Polarity reversals under sluicing*

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Abstract This paper presents novel English sluicing data that challenge even the most successful existing theories of the relationship between antecedent and elided content in sluicing constructions. The data supply robust evidence for a previously unobserved phenomenon in which the elided content and antecedent content in a sluicing construction contain opposite polarity. The data challenge current accounts of identity conditions on ellipsis by demonstrating that a greater mismatch between antecedent and elided content is possible than previously thought; specifically, the paper shows that the identity condition for sluicing must be sensitive to pragmatic — i.e. non-truth-conditional — content as well as to semantic content. This observation motivates a proposal in which sluicing is treated as a pragmatics-sensitive phenomenon licensed by local contextual entailment.

1 Introduction

1.1 Overview of the current project

Sluicing, first noted by J. R. Ross (1969), is an ellipsis phenomenon in which the TP of an interrogative is elided under some identity condition, stranding an overt wh-phrase in the CP domain. An example is given in (1).

(1)   Bernie knows that someone in Iowa voted, but he doesn't know who.

Research on sluicing mainly focuses on (at least) two major questions: whether or not there is syntactic material present in the ellipsis site, and how we should characterize the nature of the identity condition that licenses elision. This paper does not contribute anything new to the former question, and I assume an account of underlying syntactic structure elided at phonological form as presented in Merchant 2001 (cf. Hardt 1993, Chung, Ladusaw & McCloskey 1995, Ginzburg & Sag 2001, Barker 2013). The focus of this paper is on the latter question, the nature of the licensing condition for sluicing. The empirical contribution of the paper is to introduce a sluicing phenomenon that has previously gone unnoticed; I'll refer to this as *polarity reversals under sluicing*.[1] Polarity reversals are sluices in which the presumed antecedent content (A) and the ellipsis site (E) differ in polarity. For example, the presumed antecedent in (2), *California will comply*, has positive polarity while the interpretation of the ellipsis site, *California won't comply*, has negative polarity.[2]

(2)   I don't think that [California will comply]$_A$, but I don't know why [$_{TP}$ California won't comply]$_E$.

Similarly, the presumed antecedent in (3), *John didn't do an extra credit problem*, has negative polarity, while the interpretation of the ellipsis site, *he did do*, has positive polarity.

(3)   **Context:** Students were given the option to do an extra credit problem, but were required to mark which problem they did next to their name on a spreadsheet. There is no mark next to John's name. The TA says:

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1 I use this label pre-theoretically and for convenience. As we will see, no actual "reversal" of polarity takes place.

2 Note that there is a reading of the ellipsis site in (2) in which the antecedent and ellipsis sites include the matrix clause, but this reading is pragmatically odd.

> **Sluice:** Either [John$_j$ didn't do an extra credit problem]$_A$, or he$_j$ didn't mark which one$_i$ [~~he$_j$ did do t$_i$~~]$_E$.

The polarity reversal data show a greater mismatch between antecedent and elided content than has been previously thought possible. Because such mismatches were not believed possible, data like (2) and (3) challenge even the most successful existing theories of the licensing condition for sluicing. Specifically, I show that the polarity reversal data are unable to be accounted for under theories that require any type of strict identity between the elided content and an antecedent in the discourse. The account presented here builds on the many successes of previous licensing conditions, but allows greater flexibility in the relationship between material preceding the sluice and the elision site by proposing that sluices rely on contextual entailment to license their elision sites. The account draws on theories from dynamic semantics and discourse coherence, which are traditionally largely unconnected with ellipsis.[3] However, the tools used here have been independently established and well-motivated in their individual domains. Overall, this paper demonstrates that new and initially challenging data can be accounted for by combining traditional theories of ellipsis with insights from other areas in the literature.

1.2 Methodological preliminaries

A methodological aside on the data used throughout: The corpus examples given here were reviewed by at least eight members of the Santa Cruz Ellipsis Project.[4] The initial round of annotation was conducted by two to three independent undergraduate research assistants and the results were reviewed by a faculty supervisor. The initial annotations were reviewed in a second phase by three additional undergraduate research assistants with a faculty supervisor. The specific examples and judgments used here were additionally discussed and verified by a separate research group of two faculty members and four graduate students, in consultation with naïve speakers. Many of the examples presented here have more than one possible interpretation. The claim here is not that the interpretations provided for these examples are the *only* interpretation available, but merely that they are a felicitous, freely available interpretation in the context in which the sluice was found or constructed.

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3 Though see Elliott & Sudo 2016 for an exception for dynamic semantics.
4 https://babel.ucsc.edu/SCEP/

Additionally, I exclude here two types of sluices that, to my knowledge, have not been explicitly excluded from previous analyses. The first is root sluices, like those in (4) and (5):[5]

(4)   A: John bought a new sailboat.
        Q: How long?

(5)   Context: Taken from a blog post about a particular kind of concert Miley Cyrus has announced she will hold:
        "Miley has yet to confirm the news or provide further details — including, for example, 'why.'"[6]

I exclude these sluices here because their range of use is clearly wider than that of embedded sluices. For example, there is no obvious linguistic antecedent for the *why* sluice in (5), though the meaning of the sluice is recoverable in context. While root sluices deserve to be studied in detail, their analysis should be separate from that given here.

The second group of sluices I exclude is semi-idiomatic uses like that in (6):

(6)   Mary got a new climbing partner – guess who!

Although these examples go as far back as J. R. Ross 1969 and are more recently discussed in Barros 2014, they should be considered separately from the examples discussed here. Most obviously, these examples are special in requiring no linguistic antecedent and in being acceptable in out-of-the-blue contexts. Because these examples appear to have different licensing requirements, I put them aside here.

The paper proceeds as follows. Section 2 provides an overview of existing theories of sluicing and demonstrates that they are unable to account for the polarity reversal sluicing data. Section 3 proposes an alternative theory called Local Givenness, and demonstrates that it makes the correct predictions for sluicing examples that have been discussed in the literature. Section 4 provides derivations for four polarity reversal examples, each of which motivates the current theory in two ways: (1) by showing that the theory makes

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5 Root sluices are interrogative forms that do not occur as complements of question-embedding verbs. While it is debated whether or not root sluices are derived via TP deletion (Bechhofer 1976, Hankamer 1977, Merchant 2001), they are distinct from the examples under consideration here in occurring only in root (non-embedded) contexts.

6 http://jezebel.com/a-miley-cyrus-nude-concert-is-the-most-miley-idea-ever-1736444064

the correct predictions, and (2) by showing that alternative theories would make incorrect predictions. Section 5 addresses concerns that arise for non-structural accounts of sluicing, §6 discusses the possibility that polarity reversal sluices are non-isomorphic sluices, and §7 concludes.

2   Sluicing in the literature

Numerous theories of sluicing have been proposed since the original syntactic isomorphy approach given in J. R. Ross 1969. A large part of the debate in the literature has been oriented around the question of licensing: what is the relationship between the content of an ellipsis site and the preceding discourse that licenses the elision of the site's material.[7] Traditionally, this licensing has been approached as a relationship between some salient antecedent and the interpretation of the ellipsis site. The identity condition underlying many approaches in the recent literature is that of semantic entailment. Originally proposed in Merchant 2001, the semantic entailment identity condition has held much weight as it is flexible enough to allow for attested structural mismatches, such as the finiteness mismatch in (7), but restrictive enough to rule out most impossible interpretations.

(7)   [Sally rock climbs]$_A$. She learned how [~~to rock climb~~]$_E$ from her mother.

I show here that a semantic entailment identity condition is too restrictive to account for the polarity reversal data, and therefore cannot be the identity condition we need. This section discusses the predictions of Merchant 2001's semantic entailment condition as well as the predictions of theories that rely in part on such an identity condition.

2.1   e-GIVENness

Merchant's theory of ellipsis, called e-GIVENness, is a theory of both the syntax and the licensing conditions for ellipsis constructions. e-GIVENness proposes that sluiced clauses contain syntactic structure within the ellipsis site that goes unpronounced, that is, is deleted at phonological form. The unpronounced structure within the ellipsis site consists of a TP missing a wh-constituent, called a *remnant* or *wh-remnant*, that has moved up and out of

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7 Even anaphoric accounts rely on some specified relationship between the interpretation of the ellipsis site and the preceding discourse.

the TP prior to the TP's deletion.[8] The licensing condition of e-GIVENness is indebted to Schwarzschild 1999's theory of GIVENness, which is not itself a theory of ellipsis, but one of focus and deaccenting. GIVENness proposes that an expression can be deaccented if its existential focus closure is contextually entailed by the existential closure of an antecedent.[9] e-GIVENness modifies the GIVENness theory of deaccenting into a theory of ellipsis (Rooth 1985, 1992, Romero 1997) by modifying the GIVENness entailment condition from a contextual, unidirectional entailment condition to a bidirectional semantic entailment condition. Specifically, e-GIVENness proposes that in order for a TP to be elided it must stand in a bidirectional semantic entailment relationship with some salient antecedent. The account is given formally as follows:

> **Focus condition on TP-ellipsis:** A TP α can be deleted only if α is e-GIVEN.
>
> **e-GIVENness:** An expression E 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).

Note that the entailment requirement here is that of semantic entailment and, unlike GIVENness, does not leave room for contextual entailment.

The semantic identity condition of e-GIVENness is permissive enough to allow for certain observed syntactic mismatches between ellipsis sites and their antecedents, such as tense (Merchant 2001); however, the bidirectional entailment requirement is too restrictive to allow for polarity mismatches. Let's look again at (2), repeated as (8).

(8)   I don't think that [$_{TP}$ California will comply]$_A$, but I don't know why [$_{TP}$ ~~California won't comply~~]$_E$.

Applying e-GIVENness to (A) and (E) yields the following:

> A entails F-clo(E): No.
> A = $\lambda w.\textbf{comply}(c)(w)$

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8 The theory presented here adopts this approach and discusses only the licensing conditions for ellipsis, but I refer the reader to Merchant 2001 and much subsequent work for a thorough defense of the syntactic proposal.

9 Existential closure is a type-shifting operation that raises expressions to type t by existentially binding unfilled arguments. Existential-F-Closure (F-clo) is the result of replacing F(ocus)-marked phrases in an expression with variables and existentially closing the result (Schwarzschild 1999).

$$\text{F-Clo(E)} = \lambda w.\neg\textbf{comply}(\text{c})(w)$$

E entails F-clo(A): No.
$\overline{\text{E} = \lambda w.\neg\textbf{comply}(\text{c})(w)}$
$\text{F-Clo(A)} = \lambda w.\textbf{comply}(\text{c})(w)$

Neither the antecedent expression nor the elided expression in (8) entails the other, and so e-GIVENness incorrectly predicts that we should not be able to elide the TP.

A skeptical reader might propose that, instead of the antecedent given in (8), we should consider the entire first conjunct to be the antecedent, as doing so will capture the negation in the antecedent expression. However, as (9) shows, expanding the antecedent to include the matrix negation still does not yield semantic entailment in either direction.[10]

(9)   [$_{\text{TP}}$ I don't think that California will comply]$_\text{A}$, but I don't know why [$_{\text{TP}}$ ~~California won't comply~~]$_\text{E}$.

A entails F-clo(E): No.
$\overline{\text{A} = \lambda w'.\neg\forall w[w \in \text{DOX}(\text{s})(w') \rightarrow \textbf{comply}(\text{c})(w)]}$
$\text{F-Clo(E)} = \lambda w.\neg\textbf{comply}(\text{c})(w))$

E entails F-clo(A): No.
$\overline{\text{E} = \lambda w.\neg\textbf{comply}(\text{c})(w)}$
$\text{F-Clo(A)} = \lambda w'.\neg\forall w[w \in \text{DOX}(\text{s})(w') \rightarrow \textbf{comply}(\text{c})(w)]$

2.2   Hybrid Theories

Merchant 2013b and Chung 2013 argue that e-GIVENness alone is too weak an identity condition on sluicing, as it fails to rule out impossible sluices such as the active/passive mismatch in (10).

(10)   #[John was kicked]$_\text{A}$, but I don't know who$_\text{i}$ [t$_\text{i}$ ~~kicked John~~]$_\text{E}$.

Merchant and Chung propose to rule out sluices such as (10) by including substantive syntactic restrictions on sluicing in addition to the bidirectional semantic entailment condition of e-GIVENness. As the accounts presented in these works are by their very purpose more restrictive than e-GIVENness,

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10 For a discussion of the relevance of the neg-raising property of the data, see §4.1-§4.2.

the objections in the last section regarding the too-restrictive nature of e-GIVENness apply equally to these accounts, as well.

2.3 Inquisitive entailment

AnderBois 2014 criticizes e-GIVENness for failing to predict the impossibility of sluicing out of doubly-negated indefinites and appositives. AnderBois argues that while examples (11) and (12) satisfy bidirectional entailment, they are not well-formed sluices (AnderBois 2014: pp. 19 & 23, respectively, brackets added):

(11)   #[It's not the case that no one left]$_A$, but I don't know who [l̶e̶f̶t̶]$_E$.

(12)   #Joe, [who once killed a man in cold blood]$_A$, doesn't even remember who [h̶e̶ ̶o̶n̶c̶e̶ ̶k̶i̶l̶l̶e̶d̶ ̶i̶n̶ ̶c̶o̶l̶d̶ ̶b̶l̶o̶o̶d̶]$_E$.

AnderBois proposes a modified account of sluicing based on inquisitive semantic entailment over CPs (Groenendijk & Roelofsen 2009). Inquisitive semantic entailment is a more restrictive identity requirement than e-GIVENness and rules out examples (11) and (12): neither antecedent contains inquisitive content and therefore cannot entail the inquisitive content of the question CP (see AnderBois §3.4 and §4 for discussion).

Recent work has challenged the inquisitive semantic entailment account on empirical grounds. Collins et al. 2014 provide experimental evidence that sluices out of doubly-negated constructions and appositives are indeed possible,[11] and Barros 2014 observes that (12) above, modified in (13), is acceptable when the remnant *who* is replaced with the d-linked wh-expression *which man* (see also discussion in §5.3).

(13)   Joe, [who once killed a man in cold blood]$_A$, doesn't even remember which man [h̶e̶ ̶o̶n̶c̶e̶ ̶k̶i̶l̶l̶e̶d̶ ̶i̶n̶ ̶c̶o̶l̶d̶ ̶b̶l̶o̶o̶d̶]$_E$.

Additionally, Inquisitive Entailment was created to be a more restrictive entailment identity account than e-GIVENness. As I have shown that e-GIVENness is too restrictive to permit polarity reversal sluices, it follows that an account that was created to predict a subset of those constructions predicted by e-GIVENness is also too restrictive to permit the polarity reversals. Thus, while contributing many insights into the semantics and pragmatics of sluicing,

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11 The results show that while speakers in the experiment did not judge the examples highly, they judged them no worse than the equivalent pre-sluice examples.

particularly regarding *which* sluices out of disjunctive clauses, Inquisitive Entailment is too strict an identity condition to correctly predict the full range of sluicing possibilities.

2.4 Scopability

Barker 2013 analyzes sluicing as anaphora to the semantic remnant of a clause from which a subconstituent has been removed (a *continuation*). Under this proposal, sluicing constructions contain gaps and silent proforms but no internal syntactic structure in the ellipsis site. This analysis, called *scopability*, uses a type logical (categorial) grammar that allows a tight connection between syntactic and semantic content. Certain facts about scope and case matching behavior in sluicing therefore fall out naturally from the system.

Scopability focuses on the scope facts of sluicing originally observed in Chung, Ladusaw & McCloskey 1995. Chung et al. notice that an example like (14) only allows a reading in which the indefinite *a book* takes wide scope over the quantifier *everyone* (Barker 2013: p. 191).

(14)   Everyone selected a book, but I don't know which book.

Chung et al. propose that in sluicing constructions, the correlate (their *inner antecedent*: the optionally-present constituent in the antecedent of a sluicing construction that corresponds to the wh-remnant) must take scope over the antecedent clause. This scope fact follows in the system of scopability because a sluicing antecedent is created by allowing the correlate to take scope over the rest of the antecedent clause. In (14), this means that the indefinite correlate [a book] must take wide-scope over the antecedent [everyone selected ___]; the scope facts then follow naturally.

I argue that scopability, too, is too restrictive to capture the polarity reversal data. While scopability rejects the semantic entailment condition, Barker argues that scopability avoids overgeneration by imposing effectively the same restriction through different means: "...the net effect of the mutual entailment requirement [of e-GIVENness] is that once we subtract the inner antecedent from the antecedent clause, and once we subtract the wh-phrase from the sluice, the remainders must be semantically equivalent — exactly what is guaranteed by the anaphoric [scopability] analysis" (213). Indeed, it is clear that Barker intends scopability to deliver semantic equivalency between a sluice and its antecedent. However, we have seen that a condition which im-

poses semantic equivalency between an ellipsis site and its antecedent is too restrictive to predict the novel data contributed by polarity reversal sluices.

In summary, bidirectional semantic entailment accounts such as e-GIVENness, and theories that impose semantic identity between an ellipsis site and its antecedent, are too restrictive and fail to predict the existence of polarity reversal data.[12] The next section proposes an alternative account that builds off the insights provided by the accounts discussed here.

3 A modified account

This section proceeds in two parts. The first subsection discusses a constraint proposed in Dayal & Schwarzschild 2010 that explains certain data that have been used to motivate a bidirectional entailment account. I propose that since these data can be ruled out on independent grounds, they should not be ruled out by a sluicing theory specifically. Section 3.2 then proposes a new identity condition on sluicing called Local Givenness, which argues that sluices are licensed by local contextual entailment. Section 3.2 also spells out the assumptions of the account, and derives a non-polarity reversal sluicing example.

3.1 The Well-Formedness Condition

This subsection shows that we can rule out certain forms of unacceptable sluices independently from our sluicing licensing condition. There are many reasons why a particular sluice may be unacceptable, and, importantly, the reason is not always because of its failure to satisfy an ellipsis licensing condition. Dayal & Schwarzschild 2010 observe that one reason a sluice may be unacceptable is because its pre-sluice — or, the unelided form of the sluice — is also unacceptable. They therefore propose that infelicitous pre-sluices will yield infelicitous sluices. For example, (15a) is infelicitous, or pragmatically anomalous (in this case, because it contains two generally contradictory clauses). It is not surprising, then, that the corresponding sluice in (15b) is also infelicitous.

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12 Note that Ginzburg & Sag 2001 and Barros 2014 take a slightly different approach, combining syntactic and pragmatic constraints.

(15)   a.   #Hillary$_i$ knows that the President lives in the White House, but she$_i$ doesn't know where the President lives.

        b.   Hillary$_i$ knows that the President lives in the White House, but she$_i$ doesn't know where$_j$ #[~~the President lives t$_j$~~].

For ease of reference, I call this observation the Well-Formedness Condition (see discussions in Romero 1998, Dayal & Schwarzschild 2010, Tancredi 1992, and Merchant 2013a):

(16)   *The Well-Formedness Condition*:
        If a pre-sluice is infelicitous, then the corresponding sluice will not be well-formed.

The Well-Formedness Condition is, to the extent of my knowledge, both empirically verifiable and intuitively satisfying. It seems desirable that a question that is infelicitous when uttered overtly will remain infelicitous when partially elided. The importance of this observation is that it rules out certain examples that we do not want to force our sluicing theory to rule out. The observation is not specific to polarity reversal sluices, but is helpful to keep in mind when considering the scope of the data that any theory of sluicing needs to account for. By adopting the Well-Formedness Condition, we are able to rule out examples like (15b) independently, obviating the need to account for such sluices in our theory of ellipsis.[13]

3.2   Local Givenness

This section proceeds in three parts. The first outlines the basic formal assumptions used in the current account. The second presents a first pass at the sluicing theory that is developed and argued for in this paper, called Local Givenness. The third independently motivates the theory by applying it

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13 The infelicity of examples like (15a) comes from the infelicity of asking a question that already has (at least) a partial answer available in the discourse (Romero 1997, Fitzpatrick 2005, Ginzburg 2012, Barros 2014). For example, B's question in (i) is infelicitous without the inclusion of *other*, because A has already asserted that she has seen some tigers that day at the zoo, which is a partial answer to the question 'What animals did you see today at the zoo?'.

    (i)   A: I saw some tigers today at the zoo.
          B: What/which #(OTHER) animals did you see today at the zoo?

to a non-polarity reversal sluice. The reader who is familiar with dynamic theories of context update can safely skip to the second section on Local Givenness.

3.2.1 Context update and dynamic interpretation systems

I use here a dynamic interpretation system outlined in Kadmon 2001 and based on File Card Semantics (Heim 1983a) and the Context Change Potential (CCP) system of Heim 1983b. Dynamic interpretation systems such as CCP update the conversational context incrementally. They aim to capture the observation that clausal interpretation may crucially rely on the interpretation of previous intrasentential clauses. For example, the context need not be updated only at the end of a sentence as in a static system; instead, semantic content can incrementally update the context at the completion of a proposition or earlier. Because of this incremental updating, the second clause of a sentence — such as in a sentence containing conjoined clauses — can be interpreted in a different context from the first clause of the same sentence, and in a different context from the global conversational context. Theories of incremental updating have been of particular interest in studies of presupposition projection (Stalnaker 1973, 1974, Karttunen 1974, Gazdar 1979, Karttunen & Peters n.d., Heim 1983b, Soames 1989, Beaver 2001, a.o.) and anaphora (Geach 1962, Evans 1977, Roberts 1989, Heim 1990, Kamp & Reyle 1993, van Rooij 1997–2006, Nouwen 2007, Murray 2014, a.m.o.).

In order to be able to clearly refer to the context of an entire sentence versus the context in which a particular clause is interpreted, Karttunen 1973 first distinguished *global* contexts, contexts at which the current sentence is interpreted, from *local* contexts, contexts at which the current clause (or possibly some smaller constituent) is interpreted. This terminology is adopted in Heim 1983b and Kadmon 2001 under a similar meaning. It is further developed under the motivation of processing parsimony in Schlenker 2009, 2010, 2011a. As mentioned above, the local context in which a clause is interpreted is not necessarily identical to the global context of its containing sentence. One effect of distinguishing between the two types of context is that propositions can be entered into local contexts without being entered into the discourse common ground or context set (Stalnaker 2002), i.e. without being accepted as true by the speakers of the discourse for purposes of the discourse. Note that this means that, throughout a discourse, a local context is not necessarily a continually narrowing set of worlds. I notate local

contexts throughout as c_L to distinguish them from global contexts, though the reader is asked to keep in mind that this serves merely as a reminder that we are concerned with updating our derivations incrementally.

In Heim 1983b's CCP system, the context is defined as a set of worlds (or, alternatively, as a set of world-assignment pairs). Instead of a standard truth-conditional semantics, operators contribute a context change potential, which is a partial function from contexts to contexts. Context change potentials express partial functions because a new context is defined only when the presuppositions of the entering expression are defined (entailed by the context), or are accommodated. The basic assumptions I make here are given as follows:

A context c and a proposition p are defined as sets of worlds. Because c is a set of worlds, entailment is defined by the subset relation, such that if a context c entails a proposition p, then $c \subseteq p$. A context is updated with a new proposition p by conjoining, or intersecting, with p. Context updating is defined as follows:

> *Context update*:
> a. If c entails the presuppositions of p, then $c + p = c \cap p$
> b. If c does not entail the presuppositions of p, then c is undefined[14]

Some Heimian rules for basic English propositional operators are given here (see e.g. Karttunen 1974, Heim 1983b, Kadmon 2001):

> Negation: $c + \neg p = c \setminus (c + p)$
> Conjunction: $c + (p \wedge q) = (c + p) + q$
> Disjunction: $c + (p \vee q) = (c + p) + (c + (c \setminus p) + q)$
> Conditional: $c + (\text{If} p, q) = c \setminus (c + p \setminus ((c + p) + q))$

Note that the final results of applying these rules to the context is an updating of the global sentence context, or the context resulting from the interpretation of the entire expression. Importantly, the context change po-

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14 Heim (1988), following Lewis (1979), also allows for the possibility of accommodation of the presuppositions of p if c is undefined. Accommodation is defined as follows: $c + p = (c \cap \text{ps}(p)) \cap p$. As Heim notes, accommodation is not a mechanism of the formal system, but instead an act that a speaker chooses to do to avoid a breakdown in communication (pg. 401).

tentials of these complex expressions are derived compositionally from the context change potentials of their constituents.[15]

While there is debate in the literature over the correct formalization of some of these rules, the differing implementations of the rules does not impact in any crucial way the ellipsis derivations that concern us here. I use a basic Heimian account because the CCP account is widely known and is sufficient to capture the data we are concerned with. The interested reader is encouraged to reference Karttunen 1974, Heim 1983b, Kadmon 2001, Schlenker 2010, 2011b for additional discussion, as well as the respective benefits and drawbacks of different rule formalizations. However, the account developed here does not rely on the use of any particular system. Other developed dynamic theories, such as the closely related Discourse Representation Theory (Kamp 1981) and its expansions and Dynamic Predicate Logic (Groenendijk & Stokhof 1990), could alternatively be used. Also available as alternatives are non-dynamic accounts that use local contexts to compute incremental processing, such as Schlenker 2009, 2010, 2011a.

3.2.2 Local Givenness

The theory of sluicing presented here eschews semantic identity in favor of pragmatics-based entailment. The spirit of the proposal is indebted to those accounts already discussed and to the contextual entailment allowance that was included, though not given an exposition, in Schwarzschild 1999's GIVENness theory. Informally, I propose that the TP of an interrogative can be elided if and only if the proposition expressed by the TP, modulo existential closure, is entailed by the context in which the sentence expressing the proposition would be uttered. Recall that the notation c_L is used to indicate the local context of p; that is, the context into which p is entered. Formally,

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15 A reviewer asks about the predictability of the local context. The field does not currently have a complete set of CCPs; thus, I acknowledge that the theory presented here might over or under-generate once we have exhaustively documented the full set of natural language constructions. I use existing CCP rules to describe every category of polarity reversal sluicing examples found by the SCEP. The use of local contexts is motivated by examples in which the local licensing context is substantively different from the global licensing context; that is, cases in which the antecedent material updates the local context, but is not preserved in the global context. Local contexts are used extensively in dynamic update systems, where general criteria for their predictions are discussed in a depth that this paper is unfortunately unable to cover.

Local Givenness is expressed as follows:

Local Givenness (preliminary): A TP α can be deleted *iff* $ExClo(\llbracket\alpha\rrbracket^g)$ expresses a proposition p such that $c_L \subseteq p$.

Because the theory uses contextual entailment as its licensing requirement, there is no reliance on antecedents built into the theory. For expositional clarity and in deference to the historical importance antecedents hold in accounts of ellipsis, I use antecedent labels throughout in the derivations of sluices in this paper. I ask the reader to please keep in mind, though, that this is a notational convenience and not a requirement of the theory. The propositions labelled as antecedents should be thought of more accurately as licensers, in that they provide the main propositional content constraining the local context of the sluiced proposition. There are no actual antecedent requirements built into the account, however, other than what content impacts the local context of the elided proposition.

3.2.3 Application of Local Givenness

This subsection applies the theory of Local Givenness to a non-polarity reversal example.[16] The example was chosen to display the generalizability of the theory and to show that it correctly accounts for examples that are not polarity reversals (see Kroll 2019 for additional examples). Because the contextual entailment condition of Local Givenness is a less restrictive condition than the bidirectional semantic entailment condition of e-GIVENness, it predicts not only those sluices predicted by e-GIVENness, but also sluices that the bidirectional entailment condition is too restrictive to capture.

Example (17) shows that the account correctly predicts sluicing out of appositives, as is shown to be empirically available in (13). While appositives are canonically considered to be not-at-issue content, it has been widely observed that they participate in discourse level activities — including ellipsis — in the same manner as matrix or at-issue content. Appositives can also in the right circumstances behave like at-issue content in their projection and truth conditional behavior (Potts 2005, Amaral, Roberts & Smith 2007, Syrett & Koev 2014, AnderBois, Brasoveanu & Henderson 2015, Kroll & Rysling n.d., a.o.). I assume here that appositive relative clauses are propositional (Potts 2005), stand in an anaphoric referential relationship with their main clause anchor (notated here by the superscript *x*) (Nouwen 2007), and differ

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16 I thank a reviewer for noting that a discussion of such an example would be helpful.

from main clause content in that appositive content is automatically added to the global context, while main clause content is added in the local context and introduced as a proposal to update the global context (Murray 2014, AnderBois, Brasoveanu & Henderson 2015).[17] A slightly simplified version of example (13) is repeated in (17).

(17) Joe_j^x, [who^x killed a man in cold blood]$_A$, doesn't know which man$_i$ [he$_j$ killed t$_i$ in cold blood]$_E$.

   (i)   The appositive content of (17) updates the global context c, which I assume for maximal generality is W:[18]
$c = W \cap \{w\colon \exists x[\textbf{man}(x)(w) \wedge \textbf{kill in cold blood}(x)(\text{j})(w)]\} = \{w\colon \exists x[\textbf{man}(x)(w) \wedge \textbf{kill in cold blood}(x)(\text{j})(w)]\}$

  (ii)   The existential closure of (E) is as follows:
$ExClo(\llbracket E \rrbracket^g) = \{w\colon \exists x[\textbf{man}(x)(w) \wedge \textbf{kill in cold blood}(x)(\text{j})(w)]\}$

 (iii) $\{w\colon \exists x[\textbf{man}(x)(w) \wedge \textbf{kill in cold blood}(x)(\text{j})(w)]\} \subseteq ExClo(\llbracket E \rrbracket^g)$

As there are no intervening updates (no intervening operators or propositions), the local context for the expression following the appositive is identical to the global context, and we correctly predict entailment and elision of the sluiced clause in step (iii).

Note that entering the appositive content immediately into the global context in this way correctly predicts the projection behavior of appositives and the existence of anaphoric and ellipsis possibilities across appositive and main clause content. The interested reader is referred to Potts 2005, Del Gobbo 2007, Nouwen 2007, 2014, Schlenker 2013, and AnderBois, Brasoveanu & Henderson 2015, a.o. for additional details. The next section turns to deriving polarity reversal sluices.

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17 While AnderBois, Brasoveanu & Henderson 2015's account allows for the free occurrence of ellipsis over borders, they rely on AnderBois 2014 to rule out sluicing specifically. See discussion above on why we want our ellipsis theory to derive this example.

18 A reviewer raises a concern about the assumption that the context is the set of all possible worlds. In fact, assuming a starting context of all possible worlds is the most difficult case facing the theory, as all restrictions of the set in order to meet the entailment condition must be generated by the content preceding the sluice.

4 Deriving polarity reversal sluices

The following sub-sections apply Local Givenness to three main categories of polarity reversal sluices.[19] The categories are formed by grouping the data based on a salient similarity. For example, polarity reversal sluices are easily constructed with neg-raising verbs, so one category is Neg-Raising Polarity Reversals. While I believe that these categorizations hold theoretical significance, I remain uncommitted to them as holding final explanatory power or as comprising an exhaustive subcategorization.[20]

4.1 Polarity reversals are not semantic entailment: Neg-raising polarity reversals

One class of polarity reversal sluices contains neg-raising verbs. For example, (2) is repeated as (18):

(18) I don't think that [California will comply]$_A$, but I don't know why [$_{TP}$ ~~California won't comply~~]$_E$.

That neg-raising is the relevant property in (18) can be seen by the minimal pair comparison in (19) and (20). Example (20) swaps the neg-raising verb *think* with the non-neg raising verb *hope*. While the neg-raising and non-neg-raising interpretations are both available for (19), (20) cannot receive the polarity reversal interpretation in (20a). Instead, the only available interpretation is the matrix clause reading, given in (20b).

(19) a. Mary doesn't think that California will comply, but she can't explain why [~~California won't comply.~~]$_E$.
      b. Mary doesn't think that California will comply, but she can't explain why [~~she$_1$ doesn't think California will comply.~~]$_E$.

(20) a. Mary doesn't hope that California will comply, but she can't explain why #[~~California won't comply.~~]$_E$.
      b. Mary doesn't hope that California will comply, but she can't explain why [~~she$_1$ doesn't hope California will comply.~~]$_E$.

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19 See Kroll 2019 Appendices A and B for derivations of polarity reversal examples containing *doubt* and *until*.

20 Many polarity reversal examples given here contain *why* and *which NP* correlates. The paucity of correlate types may raise concerns that polarity reversals comprise a restricted set of data and are not generalizable to a wider theory of sluicing. Polarity reversal examples are, however, available with a greater class of remnants. See Kroll 2019, (51), and (55).

Neg-raising verbs are clause-embedding verbs that when negated allow a reading in which matrix negation takes scope in an embedded clause. As it is one of the dominant approaches in the literature, I use here the account of neg-raising given in Gajewski 2007.[21] Gajewski's account draws importantly on an idea from Bartsch 1973 that the inference from the literal interpretation of a neg-raising sentence like the antecedent in (18), where negation takes matrix scope, to the neg-raised interpretation, where negation takes embedded scope, is a pragmatic inference. Specifically, Bartsch argues that neg-raising verbs license an excluded middle presupposition as a pragmatic inference. For a sentence like the antecedent in (18) that contains the neg-raising verb *think*, the presupposition is that the subject either believes that the proposition expressed by the complement of the verb is true, or believes that it is false. The assertion of the antecedent of (18) combined with this presupposition then pragmatically entails that the speaker in (18) has a belief that California will not comply. The pragmatic nature of the reasoning involved explains how negation comes to be interpreted low and also explains why the neg-raised reading is cancelable in context. The criticism leveled against Bartsch's original account is that no principled reason is given for why some verbs are neg-raising verbs and others are not (Horn 1978). For example, no explanation is given for why the verb *think* can neg-raise while the epistemically stronger verb *know* cannot, or why neg-raising verbs are idiosyncratically distributed across different languages.

Gajewski proposes to alleviate this objection by categorizing the excluded middle presupposition of neg-raising verbs as a soft-trigger presupposition in the sense of Abusch 2009. Abusch's soft-trigger presuppositions are presuppositions that are easily cancellable in context and as such are distinct from hard-trigger presuppositions, which cannot be cancelled. Soft trigger presuppositions are carried by predicates that invoke lexically-stipulated alternatives as a matter of convention. The invocation of these alternatives triggers a pragmatic presupposition that one of the alternatives is true. In the case of neg-raising verbs, the alternatives invoked are the literal interpretation of the sentence and the neg-raised interpretation of the sentence. In summary, Gajewski proposes to treat neg-raising predicates as soft triggers that invoke a pragmatic excluded-middle presupposition. This proposal intends to capture the behavior described in Bartsch's account while provid-

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21 I ask my syntactically-inclined readers to please preview §4.2 to assuage objections to this choice.

ing a more principled explanation for why some verbs allow neg-raising and others do not.

With this theoretical background in place we can return to example (18). I have proposed that the assertion of the antecedent in (18) combined with the excluded-middle presupposition invoked by the verb *think* entails that the speaker in (18) has the belief that California will not comply. Formally, this is expressed as follows:

(21)   [I don't think that California will comply]$_A$, but I don't know why [$_{TP}$ ~~California won't comply~~]$_E$.
        $[\![$I don't think that California will comply$]\!]^g_A =$
        $\lambda w'.\neg \forall w[w \in \text{DOX}(s)(w') \rightarrow \textbf{comply}(\text{c})(w)]$

DOX(s)(w) indicates the set of worlds compatible with the doxastic state of the speaker. Via the excluded middle presupposition conventionally associated with the verb *think*, (A) presupposes that the world of evaluation of *think* meets the following restriction:

Excluded middle presupposition of (18)'s antecedent:
$\lambda w'.[\forall w[w \in \text{DOX}(s)(w') \rightarrow \textbf{comply}(\text{c})(w)] \lor \forall w[w \in \text{DOX}(s)(w') \rightarrow \neg\textbf{comply}(\text{c})(w)]]$

The denotation of *think* assumed here is given as follows (following Uegaki 2015):
$[\![$think$]\!]^g = \lambda p.\lambda s.\lambda w'.[\forall w[w \in \text{DOX}(s)(w') \rightarrow p(w)] \lor \forall w[w \in \text{DOX}(s)(w') \rightarrow \neg p(w)]].[\forall w[w \in \text{DOX}(s)(w') \rightarrow p(w)]]$

Because (A) expresses that the first disjunct of the excluded middle presupposition is false, the presupposition of (A) and the assertion of (A) together entail the second disjunct of the presupposition. This entailment produces the stronger reading that the speaker uttering (18) has a belief that California will not comply. The following steps apply Local Givenness to (18). I use throughout a function C that takes a given function f and returns a set such that for any <s,t> function f, $C(f) = \{w : f(w) = 1\}$. This is merely a notational convenience, which allows us to move between function and set notation.

   (i) Starting Context:
        $c = W$

   (ii) Semantic Denotation of (A):
        $[\![A]\!]^g = \lambda w'.\neg \forall w[w \in \text{DOX}(s)(w') \rightarrow \textbf{comply}(c)(w)]$

(iii) Excluded Middle Presupposition of (A):
$\lambda w'.[\forall w[w \in \text{DOX}(s)(w') \rightarrow \textbf{comply}(c)(w)] \vee$
$\forall w[w \in \text{DOX}(s)(w') \rightarrow \neg\textbf{comply}(c)(w)]]$

(iv) Strengthened Neg-Raised Interpretation of (A):
$\lambda w'.\forall w[w \in \text{DOX}(s)(w') \rightarrow \neg\textbf{comply}(c)(w)]$

(v) Local Context for (E):
$W \cap C(\lambda w.\neg\textbf{comply}(c)(w)) = W \cap \{w : \neg\textbf{comply}(c)(w)\} = c_{L_E}$

(vi) Denotation of (E):[22]
$ExClo(\llbracket \text{E} \rrbracket^g) = \{w : \neg\textbf{comply}(c)(w)\}$

(vii) Local Givenness:
$c_{L_E} \subseteq \{w : \neg\textbf{comply}(c)(w)\}$

The semantic denotation of (A) in step (ii) asserts that it is not true that the speaker believes that California will comply. The pragmatic excluded middle presupposition in (iii) carried by (A) — conventionally associated with the verb *think* — requires that the speaker either believes that California will comply or believes that California will not comply.[23] Steps (ii) and (iii) together derive the strengthened neg-raised interpretation: Because (ii) asserts that it is not true that the speaker believes that California will comply, it follows from (iii) that the speaker believes that California will not comply. The utterance of (A) thus asserts the strengthened meaning given in (iv).

Steps (i)-(iv) pragmatically assert that California will not comply. The matrix verb *think* is in the set of communicative assertive verbs, which have long been observed to be able to assert their complement as true in a local context (although the truth is not necessarily projected up to a global context; for recent discussions see Schlenker 2010 and Anand & Hacquard 2014). This example is part of a more general observation that embedding verbs such as *see, think,* and *believe* are able to assert their clausal complement as either

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22 The observation that adjunct *wh*-traces do not participate in semantic parallelism relationships in ellipsis is part of an ongoing discussion in the literature (see Schwarzschild 1999, Merchant 2001, Hartman 2011, Barros 2014, Messick & Thoms 2016). This project has nothing to add beyond the current state of the literature on this question, and I refer the interested reader to the given citations.

23 Note that the derivation does not fail here because the presupposition is "soft" in Abusch 2009's sense. That is, the presupposition is not a definedness requirement of the context, but is introduced by the lexical item, which invokes alternatives as a matter of convention. Thank you to a reviewer for requesting clarification on this step.

true or as the main point of the utterance (Higginbotham 1975, Simons 2007, 2013). These clausal complements can therefore behave in discourse as independent propositions that can be asserted, responded to, and questioned independently of the matrix clause. Because this issue is discussed at length elsewhere, and because the current theory has no new contribution to this topic, I assume here existing proposals and treat the complements of such verbs as entering into the local context.[24]

The pragmatic assertion of (iv) creates a local context c_L in which the worlds under consideration are only those in which California does not comply, given in step (v). Step (vi) shows the set of worlds in which California does not comply, and step (vii) shows that Local Givenness is satisfied because the local context in (v) entails the elided proposition given by (E). The theory therefore predicts the felicitous elision of the TP in (18).

4.2 Polarity reversals are not syntactic: *Remember* polarity reversals

The reader may at this point raise the objection that the previous example wrongly dismissed the possibility of a syntactic account of neg-raising as an explanation for the inference from $\neg\phi(p) \rightarrow \phi(\neg p)$. Indeed, the classic analysis of neg-raising — originally advanced by, among others, Fillmore 1963 and J. Ross 1973, and revived recently by Collins & Postal 2014 — argues for a syntactic explanation. This section shows that an appeal to a syntactic account of neg-raising will not save a semantic entailment account of sluicing. Instead, the inference $\neg\phi(p) \rightarrow \phi(\neg p)$ must, at least in some cases, be pragmatic in nature.

Example (22) is a corpus polarity reversal sluice containing *remember*.

(22)   [Corpus example 91594, Santa Cruz Ellipsis Project]
        Context: [O]n the day the Japanese invaded Pearl Harbor, Hummel was rounded up and locked in an internment camp along with about 2,000 other foreigners…So he and a British friend engineered an escape with the help of Nationalist guerrillas concealed nearby. He crawled over barbed-wire and walked most of the night and the next day. He was 20 and had no military training. But he was handed a small Belgian pistol, and he had little choice but to stay and help, harassing Japanese patrols by night and trying to defend a small patch of land against a

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24 This can be achieved formally via a form of local accommodation, see discussions in Roberts 1989, 2015 and Kadmon 2001: Ch. 9.

communist takeover.

Sluice: "I don't know why [~~I wasn't scared~~], but I really can't remember being scared." [Hummel] said. "It all seemed like great fun."

Example (22) is illustrative in that it appears to behave like the neg-raising examples: ¬*remember p* is interpreted in context as entailing ¬*p*. However, *remember* is not classified as a neg-raising verb in the literature and, indeed, the inference is more contextually dependent than that carried by neg-raising verbs. For example, A's utterance in (23) is perfectly acceptable, while A's utterance in (24) is grammatical but a bit unwieldy.

(23)   I don't remember being scared, but apparently I was!

(24)   ?I don't think that Jane went to the party last night, but that's because I don't know anything about her whereabouts last night.

Karttunen 1971 classifies *remember* as an *implicative* verb. As such, it has the following properties when taking an infinitival complement: *remember* $p \rightarrow p$, ¬*remember* $p \rightarrow \neg p$. For example, in (25) there is a strong intuition that the assertion of the sentence commits the speaker to believing that she did not shut the door.

(25)   I didn't remember to shut the door.

Higginbotham 2003 proposes that *remember* (along with *imagine*) in its usage with a gerund complement carries an obligatory *de se* reading when the embedded subject is PRO. For example, while (26) has both a possible *de re* and a possible *de se* reading, (27) carries only the *de se* reading, under which John remembers he himself going to the movies.

(26)   John remembered his going to the movies.

(27)   John remembered going to the movies. [Higginbotham 2003 7&10]

Based on these discussions, I propose that the inference ¬*remember* $p \rightarrow \neg p$ in (22) is licensed by two defeasible contextual assumptions.[25] The first assumption is that the speaker has a memory about the particular event represented by p.[26] That is, the speaker is informed about the event under dis-

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[25] We can easily find contexts in which both assumptions fail to hold; as expected in such contexts, the inference ¬*remember* $p \rightarrow \neg p$ also fails to hold.

[26] I abstract away here from concerns about negative events, and assume that the event in question in (22) exists and that it was either an event of being scared or an event of being

cussion. This is analogous to the Competence Assumption that is used by researchers in computing scalar implicatures (van Rooij & Schulz 2004, Geurts 2009, a.o.) I argue that this assumption is stronger in cases in which the subject of *remember* is remembering their own experience of the particular event, as in Higginbotham's *de se* examples. The second assumption is based on the idea that insofar as our memory of eventualities track with our beliefs about those eventualities, a speaker's memory represents the speaker's beliefs about the way the actual world was in the past. An assertion of memory can therefore in context be taken as doxastic evidence for or against a description of a particular eventuality, and can license inferences from memory to belief. These assumptions are defeasible in that a speaker can have the reliability of their memory challenged. The following steps apply Local Givenness to (22).

(i) Starting Context:
$c = W$

(ii) Assumption of Speaker Memory:[27]
$\lambda w'.\forall w[w \in \mathrm{MEM}(\mathrm{s})(w') \rightarrow \exists e \exists t[\neg\textbf{scared}(s)(e)(w)\wedge\mathrm{AT}(t)(e)(w)]]\vee$
$\forall w[w \in \mathrm{MEM}(\mathrm{s})(w') \rightarrow \exists e \exists t[\textbf{scared}(\mathrm{s})(e)(w) \wedge \mathrm{AT}(t)(e)(w)]]$

(iii) Semantic Denotation of (A):
$[\![\mathrm{A}]\!]^g = \lambda w'.\neg\forall w[w \in \mathrm{MEM}(\mathrm{s})(w') \rightarrow \exists e \exists t[\textbf{scared}(\mathrm{s})(e)(w)\wedge\mathrm{AT}(t)(e)(w)]]$

(iv) Enriched Denotation of (A):
$\lambda w'.\forall w[w \in \mathrm{MEM}(\mathrm{s})(w') \rightarrow \exists e \exists t[\neg\textbf{scared}(\mathrm{s})(e)(w)\wedge\mathrm{AT}(t)(e)(w)]]$

(v) Assumption of Speaker Consistency:
$\lambda w'.\forall w[w \in \mathrm{DOX}(\mathrm{s})(w') \rightarrow \exists e \exists t[\neg\textbf{scared}(\mathrm{s})(e)(w)\wedge\mathrm{AT}(t)(e)(w)]]$

(vi) Context Update:
$W \cap C(\lambda w.\exists e \exists t[\neg\textbf{scared}(\mathrm{s})(e)(w) \wedge \mathrm{AT}(t)(e)(w)]) =$
$W \cap \{w : \exists e \exists t[\neg\textbf{scared}(\mathrm{s})(e)(w) \wedge \mathrm{AT}(t)(e)(w)]\} =$
$\{w : \exists e \exists t[\neg\textbf{scared}(\mathrm{s})(e)(w) \wedge \mathrm{AT}(t)(e)(w)]\} = c_{L_E}$

(vii) Existential Closure of (E):
$ExClo([\![\mathrm{E}]\!]^g) = \{w : \exists e \exists t[\neg\textbf{scared}(\mathrm{s})(e)(w) \wedge \mathrm{AT}(t)(e)(w)]\}$

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not scared. Another way to approach this is to say that the speaker either remembers the event e or remembers the maximal eventuality S of all eventualities e' in the relevant time period and $e \not\sqsubseteq S$ (Krifka 1989, de Swart 1996).

27 Contextual domain restriction assumed throughout.

(viii) Local Givenness:

$c_L \subseteq ExClo(\llbracket \mathrm{E} \rrbracket^g)$

$\{w \colon \exists e \exists t [\neg\mathbf{scared}(\mathrm{s})(e)(w) \wedge \mathrm{AT}(t)(e)(w)]\} \subseteq$

$\{w \colon \exists e \exists t [\neg\mathbf{scared}(\mathrm{s})(e)(w) \wedge \mathrm{AT}(t)(e)(w)]\}$

The pragmatic assumption associated with (A) is that the speaker has a memory of the particular event being discussed, namely an event of being scared or being not scared. This is given in the Assumption of Speaker Memory in step (ii); MEM(s)(w) acts as an information state of the speaker containing all those worlds compatible with the memory of the speaker. The semantics of (A) given in (iii) expresses that the speaker does not remember an event of being scared: in all the worlds compatible with the memory of the speaker there was no event (in the relevant time period) in which the speaker was scared. Steps (ii) and (iii) together entail the proposition that the speaker remembers an event of his being not scared. Therefore, an assertion of (A) expresses the proposition given in (iv). Under the assumption that the speaker's memories of the past represent the speaker's beliefs about the history of the actual world, we infer the proposition in (v) from (iv). Step (v) pragmatically asserts that the speaker was not scared; the context is then updated with this proposition in (vi) in the same manner as in example (18). Step (vii) provides the existential closure of (E), and step (viii) shows that the existential closure of (E) is entailed by its local context, and we correctly predict felicitous elision of (E).

4.3   Polarity reversals are not bidirectional pragmatic entailment: Disjunction polarity reversals

The resourceful reader might at this point object that, instead of jettisoning our familiar bidirectional entailment account, a simpler path is to simply enrich the bidirectional entailment condition to include pragmatic and not merely semantic content. This section shows that a pragmatically enriched bidirectional entailment account still fails to generate the full range of polarity reversal data. Consider example (28) containing disjunction.

(28)   **Context:** Students in a semantics class were given the option to do an extra credit problem, and were required to mark the number of the problem that they did on a spreadsheet accessible by the course's professor and TA. Both the professor and TA thought that John, a student in the class, would have chosen to do a problem. They look

> at the spreadsheet and see that nothing is marked down under John's name. The TA says to the professor:
> **Sluice:** Either [John$_j$ didn't do an extra credit problem]$_A$, or he$_j$ didn't mark which one$_i$ [$_{TP}$ ~~he$_j$ did t$_i$~~]$_E$.

In (28), we see that negation is present in the antecedent but not in the ellipsis site.[28] An utterance of (28) asserts that either (A) John didn't do an e.c. problem or (E) John did an e.c. problem. The disjunction contains contrary propositions: they cannot both be true at the same time. Although we are unable in principle to tell whether the disjunction is inclusive or exclusive, as the two cases collapse in this instance, an inclusive rule of disjunction would fail to make the correct predictions for the update of the local context of (28).[29] The dynamic literature provides an existing rule for exclusive disjunction, however, that we can use in this case (Karttunen 1974, Heim 1983b, Kadmon 2001).

> Disjunction for Propositions:
> For propositions p, q such that p *or* q is uttered in a context c:
>
> c_L for $p = c$,
> c_L for $q = c + (c \smallsetminus p)$

The proposal says that the local context for the first disjunct of an exclusive disjunction construction is the context c of the conversation at the time at which p is uttered. The local context for the second disjunct is c intersected with the complement of the first disjunct. The intuition for this proposal is that the context for the second disjunct must be allowed to include worlds incompatible with the first disjunct, in order to correctly predict that the second disjunct is defined. The following steps show how Local Givenness correctly predicts the availability of the sluice in (28).

(i) Starting Context:
   $c = W$

(ii) Denotation of (A):
   $C(\llbracket A \rrbracket^g) = \{w : \neg \exists x [\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(j)(w)]\}$

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28 Thank you to Jason Merchant (p.c.) for pointing out that these data run counter to the claim made in Merchant 2013a: p. 15 that negation present in the antecedent of a sluicing construction requires a corresponding negation present in the ellipsis site.
29 Note that this fact holds regardless of whether the example contains ellipsis.

(iii) Denotation and Existential Closure of (E):[30]
$$ExClo([\![\text{E}]\!]^g) = \{w : \exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(\text{j})(w)]\}$$

(iv) Local Contexts for (A) and (E):
$$c_{L_A} = c = W$$
$$c_{L_E} = W \cap \{w : \neg\neg\exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(\text{j})(w)]\}$$

(v) Local Givenness:
$$c_{L_E} \subseteq ExClo([\![\text{E}]\!]^g) =$$
$$\{w : \neg\neg\exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(\text{j})(w)]\} \subseteq$$
$$\{w : \exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(\text{j})(w)]\}$$

Local Givenness is satisfied in step (v) because the local context for (E) entails the proposition expressed by (E), assuming a classical logic in which a doubly negated proposition equals its unnegated equivalent. We therefore correctly predict felicitous elision of (E).

The possibility of polarity reversal sluices in disjunction constructions illustrates the necessity of local contextual entailment in the current account. The global context of (28) does not entail the proposition that John did any extra credit problems, as both possibilities — of John having done extra credit problems and of him not having done any — are being entertained as possibilities. It is only in the local context of the second disjunct that the proposition that John did extra credit problems is entailed, as the local context excludes those worlds in which John didn't do any extra credit problems. Furthermore, examples such as (28) show that a pragmatically-enriched bidirectional entailment account is insufficient to explain the polarity reversal data, as no pragmatic enrichment of the semantic content of (A) and (E) in (28) will yield bidirectional entailment of the propositions. Instead, the crucial licensing factor in this example is the disjunctive operator — which contributes its context change potential — and not the propositional content of (A) and (E) themselves.

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30 Note that the *wh*-phrase *which one* is d-linked in the sense of Pesetsky 1987, meaning that it ranges over a salient set in the discourse. One could assume here, following Cinque 1989, that d-linked *wh*-phrases are referential and therefore leave behind a referentially indexed trace. Existentially closing over this trace would then restrict the possible identity of the thing to which the existentially bound variable can refer to a member of a particular set present in the discourse. However, as the d-linking is orthogonal to the example here, I suppress this issue for the sake of expositional clarity.

4.4 Polarity reversals are not entailment at LF: More disjunction

I have so far addressed concerns that the polarity reversal examples might be explained by appeals to syntactic accounts of neg-raising or to a pragmatically enriched bi-directional entailment account, and I have shown that both possibilities fail to account for the entirety of the polarity reversal data. A third possibility is that negation is scoped out of the relevant antecedent at logical form. Proponents of this view might argue that the example above is derived using the following LF form:

(29)   Either [not [John$_j$ did an extra credit problem]$_A$], or he$_j$ didn't mark which one$_i$ [$_{TP}$ ~~he$_j$ did t$_i$~~]$_E$.

In such a construction, a standard bi-directional entailment account would predict the possibility of the sluice.

There are two reasons why this possibility does not save a bi-directional entailment account. First, it has for some time been observed that the scope of negation is fixed by its surface position, unlike quantifiers and modals (see an early discussion in Ladusaw 1988 and more recent discussions in Iatridou & Sichel 2011 and Potsdam 2013). That is, negation does not raise or lower at LF. Second, polarity reversal examples are also found in which negation is added into the ellipsis site. For example, the modified corpus example in (30):[31]

(30)   [modified corpus example]
        Context: On Dec. 10, Senator McCain sent a letter to the FCC urging the five-member board to end two years of deliberations and decide whether Paxson Communications should be given a license for a Pittsburgh station. Angela J. Campbell, an attorney for opponents to the deal, told the Globe that McCain's letter likely 'tipped' the scales in favor of the decision.
        Sluice: "Senator McCain said, 'Either the Board grants the license by December 15 or it explains why [~~the Board did not grant the license by December 15~~]' and the commission jumped to it and did it that very day," Campbell told the Globe.

This example contains a positive antecedent and a negative elided phrase, the reverse of (28). There is no possibility of scoping the negation out of the

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elided phrase; because it is unpronounced, the negation is uncontroversially inside of the ellipsis site. The following steps apply Local Givenness to the disjunction in (30).

(i) Starting Context:
$c = W$

(ii) Denotation of (A):
$C(\llbracket A \rrbracket^g) = \{w : \textbf{grant the license by December 15}(b)(w)\}$

(iii) Denotation and Existential Closure of (E):
$ExClo(\llbracket E \rrbracket^g) = \{w : \neg\textbf{grant the license by December 15}(b)(w)\}$

(iv) Local Context for (A) and (E):
$c_{L_A} = c = W$

$c_{L_E} = W \cap \{w : \neg\textbf{grant the license by December 15}(b)(w)\} =$
$\{w : \neg\textbf{grant the license by December 15}(b)(w)\}$

(v) Local Givenness:
$c_{L_E} \subseteq ExClo(\llbracket E \rrbracket^g) = \{w : \neg\textbf{grant the license by December 15}(b)(w)\} \subseteq$
$\{w : \neg\textbf{grant the license by December 15}(b)(w)\}$

Local Givenness is satisfied in step (v) because the local context for (E) entails the proposition expressed by (E,) as they express identical propositions. We therefore correctly predict felicitous elision of (E).

4.5 Failure to license

This section provides an example of the account's ability to correctly rule out an impossible ellipsis site. Examples (28) and (31) contain minimally different contexts and sluices; however, while the sluice in (28) is acceptable, the sluice in (31) is not.

(31)   **Context:** Students in a semantics class were given a set of extra credit problems, which they could choose to do up to half of. All students were required to put a mark on a spreadsheet next to each question, indicating whether they did or didn't do it. The professor and TA look at the spreadsheet and see that John has not put a mark next to all of the questions. The TA says to the professor:
Impossible Sluice: [John$_j$ marked which problems he did]$_A$, but he$_j$

didn't mark which problems$_i$ #([he$_j$ didn't do t$_i$])$_E$.

While the example is acceptable in its un-elided form, the sluiced interpretation given in (31) is impossible. We predict this result because the conjunction in (31) does not yield the same local context for the second conjunct as the disjunction does in (28). Recall our dynamic rule of conjunction stated above, which is motivated in the literature on presupposition projection in conjoined clauses: $c + (p \wedge q) = (c + p) + q$. Because the local context for the elided phrase contains the global context plus the proposition expressed by (A), $\{w : \exists x[\mathbf{PL}(x)(w) \wedge \mathbf{problem}(x)(w) \wedge \mathbf{mark}(x)(\mathrm{j})(w) \wedge \mathbf{do}(x)(\mathrm{j})(w)]\}$, the local context clearly does not entail the proposition expressed by (E), $\{w : \exists x[\mathbf{PL}(x)(w) \wedge \mathbf{problem}(x)(w) \wedge \neg\mathbf{do}(x)(\mathrm{j})(w)]\}$. Local Givenness is therefore not satisfied and we correctly predict the infelicity of the sluice in (31).

This section has discussed the possibilities of accounting for the polarity reversal sluices with a bidirectional semantic entailment account, a bidirectional pragmatic entailment account, and accounts that scope negation outside of the relevant antecedents either syntactically or at LF. I have shown that none of these possibilities can capture the full scope of the polarity reversal examples. I have additionally shown that a contextual entailment condition like Local Givenness successfully accounts for the full range of examples. The next section addresses concerns that have historically been levied against non-structural ellipsis licensing conditions.

5   Structural constraints on sluicing

The analysis that has been proposed so far is necessarily more permissive than existing syntactic or semantic entailment accounts of sluicing. While this additional permissiveness is required in order to capture the structural and semantic differences between the preceding linguistic context and the elided phrases in polarity reversal sluices, it also invites concerns of overgeneration. There are two ways Local Givenness can avoid these concerns. The first is to follow existing accounts in combining the contextual constraint of Local Givenness with an independent syntactic constraint. Section 5.2 outlines what such a syntactic constraint would need to look like. While this approach is promising, §5.3 shows that even combining Local Givenness with a syntactic constraint does not yield a theory sufficient to capture the data.

Instead, some notion of salience must also be integrated into the account. Because a salience constraint is independently necessary, §5.4 proposes a way in which we might define a notion of propositional salience for ellipsis.

5.1 Data motivating syntactic constraints on sluicing

A concern levied at non-structural analyses of sluicing is that they fail to capture certain identity requirements of sluicing constructions that appear to have a syntactic basis. One of these requirements is case matching, which was first noted in J. R. Ross 1969 and is discussed at length in Merchant 2001. Case matching is the generalization that the remnant in a sluiced construction must match in case with its correlate. Merchant 2001 accounts for this behavior by proposing that the correlate is assigned case in the elided structure, before movement. The case matching facts are then an argument for the existence of syntactic structure in the elision site. Because I adopt the position that the elision site contains syntactic material, Merchant's account of case matching applies equally to the pragmatic theory outlined in this paper as it does to his own account of bidirectional semantic entailment.

A second identity condition on sluicing that is argued to require a syntactic explanation is what is known as Chung's Generalization (Chung 2013). The Generalization states that a preposition can be stranded by a remnant in the ellipsis site only when the remnant corresponds to syntactic material in the antecedent clause. This Generalization captures the paradigm in (32)-(34).

(32) [John is flirting]$_A$, but I don't know with who$_i$ [~~John is flirting t$_i$~~]$_E$.

(33) [John is flirting]$_A$, but I don't know #who$_i$ [~~John is flirting with t$_i$~~]$_E$.

(34) [John is flirting with someone]$_A$, but I don't know who$_i$ [~~John is flirting with t$_i$~~]$_E$.

As Chung pointed out, the facts in (32)-(34) present a difficulty for meaning-based accounts relying only on entailment licensing conditions: if we assume that the act of flirting entails the act of flirting with someone and vice versa, then bidirectional semantic entailment holds between the antecedent and elided clauses in (32)-(34). A meaning-based entailment condition would therefore fail to rule out the impossible sluice in (33). Since these observations, researchers advocating for meaning-based licensing conditions have opted to include a structural constraint in their theory in order to account for these facts. The next section discusses some ways in which this has been

undertaken, and proposes a path forward that unites structural constraints of sluicing with Local Givenness.

5.2 Local Givenness plus structural constraints

Since Chung's observations of the facts above, meaning-based accounts have incorporated an independent structural constraint to account for the data. For example, AnderBois 2014 follows Merchant 2007 in using the constraint No New Morphemes, which states that the morphemes contained within the elided expression of a sluice must be a subset of the morphemes contained within the antecedent expression. The polarity reversal data show us, however, that No New Morphemes cannot be the generalization needed. For example, (30) contains a negation morpheme in the ellipsis site that is not present in the antecedent site. The morphemes contained within the ellipsis site are therefore not a subset of the morphemes contained within the antecedent, in opposition to the predictions of No New Morphemes.

While No New Morphemes is not the formulation we need, it is still possible to adopt a limited syntactic identity constraint that works in conjunction with Local Givenness to account for the facts. Such a path follows Chung 2013, Merchant 2013b, Barros 2014, and AnderBois 2014 in proposing a theory that relies on limited structural constraints in conjunction with a contentful meaning-based licensing constraint. One obvious way to proceed is to adopt into the current account Chung's more finely articulated constraints on which No New Morphemes is based. Chung proposes two constraints, given in (35):

(35)   Limited Syntactic Identity in Sluicing:

 (i) Argument structure condition: If the interrogative phrase is the argument of a predicate in the ellipsis site, that predicate must have an argument structure identical to the corresponding predicate in the antecedent clause.

 (ii) Case condition: If the interrogative phrase is a DP, it must be Case-licensed in the ellipsis site by a head identical to the corresponding head in the antecedent clause.

Merchant 2013b operationalizes these conditions to account for both verb phrase ellipsis (VPE) and sluicing facts by proposing a limited syntactic identity condition that holds between syntactic heads within an ellipsis site and

syntactic heads within some preceding structure. While not aware of the polarity reversal data, Merchant's account proposes that the syntactic identity condition for sluicing holds over a greater swath of syntactic structure than it does for VPE. Specifically, that sluicing requires syntactic identity from the bottom of the tree to a head above Voice, while VPE only requires matching from the bottom of the tree to vP.

While Merchant leaves open the exact formulation of the limited syntactic identity constraint needed, Rudin 2019 and Kroll & Rudin n.d. propose one possible implementation of Chung and Merchant's ideas. The account proposes that syntactic identity holds only over heads within the eventive core of the elided clause, namely heads including and below the highest vP that is associated with an event-introducing verb. Crucially, because the syntactic identity condition holds only over the eventive core of the elided clause (bolded in (36)), any mismatch in structure or lexical material is allowed above the highest vP domain. This account correctly predicts the possibility of polarity mismatches, as polarity nodes are located above the highest vP domain (Laka 1990, Ladusaw 1992). For example, (2) is repeated as (36).

(36)   I don't think that [California will comply]$_A$, but I don't know why [~~California won't comply~~]$_E$.

   A: [$_{TP}$ California [$_T$ will [$_{PolP}$ **[$_{vP}$ [$_{VP}$ comply]]**]]]]
   E: [$_{TP}$ California [$_T$ will [$_{PolP}$ not **[$_{vP}$ [$_{VP}$ comply t]]**]]]]

The account also correctly rules out the data violating Chung's generalization. It is clear in (33) that the elided PP has no syntactically matching antecedent in the preceding discourse, and therefore violates the limited syntactic identity condition.[32]

In summary, one way to deal with Chung's facts is to follow previous accounts and integrate into Local Givenness an independent limited syntactic identity constraint, as proposed in Chung 2013 and Merchant 2013b. Rudin 2019 and Kroll & Rudin n.d. argue that their account presents one possible way of doing this. However, Local Givenness need not rely on any particular formalization of the syntactic facts discussed here. The data have presented tenacious challenges for purely meaning-based approaches to sluicing ever since the original observations. As Merchant 2013b states, the exact form of a

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32 Note that traces are not included in the structure-matching requirements of the theory. See Rudin 2019 for an extensive defense of these claims.

syntactic identity formulation for ellipsis remains to be fully explicated, and the proposal here is not intended to advance this particular line of research. I hope merely to point out the arguments that have been presented in favor of combining meaning-based sluicing accounts with a limited syntactic identity condition. Ultimately, any limited syntactic identity constraint that captures the facts is in principle available to us. The contribution of the current proposal is to observe that such a constraint, whatever its exact formulation, must be permissive enough to allow for high syntactic mismatches such as polarity.

5.3   Structure plus pragmatics: A full picture?

In the previous section, we saw arguments for integrating an independent limited syntactic constraint into a meaning-based licensing account. This section shows that combining a meaning-based account with a syntactic constraint is still not sufficient to alleviate over-generation concerns. Consider (37a)-(37b) (Cantor 2013). In the desired interpretations, the remnants *who* are linked to a discourse referent that was introduced, via *some pedestrian*, within a discourse subordinated relative clause:

(37)   a.   #That John rented a car that hit some pedestrian surprised every-one, but the report didn't say who$_i$ [~~that John rented a car that hit t$_i$ surprised everyone~~].
         b.   #A car that hit some pedestrian crashed into the wall last night, but the report didn't say who$_i$ [~~a car that hit t$_i$ crashed into the wall last night~~].

Although (37a)-(37b) have matching linguistic antecedents, satisfy Local Given-ness, and do not violate any of the discussed syntactic constraints, the sluices are easily judged to be infelicitous. Any theory that licenses sluiced clauses based only on the existence of an appropriately matched antecedent will therefore fail to rule the examples out.

   The notable property of the examples is that they become acceptable with the d-linked remnant *which pedestrian*, shown in (38) (Cantor 2013: p. 27-28):

(38)   a.   That John rented a car that hit some pedestrian surprised every-one, but the report didn't say which pedestrian$_i$ [~~that John rented a car that hit t$_i$ surprised everyone~~].

b. A car that hit some pedestrian crashed into the wall last night, but the report didn't say which pedestrian$_i$ [a̶ ̶c̶a̶r̶ ̶t̶h̶a̶t̶ ̶h̶i̶t̶ ̶t̶$_i$̶ ̶c̶r̶a̶s̶h̶e̶d̶ ̶i̶n̶t̶o̶ ̶t̶h̶e̶ ̶w̶a̶l̶l̶ ̶l̶a̶s̶t̶ ̶n̶i̶g̶h̶t̶].

I argue that d-linking the remnant in (38) increases the acceptability of the sluice by providing an overt cue to the proposition that must be recovered. That is, the d-linked referent signals that the elided proposition contains an extracted argument with the semantic and syntactic properties given by the remnant, thereby making the most recent propositional content given about that argument salient at that point in the discourse (see Martin & McElree 2011 and Harris 2019, a.o.). For comparison, the most salient correlate for the remnant in (37) is, due to a combination of recency and discourse status (Jarvella 1971, van Dijk & Kintsch 1983, Kintsch 1988, Anderson 2007, a.o.), *everyone*, which leads to an infelicitous interpretation of the question.

The ability of a d-linked remnant to link to a discourse subordinated correlate more easily than a bare wh-remnant is perhaps not surprising given the many years of careful experimental and theoretical work on related phenomena. Though I remain agnostic here about the particular analysis of d-linked phrases one may wish to take, the data here fit naturally with studies of anaphors showing that the more semantic content an anaphor has, the greater the distance that may separate the anaphor from its antecedent and the less prominent the antecedent can be while still maintaining successful reference (Givón 1983, Ariel 1990, Gundel, Hedberg & Zacharski 1990, O'Brien et al. 1997, Foraker & McElree 2006). The related observation that the amount of semantic information in an extracted element appears to affect its ability to be felicitously extracted has also been made in the theoretical literature (Karttunen 1977, Rizzi 1990, Cinque 1990, Pesetsky 1987, Chung 1994, Hofmeister 2007, 2011, a.o.).[33] While these questions are still the subject of active research, I bring them up to demonstrate that the sluicing data fit within a much larger research project of the role of salience in anaphoric and syntactic dependencies in language.

Examples like (38) demonstrate that structural and contextual/antecedent licensing requirements by themselves are not enough to constrain a theory of sluicing sufficiently to avoid overgeneration. This observation is not a novel one, and has been made by many previous researchers working on ellipsis. Because of this, explicit salience requirements are built into most if not all existing sluicing accounts, including each sluicing theory discussed in §2. For

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33 Thank you to Shayne Sloggett (p.c.) for bringing these works to my attention.

example, e-GIVENness (Merchant 2001) requires that the elided constituent have "a salient antecedent," Inquisitive Entailment (AnderBois 2014) requires "some salient antecedent CP," and Barker 2013's scopability analysis requires "a silent proform that is anaphoric to some salient discourse object" (pg. 193). The thread tying all these accounts together is the recognition that salience is intricately tied to our ability to elide and recover propositional or sub-propositional expressions in conversation.

One option here is to follow in the footsteps of these analyses and build a notion of salience into Local Givenness. This constraint is given in (39).

(39)   Local Givenness (final): A TP α can be deleted *iff* $ExClo(\llbracket \alpha \rrbracket^g)$ expresses a proposition p, such that $c_L \subseteq p$ and p is maximally salient.

The final version of Local Givenness proposes that a proposition can be elided if the existential closure of the proposition is entailed by the local context and is maximally salient.[34] The requirement that the elided proposition must be maximally salient is motivated by the common sense principle that in order for a speaker to felicitously not pronounce some part of an utterance, the meaning of the unpronounced piece of the utterance must be recoverable in the discourse. Put another way, this principle encompasses the idea that the content of an elided phrase must be sufficiently salient in the discourse such that it is recoverable in the discourse even though it is unpronounced.[35]

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34 An earlier version of this theory used *uniquely* salient; this was changed after a reviewer asked about ambiguous readings of sluices such as in (i):
(i) John told me that Mary is going to Canada, but I don't know why [ ].
     a. why John told me Mary is going to Canada
     b. why Mary is going to Canada
There are two possibilities for capturing these facts. The first is that the ambiguity is one of the context and, as is the case with anaphoric dependencies, the salience of (a) and (b) are partially established by non-linguistic top-down information such as conversational goals and expectations (Brown-Schmidt, Byron & Tanenhaus 2005). Under this view, either (a) or (b) is maximally salient in a given context. The second possibility is that in a given context both (a) and (b) are equally salient, in which case propositional salience can be modeled formally as a partial order in which both (a) and (b) are maximally salient. I am in principle open to either of these possibilities, and leave the decision of which more accurately captures the data to future research.

35 A reviewer brings up Hartman 2009's asymmetrical sluicing examples:
(i) [Someone won the chess game]$_A$, but I don't remember who #[~~lost the chess game~~]$_E$.
While (A) and (E) are generally considered denotationally equivalent, the account here does not predict that any proposition denotationally equivalent to (A) can be elided. This type of

I have argued that any theory of ellipsis must include some notion of salience in order to account for facts that cannot be explained by contextual, antecedent-based, or syntactic licensing conditions. As an exercise in parsimony, we might wonder whether a salience constraint can also capture certain facts that have been proposed to be syntactic in nature, such as the Case condition and the Chung's Generalization facts. Chung 2013: pp. 48 argues for the Case condition based in part on the data in (40):

(40)   #The message said [to show up in the square at midnight]$_A$, but it didn't say who$_i$ [t$_i$ ~~should show up in the square at midnight~~]$_E$.

While the remnant here is a subject of a finite clause and will be assigned Case by the finite T in the ellipsis site, the corresponding T in the antecedent clause is non-finite and therefore will not assign case (antecedent bracketing and labelling my addition). However, naïve speakers judge (40) to be perfectly felicitous in the following constructed context:

> **Scenario:** There are two gangs fighting for turf, the Sharks and the Jets. After a verbal spar at the gym, the two gangs decide that each gang is going to send a single member to fight at a particular location and at a particular time in two nights time. Each gang gets to pick the member of the other gang that will fight. Additionally, the Sharks get to pick the time of the fight and the Jets get to pick the location of the fight. That night, the Jets send a message to the Sharks telling them to send the Shark gang leader to the West Side Square for the fight. The next night, the Jets receive a message from the Sharks in return. A Jet member opens the message and reads it. He says to the other members in an annoyed voice:
> **Sluice:** "the message says to show up at the Square at midnight, but it doesn't specify who."

The judgment given for the continuation of the sluice is "who [should show up at the Square at midnight]." The discourse was constructed in such a way as to preclude the possibility that an antecedent for the sluice could be

observation is what motivates salience requirements in ellipsis theories. See §6 for further discussion of salience and ellipsis. Thank you to a different reviewer for pointing out that these examples are given an alternative analysis in Merchant 2018: ft. 10, in which the mutual entailment condition of e-GIVENness is replaced by semantic equivalence modulo focus. However as the reviewer notes, this analysis is still too restrictive to account for the polarity reversal cases discussed here.

found not in the preceding sentence, but in the preceding discourse.[36] If the infelicity of (40) is truly rooted in syntactic ill-formedness, as the Case condition claims, it is unclear why the example becomes acceptable in context. A salience condition could possibly explain why additional context facilitates the sluiced structure.

A detailed analysis of the Chung's Generalization facts, given in (32)-(34), is unfortunately outside the scope of the current paper. However, it is plausible that the $ExClo(\llbracket E \rrbracket^g)$ in (33) satisfies the entailment condition of Local Givenness but fails to satisfy its salience condition, which is based not on entailment but on the prominence of the proposition expressed by (E) in the discourse. I leave this interesting question as an area of future research.

5.4 Salience

I have followed previous accounts by including a salience constraint in Local Givenness to account for certain facts that are not explained under purely meaning or structure-based accounts. I have also tentatively suggested that such a constraint can be expanded to encompass certain facts that have previously been attributed to constraints on syntactic structure. Because I have motivated the inclusion of a salience condition into Local Givenness, it is worth discussing what such a condition would look like and whether we can constrain it enough to have predictive power. Determining the salience of a given proposition is, of course, not trivial. This paper does not attempt to provide an exhaustive theory of salience, which remains a challenging and important continuing line of research. Instead, I argue here for two points: that salience is indeed relevant to sluicing, and that a theory of propositional salience can be constrained in such a way as to offer concrete, testable predictions. The reader who is already familiar with these facts or is uninterested in accounting for salience can safely skip this section.

While there is currently no rigorous definition of what is means for a given proposition to be salient enough to license ellipsis, some existing theories encode salience in discourse organizational terms. For example, Ginzburg & Sag 2001 and Barros 2014 encode the notion of salience as relevance to a Question under Discussion (QuD) (Roberts 1996, Ginzburg 1996, Roberts 2012),

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36 Pseudosluicing is a possible explanation for the lack of case connectivity effects observed here. However, such an argument would need to explain why pseudosluicing is not freely available in English and why this strategy would only be available here in a specific context. See discussion in §6.

and require the interpretations of sluices to be resolved to a Maximal Question under Discussion.[37] Similarly, Frazier & Clifton 2005 encode salience in the notion of main assertion. They claim that, ceteris paribus, comprehenders prefer to resolve ellipsis and anaphoric expressions to the main assertion of the preceding sentence (see also Syrett & Koev 2014). In their proposal, this preference follows from the greater salience, or availability, of the main assertion in the discourse structure.

Another linguistic phenomenon known to be sensitive to discourse organization and salience is anaphora. For example, the anaphor *that* is known to specifically license propositional anaphora of salient propositions (Webber 1988, Gundel, Hedberg & Zacharski 1990, Asher 1993, a.o.). As we see in (41), B's response is more easily interpreted as a reply to the matrix assertion about Diane winning the race than it is as a reply to the claim about her age, contained in the discourse subordinated appositive.

(41)   A: Nancy, who's 79 years old, will lose the race.
         B: That's not true!

We can tentatively note that this type of anaphoric reference to the sluiced content is also possible in the polarity reversal cases, as shown in (42).[38]

(42)   A: I don't know why [~~I wasn't scared~~]$_i$, but I really can not remember being scared.
         B: That$_i$'s impossible! You were just a child.

In (42), the deictic demonstrative *that* is anaphoric to the sluiced proposition expressed by *I wasn't scared*. That is, the meaning of the first sentence in B's utterance is "It's impossible that you weren't scared."[39] The ability to pick out the elided proposition with an anaphor that selects salient propositions provides independent evidence that, at least in the example above, the elided proposition is salient in the context.

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37 Ginzburg & Sag also have an explicit salience requirement, SAL-UTT, that requires a salient utterance to serve as the correlate for sluicing constructions.

38 The ability of elided content to contribute antecedents for discourse anaphora has been widely documented in the literature, notably in Hankamer & Sag 1976.

39 We do not predict or expect, of course, a one-to-one correspondence between propositions that can be anaphorically referred to with *that* and propositions that can be sluiced. Additional requirements exist on sluicing that do not exist on *that*, such as entailment. The set of propositions that can be sluiced and that can be referred to with *that* are likely overlapping but not identical sets (see Kroll 2019).

Additional experimental and theoretical work on anaphora and ellipsis can also inform ways in which we can constrain our notion of salience. A reviewer points out the following contrast:

(43)   a.   Sue bought a car. It's blue. ?/#I'm not sure where, though.
       b.   Sue bought a car that is blue. I'm not sure where, though.

While the sluice is acceptable in (b), it is not in (a). It seems natural to attribute the difference to a matter of salience, as the reviewer suggests. And indeed, existing work on salience can help us understand why the first proposition is more difficult to target in (a) than in (b).

One way to explain such data is to appeal to a Frazier & Clifton-style account. Such an account predicts the availability of the sluice *I'm not sure where* [~~she bought a car that is blue~~] in (b), since the buying event is the main asserted content of the preceding sentence. That account would also rule out the sluice *I'm not sure where* [~~she bought a car~~] for (a), since the sentence *It's blue* intervenes between the sluice and its antecedent. However, many authors working on the relevance of discourse relations and structure to anaphora resolution and ellipsis have observed that, although recency is a strong tendency, it does not always hold that the most recently encountered proposition contains the most salient topic (Hobbs 1978, Polanyi 1986, Webber 1988, Asher 1993, Kehler 2002, Asher & Lascarides 2003, Hardt & Romero 2004, Asher 2008, Harris 2015, a.m.o.). For example, in (44) the elided content is about Mary kissing someone, not about John leaving (Asher 2008: 9a):

(44)   Mary kissed someone because John left for some other party. You'll never guess who.

To account for such data, Hardt & Romero 2004 propose a Discourse Condition on Ellipsis Resolution, in which an antecedent clause must locally c-command the elided clause in the discourse tree. While Local Givenness cannot directly integrate such an account, as the theory has no explicit antecedent clause, the force of the proposal is to enforce a kind of local Right Frontier Constraint[40] on a sluiced clause, which in turn requires the elided proposition to be salient or "on topic." Asher 2008 takes this approach to

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40 The Right Frontier Constraint (see Polanyi 1986, Webber 1988, Asher 1993, Asher & Lascarides 2003, a.m.o.) is a discourse structure constraint requiring new discourse constituents to attach into an existing discourse only by attaching to the last simple constituent in the discourse or by attaching to any constituent that dominates the last simple constituent in the discourse. This constraint, very roughly, captures some notion of topicality.

data such as (44), and proposes that the Right Frontier Constraint holds for sluiced and VPE clauses. Asher's theory of sluicing resolution requires two things: that the elided material of a clause be recovered from the discourse constituent that the clause is attached to, and that the ellipsis clause be attached to the antecedent clause by at least the structural relations Parallel or Contrast.

One interesting consequence of the Hardt & Romero 2004 and Asher 2008 theories is that, similar to a Frazier & Clifton-style account, they impose a type of locality restriction on sluiced clauses. Constraining where in the discourse an elided clause can attach forces the elided clause to be "about", in an atheoretical sense, a recent proposition in the discourse. Asher and Hardt & Romero argue convincingly that the locality constraint is not sensitive to mere discourse constituent adjacency (i.e. recency), but to the richer representations given by theories of discourse relations. However, these constraints still result in a strong advantage given to the last discourse constituent introduced in the discourse, such that we generally try to resolve the ellipsis site to modifying the most recent constituent in the discourse. For example, in (43a) the oddness of the sluice disappears once the remnant is one that can plausibly be about the same topic as the previous proposition:

(45)   Sue bought a car. It's blue. I'm not sure on what parts [~~it's blue~~], though.

I have outlined here some possible ways to constrain a theory of propositional salience in relation to sluicing. I am not arguing that an appeal to discourse relations will completely capture the full array of facts. However, theories of discourse relations are one existing way of spelling out in some detail what a theory of propositional salience may look like. I hope in this section to have convinced my reader of two things: that salience is indeed relevant to sluicing, as has been argued by many researchers before, and that a theory of salience can be constrained in such a way as to offer concrete, testable predictions. The discussion here presented some possible avenues for future research that operationalize propositional salience using two factors: the recency of discourse constituents, and the discourse status of propositions within an articulated framework of discourse organization and relations.

6 Non-isomorphic sluicing

A reviewer mentions the possibility that the sluices discussed here are derived not by the underlying syntactic structure presented in this paper, but by some alternative, smaller structure that is pragmatically licensed by Local Givenness. Since we cannot see what is elided in ellipsis constructions, we oftentimes cannot argue with certainty that the form proposed is indeed the actual underlying linguistic structure. However, previous research has laid out a landscape of possibilities for possible "short form" sluices, more generally called non-isomorphic sluices. This section discusses these possibilities and shows that, while it is possible that some polarity reversal sluices are of the non-isomorphic variety, it is implausible that all polarity reversal sluices are non-isomorphic. Therefore, at least some of the polarity reversal sluices presented here must have a richer underlying structure.[41]

6.1 Types of non-isomorphic sluices

The possibility of non-isomorphic sluicing was first noted by Pollmann 1975 and Erteschik-Shir 1977. Much of the discussion since centers on the debate over whether or not sluicing ameliorates islands. For example, (46) is judged as acceptable, but under an isomorphic reading contains extraction of the remnant from within a relative clause island (Merchant 2001: p. 152):

(46)   They want to hire someone who speaks a Balkan language, but I don't remember which Balkan language$_i$ [~~they want to hire someone who speaks t$_i$~~].

Theories of non-isomorphic sluicing propose that, instead of the elided content in (46), such putatively island-violating examples are instead derived from a non-island-containing elided structure, such as that given in (47):[42]

(47)   They want to hire someone who speaks a Balkan language, but I don't remember which Balkan language$_i$ [~~it was t$_i$~~].

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41 Alternatively, it could be possible that the polarity reversal cases embody some new form of ellipsis that is separate from those that are described as sluices in the literature. I am however unaware of any convincing argumentation to motivate this view.

42 I follow Vicente 2018 in using *pseudosluicing* in the strictest sense in which it is used in the literature, though the term is sometimes also used as a general term for non-isomorphic sluices.

Because the elided clause does not contain a relative clause, we avoid any concerns about extraction from within an island.

There are three main types of non-isomorphic sluices: pseudosluices, copula clause deletion, and cleft deletion. The first type, pseudosluices, which are characterized by a null copula and a null subject instead of by TP deletion (Vicente 2018), has been argued to exist in Japanese (Kizu 1997, Merchant 1998) and in Uzbek (Gribanova 2013). However, it is not argued to exist in English, and so will not be discussed here (Vicente 2018). The second group of non-isomorphic sluices contains those characterized by copular clause deletion.[43] Copular clause deletion is proposed by Barros, Elliott & Thoms 2013 to be available as an island-evasion strategy for sluicing in English. For example, in (48a) the elided structure is argued to contain a predicational copular clause, instead of an isomorphic left branch extraction as in (48b) (ibid., 28):

(48)   a.   Mary married a tall man, but I'm not sure how tall$_i$ [~~he was t$_i$~~].
       b.   *Mary married a tall man, but I'm not sure how tall$_i$ Mary married a t$_i$ man.

The last group of non-isomorphic sluices are those derived by the deletion of a cleft (Erteschik-Shir 1977, Pollmann 1975, Rosen 1976, Merchant 2001, van Craenenbroeck 2010). For example, (49a) avoids the sentential subject extraction violation of (49b) by eliding a cleft instead of an isomorphic island structure (Vicente 2018: p. 33-34). This strategy is limited, however, and is not available with wh-adjuncts or implicit arguments, as illustrated in (50) (Merchant 1998: 53a).

(49)   a.   That they will hire someone is possible, but I don't know who [~~it will be~~].
       b.   *That they will hire someone is possible, but I don't know who$_i$ that they will hire t$_i$ is possible.

(50)   He fixed the car, but I don't know why *[it was].

6.2   Polarity reversals cannot be reduced to non-isomorphic sluices

The last subsection provided a brief summary of the non-isomorphic strategies available for sluicing in English. This section shows that no combination of these possibilities can extend to the full range of polarity reversal sluices.

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43 I consider here only predicational copular clauses. See Rodrigues, Nevins & Vicente 2009 and Kroll 2019 for discussion of specificational copular clauses.

Let's take the polarity reversal example given in (51). I have proposed that the elided content contains the structure as shown here.

(51)   **Context:** Students in a semantics class were given the option to do extra credit problems, and they were required to write down the number that they did on a spreadsheet accessible by the course's professor and TA. Both the professor and TA thought that John, a student in the class, would have done at least some extra credit problems. They look at the spreadsheet and see that nothing is marked down under John's name. The TA says to the professor:
Sluice: Either John$_j$ didn't do any extra credit problems, or he$_j$ didn't tell us how many (extra credit problems) [he$_j$ did].

As we saw in the previous section, there are two non-isomorphic strategies available for us to use here: copular clause deletion and cleft deletion. However, both the copular clause example in (52) and the cleft example in (53) are judged by speakers to be degraded or unacceptable, suggesting that these strategies are unavailable for this example.[44]

(52)   John$_j$ either didn't do any extra credit problems, or he$_j$ didn't tell us how many ??/*[the number he did was].

(53)   John$_j$ either didn't do any extra credit problems, or he$_j$ didn't tell us how many ?*[it was].

Merchant 2001 observes that one possible way to improve clefting examples containing adjuncts is to retain the presuppositional portion of the cleft. Merchant does not propose an explanation for why retaining the presuppositional material improves some adjunct clefts, but we should be cautious when proposing an explanation that is based on the presence of overt or non-overt material within an ellipsis site. Regardless, retaining the presupposition material for our example in (54) improves the example slightly, but it is still judged by speakers to be significantly degraded.

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44 Note that we are not ruling these examples out based on the Well-Formedness Condition, which is concerned with pragmatic well-formedness. Non-isomorphic strategies are proposed in part to counter the claim that ellipsis ameliorates islands; therefore, non-isomorphic theories assume that an underlyingly ungrammatical structure will lead to an ungrammatical sluice. Thus the ungrammaticality of a pre-sluice is used to predict whether or not that structure is available as the structure in a sluiced clause.

(54)   John$_j$ either didn't do any extra credit problems, or he$_j$ didn't tell us how many ??[it was that he$_j$ did].

A reviewer brings up contrast sluices as another way of probing the presence of non-isomorphic structure. They note that contrast sluices with *else* create a semantic clash between the presuppositional properties of *else* and the exhaustivity requirement of a cleft construction (that is, the uniqueness requirement that clefts impose on the correlate). Therefore, if contrast polarity reversal sluices exist, they provide evidence against a clefting non-isomorphic strategy. This is indeed what we find, as contrast sluices are easily constructed with the polarity reversal property, as in (55).

(55)   Q: Do any of the candidates practice for their debates?
       A: I don't think that BERNIE practices for them, but I don't know who ELSE$_i$ [t$_i$ ~~doesn't practice for them~~].

As predicted, (55) is not acceptable with a clefting strategy, as shown in (56a). Retaining the presuppositional material in (56b) does not improve the example.

(56)   a.   I don't think that BERNIE practices for them, but I don't know who ELSE *[it was].
       b.   I don't think that BERNIE practices for them, but I don't know who ELSE *[it was that doesn't practice for them].

For completeness, we might wonder whether this particular example can be attributed to a copular non-isomorphic strategy instead, since a clefting strategy is unavailable. However, (57) shows that not only is such an example unacceptable, it is also not a copular construction that has been proposed or shown to be available for non-isomorphic sluicing.

(57)   I don't think that BERNIE practices for them, but I don't know who ELSE *[is someone that doesn't practice for them].

6.3   Conclusion

I have shown in this section two different polarity reversal examples that cannot be explained by non-isomorphic sluicing strategies. While this demonstrates that the polarity reversal data as a whole cannot be subsumed under a non-isomorphic sluicing analysis, I am not making the strong claim that no

polarity reversal sluices can be non-isomorphic. There are strong arguments for the existence of non-isomorphic sluices in the literature, and I have no basis from which to argue that polarity reversal sluices somehow form an exception to these arguments. Indeed, Barros, Elliott & Thoms 2013 point out that their observations challenge accounts of sluicing that require isomorphy or strict syntactic and/or semantic equivalence between an antecedent and a sluicing site. Far from being a challenge to the current theory, the non-isomorphic sluicing data provide further support for the argument presented here, which is that a complete theory of sluicing must be more permissive than current theories allow.

7 Conclusion

This paper has presented and discussed polarity reversal sluicing data that present a new challenge to the enterprise of determining the conditions under which linguistic content can be felicitously elided. This paper argues that, counter to its dominant treatment in the syntactic literature, sluicing is a pragmatics-sensitive phenomenon subject to contextual licensing. I show that the ability to elide linguistic content fits naturally into general theories of constraints regulating coherent discourses, and have detailed one way to account for the pragmatic sensitivity of data that present serious challenges for non-pragmatic theories.

A natural topic of exploration is whether and to what extent a pragmatic account can be extended to different forms of ellipsis. For example, there is some evidence that the polarity reversal phenomenon can also be found in VPE (from Jim McCloskey, p.c.):

(58) **Context:** In an internet discussion of the controversial political book *Fire and Fury*, which some discussants argue did not properly document all its claims:
      Commenter: "Much of the book is unsourced, but some is [~~sourced~~]."

It remains to be determined whether or not current analyses can account for cases of polarity reversals under VPE, if such examples are indeed robust. I leave this interesting question for future research and close by noting that, while the current project seeks both to challenge current assumptions on sluicing and to provide an answer to this challenge, much additional work on the road to developing a complete theory of sluicing and ellipsis, of course, remains.

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