger* in the context.
        Deaccenting provides an appropriate trigger, but ellipsis does not.

We propose that this process is also behind the pattern we see in (74), where (74b) is more acceptable than (74d). Specifically, in (74b) the deaccented predicate has an advantage over the deaccented predicate in (74d) in that it is not in relational opposition with its antecedent predicate. We assume that this difference aids in accommodation, and is responsible for the difference between these two examples.

At this juncture, we revisit Hartman's concern regarding whether his semantic identity condition on VP-ellipsis could be extended to sluicing. The challenge from relational opposites for e-GIVENness in VP-ellipsis stems from the fact that e-GIVENness renders XP meanings propositional via existential closure in the calculation of identity, as would be required to check mutual entailment. Hartman's semantic equivalence condition makes direct reference to VP predicate meanings, avoiding the problem of mutual entailment. Our proposal achieves Hartman's results in the same way, as the meanings we compare are not propositional for VPs.

Given this solution, however, we encounter a problem: the same issue that plagues e-GIVENness in VP-ellipsis persists in sluicing, since ∃-closure of the sluice and the antecedent would be mutually entailing (if someone lost at chess then someone won at chess and vice versa). Importantly, our proposal runs into the same problem as e-GIVENness, since the set of worlds where someone lost at chess is identical to the set of worlds where someone won at chess.

(78)   **Hartman's problem also affects sluicing:**
        *Someone lost at chess, but I don't know who ~~won at chess~~.

As a solution, Hartman suggests comparing the meanings of the predicate abstract created by *wh*-movement in the sluice to that of the predicate abstract created by scoping the correlate out of the TP in the antecedent. This would give us the right sort of objects to compare, and would rule out sluicing with relational opposites in much the same way as with VP-ellipsis, as in (71) above.[48]

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[48] See also Weir (2017), who explores similar issues in fragment answers and proposes an account of the identity condition on fragments and sluices that makes reference to structured meanings. Additionally, Weir's account makes crucial reference to the QuD that the antecedent makes salient, and is therefore subject to the same challenges as other Q-equivalence approaches, as outlined in §3.

(79)   **Comparing abstracted-over TP denotations helps:**
         $\lambda x \,.\, x$ lost at chess $\neq$ $\lambda x \,.\, x$ won at chess

Although Hartman's solution works, it faces a conceptual challenge. Hartman's semantic identity condition is intended to exist alongside Rooth's (1992a) focus-theoretic parallelism condition on deaccenting. In short, ellipsis is licensed just in case that conditions on deaccenting are met (satisfying Roothian focus-theoretic parallelism) and, *in addition*, Hartman's semantic condition is satisfied. This is justified in part by the putative need to posit two distinct parallelism conditions, one for deaccenting, and one for ellipsis.

As our generalized focus-theoretic proposal can extend to redundancy reduction operations beyond ellipsis, in the spirit of Rooth (1992a); Tancredi (1992)—with differences between ellipsis and deaccenting explained by differences in the availability of accommodation, following Fox (2000)—we believe that reducing Hartman's two distinct parallelism conditions into a single one would lead to a more parsimonious, and therefore a conceptually and intuitively sounder, account.

The solution that saves our approach in the face of data like in (78) comes free, once we adopt the assumption in Schwarzschild (1999) that conditions on accent placement are meant to apply to all levels of structure in an utterance. The challenge from clause-sized ellipsis is that even in an Alternative Semantic implementation like ours or Hartman's (2009) implementation, we're forced back to comparing propositional meanings, reintroducing the problem posed by relational opposites.

However, Schwarzschild's (1999) definition of GIVENness (see (58) and (59)) plays a part in a larger system of constraints governing the distribution of F-marking in the syntax, which is taken to be free, subject to the constraints in (80).[49]

(80)   **Constraints on the placement of accent**
         a.   **GIVENness:** If a constituent is not F-marked, it must be Given.
         b.   **AVOIDF:** F-mark as little as possible, without violating Givenness.

Importantly, in Schwarzschild's (1999) proposal, any syntactic constituent is subject to these constraints in an utterance.[50]

As we intend to account for both ellipsis and deaccenting, we contend that our generalized condition in (76) should replace Schwarzschild's (1999) definition of GIVENness in a general theory of accent placement and redundancy reduction. For explicitness, assume Schwarzschild's (1999) theory otherwise remains intact with respect to the constraints in (80), but with our (76) replacing the Schwarzschildian definition of GIVENness in (58). It follows, then, that sub-constituents of elided constituents are subject to the constraints in (80), and by extension, to our semantic identity condition in (76).

In effect, for some reduced (elided or deaccented) XP, α, not only must α satisfy the constraints in (80), and thereby, also, GIVENness/our (76), but so must all of α's subconstituents.[51] As a consequence, in TP-ellipsis, our parallelism condition in (76) must be checked at TP *as well as* its subconstituents, including VP. We summarize this in (81):

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[49] We omit Schwarzschild's (1999) accent-placement rules here for space reasons.
[50] See Schwarzschild (1999) for many demonstrations of iteratively checking, which additionally show how the constraints in (80) derive important empirical patterns in accent placement. (In particular, see the discussion in Schwarzschild 1999: 158–161.)
[51] Given this reasoning, we suggest that, in fact, *not* checking constraints on deaccenting/redundancy reduction on every constituent is what should be justified on independent grounds, given standard assumptions following Schwarzschild (1999).

(81) **Iterative satisfaction condition:**
For any reduced (elided or deaccented) XP, not only must XP satisfy (76),
but so must all of XP's subconstituents, and any sub-subconstituents therein.
(Modulo accommodation à la Fox 2000)

Like for e-GIVENness, iterative checking is superfluous in simple cases under our account as well, as shown in (82):[52]

(82) **Simple sluicing predicted to go through with iterative checking:**
    a. $[_{CP_A}$ Someone left], but I don't know $[_{CP_E}$ who ~~left~~].
    b. $\cup[\![_{CP_A}$ someone left$]\!]^f = \lambda w\,.\,\exists x(x$ left in $w)$
    c. $\cup[\![_{CP_E}$ who left$]\!]^f = \lambda w\,.\,\exists x(x$ left in $w)$
    d. $\cup[\![VP_A$ left$]\!]^f = \lambda x\,.\,x$ left
    e. $\cup[\![VP_E$ left$]\!]^f = \lambda x\,.\,x$ left

This requirement becomes crucial only in cases such as the ones of relational opposites discussed in this section. As shown above, in such cases, our condition is met at the TP level in (78). However, since the parallelism condition must be checked at the level of every subconstituent as well, VPs will also be compared. (78) will be correctly ruled out since the union of $[\![$*lost at chess*$]\!]^f$ and the union of $[\![$won at chess$]\!]^f$ are not equivalent at the VP level. In other words, TP-ellipsis with relational opposites in (78) is ruled out for precisely the same reason that VP-ellipsis was in (73). We therefore rules out clause-sized ellipsis with relational opposites, a desirable result, fitting within a general and unified theory of ellipsis and of redundancy reduction in general.

5.3 Summary

We generalized our approach beyond sluicing to account for patterns in VP-ellipsis, in the spirit of Merchant (2001), who provides a unified theory of semantic identity in ellipsis. We then followed Fox (2000) in assuming that both sluicing and deaccenting are subject to this same semantic identity condition. The empirical differences in the distribution of these two redundancy reduction operations, which had led Rooth (1992a) to propose two distinct conditions, are instead explained by appealing to accommodation as in Fox (2000). The result is a better motivated more parsimonious proposal which achieves wider empirical coverage than the previous accounts that it builds on. The generalized proposal is repeated in (83–85).

(83) **A generalized licensing condition for redundancy reduction:**
XP_E may be reduced (elided or deaccented) provided that it has a salient
antecedent, XP_A, and $\cup[\![XP_E]\!]^f = \cup[\![XP_A]\!]^f$.

(84) **Constraint on accommodation (following Fox 2000):**
In the absence of an antecedent, one can be accommodated, provided that there
is an overt *trigger* in the context.
Deaccenting provides an appropriate trigger, but ellipsis does not.

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[52] A reviewer asks how this proposal would account for disjunctions or cases where the indefinite and *wh*-pronoun originate in object position, as in (i)–(ii):

  (i)   Peter ate [[an apple] or [a pear]], BIDK which [he ate].

  (ii) Peter ate something, BIDK what [he ate].

We propose that the solution would require QR of the F-marked correlates, allowing then for a checking procedure parallel to the one illustrated in (82). This leaves open questions concerning the nature of the resulting chain—whether it must contain traces or copies—which we must leave for future work.

(85)　　**Iterative satisfaction condition:**
　　　　For any reduced (elided or deaccented) XP, not only must XP satisfy (76),
　　　　but so must all of XP's subconstituents, and any sub-subconstituents therein.
　　　　(Modulo accommodation à la Fox 2000)

Finally, note that while we have laid out a theory of parallelism in redundancy reduction, we have not proposed a more general theory of accent placement. In short, our parallelism condition in (83) could be seen as replacing the definition of GIVENness in Schwarzschild (1999), which itself plays a part in a more complex system governing the distribution of accent and deaccenting in English sentences. We leave exploring this more fully to future work.

6 Conclusion

The precise characterization of the identity condition on sluicing has been the subject of a large and growing body of literature in recent years. In this paper, we have argued against an emerging consensus that sluices must be anaphoric to an implicit *question* or *issue* that the antecedent makes salient in the discourse (Q-equivalence approaches, Ginzburg & Sag 2000; AnderBois 2011; 2014; 2016; Barros 2014; Weir 2014; Kotek & Barros 2018), which is distinct from the licensing condition on other kinds of *smaller* ellipsis. Instead, we argued for a return to a focus-based approach (Rooth 1992a; Romero 1998; Fox 2000; Merchant 2001), and offered a new formulation of the identity requirement on sluicing couched in Rooth's (1992b) Alternative Semantics framework.

Under our proposal, the set theoretic union of the focus semantic values of the antecedent and the sluice must be equivalent in order for ellipsis to go through. We showed that this proposal handles not only basic sluices, but also contrast sluices and sprouting in a parsimonious and empirically motivated way. Although our proposal is inspired by, and is in many ways similar to, Merchant's (2001) focus-based e-GIVENness account of ellipsis licensing, we showed that our account fares better in accounting for cases of multiple sluicing and sluicing with quantified correlates.

Along the way, we highlighted conceptual as well as empirical challenges to Q-equivalence approaches—most importantly, that antecedents should *not* be burdened with the task of raising the question or issue needed for ellipsis licensing—taking the rug from under any Q-equivalence approach. At the same time, we demonstrated that our account is able to straightforwardly meet and explain all of these challenges to Q-equivalence. In sum, our proposal is an argument for a return to the idea in Rooth (1992a) and Merchant (2001) that semantic conditions on sluicing, and ellipsis in general, should be couched in terms of focus-theoretic dimensions of meaning. It is an implementation of the idea that ellipsis is a radical form of deaccenting, both being forms of redundancy reduction operations.

Having established our account of the identity condition on sluicing, we then went a step further and generalized our semantic identity condition to other forms of ellipsis besides sluicing. In particular, we showed that our generalized condition is able to automatically account for challenges from VP-ellipsis to Merchant's (2001) e-GIVENness raised in Hartman (2009). Finally, we showed that our generalized condition is able to provide a unified account for the distribution of ellipsis and of deaccenting, where the two are subject to the same semantic parallelism condition, modulo accommodation and constraints thereupon (Fox 2000).

Going forward, our proposal opens several fruitful domains of inquiry. For one, it would be important to check how well our proposal fares as a replacement definition for Schwarzschild's GIVENness. More broadly, although the ellipsis literature makes heavy use, to our minds, of the results from the literature on focus, it is not as clear that results

from the ellipsis literature, in turn, inform theories of focus. If this is correct, then our paper can also be seen as giving back in a useful way to the literature on focus, in providing a new definition of GIVENness as it applies to deaccenting and accent placement.

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Competing Interests

The authors have no competing interests to declare.

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