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 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 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) below.

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

Whether there is syntactic material present in the ellipsis site of sluicing constructions is debated in the literature (see e.g. Hardt 1993, Chung et al. 1995, Ginzburg & Sag 2001, Barker 2013, a.o.). This paper will not bear directly on this question, and assumes an account of underlying syntactic structure elided at phonological form (PF) as presented in Merchant (2001). The focus of this paper is a discussion of a previously unnoticed class of sluices that I refer to as *polarity reversal sluices*.[1] Polarity reversal sluices are constructions in which the presumed antecedent content (A) and the ellipsis site (E) differ in polarity. For example, the antecedent in (2) below, *Trump will comply*, has positive polarity while the interpretation of the ellipsis site, *Trump won't comply*, has negative polarity.[2]

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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 between an antecedent and ellipsis site.

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.

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

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

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

I show that data like (2) and (3) challenge even the most successful existing theories of the relationship between antecedent and elided content in sluicing constructions by demonstrating that a greater mismatch between presumed antecedent and elided content is possible than previously thought. Specifically, I show that the polarity reversal data are unable to be accounted for under theories that require a strict identity condition between the elided content and an antecedent in the discourse. This is shown by demonstrating that sluicing constructions can be crucially reliant on pragmatic content and on non-propositional operators to license their elision site. To account for the new data as well as previous observations in the literature, this paper proposes a theory of sluicing that builds on the advances made in previous accounts while allowing greater flexibility in the licensing relationship between preceding material in the context and elided content. The theory proposed here draws on insights from domains traditionally unconnected with ellipsis, such as dynamic semantics; however, the tools used here are independently established and well-motivated in their individual domains. The contribution of this paper is to demonstrate that new and initially challenging data can be accounted for by intersecting traditional theories of ellipsis with insights from disparate domains. I show that these insights cohere naturally to form a predictive theory that yields insights into existing sluicing data and as well as into sluicing data that have previously gone unnoticed.

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 Consortium.[3] The initial round of annotation was conducted by either two or three independent undergraduate research assistants and the results were reviewed by a faculty supervisor. In the second phrase of the annotation procedure, the initial annotations were reviewed by three undergraduate research assistants working 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 for the pre-sluice (that is, the unelided form of the sentence). The claim here is not that the pre-sluices provided for these examples are the *only*

3 http://ohlone.ucsc.edu/SCEC/

interpretation available, but merely that they are a felicitous, freely available interpretation in the context in which the sluice was found or constructed.

Additionally, I exclude here three 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):

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

(5) **Context:** Taken from a post on the blog Jezebel about a particular kind of concert Miley Cyrus has announced she will be holding:
"Miley has yet to confirm the news or provide further details—including, for example, 'why.'"[4]

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 more 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 boyfriend – guess who!

Although these examples go as far back as 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, i.e. they are acceptable in out-of-the-blue contexts. For example, "Guess who!" can accompany an unexpected knock on the door, and "Guess what?" can be uttered at the start of a discourse with no antecedent—linguistic or otherwise—at all. Because these examples appear to have different licensing requirements, I put them aside here.

The last group of examples I set aside is *why*-stripping examples, such as the exclamation "Why Trump?"[5] See Yoshida et al. (2014) for an analysis of such examples.

Another possibility that I set aside in the current work is that of pseudosluicing (Pollmann 1975; Erteschik-Shir 1977; Merchant 1998, 2001; Barros 2014; Barros & Vicente 2015, a.o.).[6] Pseudosluicing is a proposal that the ellipsis site of sluicing constructions contain a cleft or a reduced cleft with an extracted wh-phrase pivot, as given below in (7):

(7) Someone spilled the ballots; do you know who [~~it was~~]?

4 http://jezebel.com/a-miley-cyrus-nude-concert-is-the-most-miley-idea-ever-1736444064
5 Headline on Huffington Post: http://www.huffingtonpost.com/george-lakoff/why-trump_1_b_9372450.html
6 I thank an anonymous reviewer for pointing out this possibility.

I set aside the interesting questions around pseudosluicing here because it is unlikely that the pseudosluicing strategy can fully explain the data with which we are most concerned. For example, most of the examples here contain adjunct and implicit argument remnants, which Merchant (1998) observes are largely unavailable for pseudosluicing in English. Additionally, the discussions around pseudosluicing are chiefly concerned with explaining case matching facts (see §5.2), which are orthogonal to the goals of the current paper. What we will be concerned with here are the licensing requirements that govern sluicing. Though Merchant (1998) notes that a full clefting pseudosluicing strategy may be able to be used with adjuncts in English, such sluices would still require a licensing requirement, and as such would be subject to the types of concerns raised in this paper.

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 walks through derivations for four polarity reversal examples, each of which motivates the current theory in two ways: (1) by showing that it makes 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, and §6 concludes.

2. Sluicing in the Literature

Numerous theories of sluicing have been proposed since the original syntactic isomorphy approach given in 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 content of the ellipsis site. The identity condition underlying many (if not most) 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 lenient enough to allow for attested structural mismatches, such as the finiteness mismatch in (8), but restrictive enough to rule out most impossible interpretations.

(8) [Sally cooks]$_A$. She learned how [~~to cook~~]$_E$ from her father.

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 licensing ellipsis sites in sluicing constructions. This section steps through the predictions of Merchant's (2001) semantic entailment identity condition and the predictions of theories that rely in part on such an identity condition.

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

2.1 e-GIVENness

In Merchant's (2001) e-GIVENness theory of ellipsis, sluicing constructions are formed by the fronting of a wh-constituent, called a *remnant*, and subsequent deletion at PF of the remaining TP. e-GIVENness is a modification of Schwarzschild's (1999) GIVENness, which itself is a theory of focus and deaccenting. Schwarzschild proposes, drawing upon Rooth's (1985, 1992) theory of focus, that an expression can be deaccented if it is GIVEN, where an expression counts as GIVEN if its existential focus closure is contextually entailed by the existential closure of an antecedent.[8] Because Schwarzschild was concerned with deaccenting, his theory does not discuss ellipsis. However, Merchant draws from GIVENness, from work on focus by Rooth, and from work on focus and ellipsis by Romero (1997) to propose an account of ellipsis called e-GIVENness. In order for a TP to elided, e-GIVENness requires that it stand in a bidirectional semantic entailment relationship with a 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 ∃ type-shifting, i) A entails F-clo(E), and ii) E entails F-clo(A).

Note also 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 below as (9).

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

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

<u>A entails F-clo(E)</u>: No.	<u>E entails F-clo(A)</u>: No.
A = **comply**(t)	E = ¬**comply**(t)
F-Clo(E) = ¬**comply**(t)	F-Clo(A) = **comply**(t)

Neither the antecedent expression nor the elided expression in (9) entails the other.

A skeptical reader might propose that, instead of the antecedent given in (9), we should consider the entire first disjunct to be the antecedent; doing so will capture the negation in the antecedent expression. This is shown in (10).

8 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).

(10) $[_{TP}$ I don't think that Trump$_i$ will comply$]_A$, but I don't know why $[_{TP}$ ~~he$_i$ won't comply~~$]_E$

A entails F-clo(E): No.
$A = \neg \forall w[w \in W_{dox,\,s} \rightarrow \textbf{comply}(t)(w)]$
F-Clo(E) = {w: $\neg \textbf{comply}(t)(w)$}

E entails F-clo(A): No.
E = {w: $\neg \textbf{comply}(t)(w)$}
F-Clo(A) = $\neg \forall w[w \in W_{dox,\,s} \rightarrow \textbf{comply}(t)(w)]$

However, as (10) shows, expanding the antecedent to include the matrix negation still does not yield semantic entailment in either direction.

2.2 Hybrid Theories

Merchant (2005, 2013b) and Chung (2006/2013) 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 (11).

(11) #[John was murdered]$_A$, but I don't know who$_i$ [~~t_i murdered him~~]$_E$.

The authors propose to rule out sluices such as (11) 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, 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 (12) and (13) satisfy bidirectional entailment, they are not well-formed sluices (AnderBois pgs. 19 & 23, respectively, brackets added):

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

(13) #Joe, [who once killed a man in cold blood]$_A$, doesn't even remember who [~~he once killed in cold blood~~]$_E$.

AnderBois proposes a modified account of sluicing based on inquisitive semantic entailment over CPs (Groenendijk and Roelofsen 2009). Inquisitive semantic entailment is a more restrictive identity requirement than e-GIVENness and rules out examples (12) and (13): neither antecedent contains inquisitive content and therefore cannot entail the inquisitive content of the question CP (see AnderBois (2014) §3.4 and §4 for discussion).

Recent work has challenged the inquisitive semantic entailment account on an empirical basis. Collins et al. (2014) give experimental evidence that sluices out of doubly-negated

constructions and appositives are indeed possible,[9] and Barros (2014) observes that (13) above, modified below in (14), is acceptable when the remnant *who* is replaced with the D-linked wh-expression *which man* (see also Dayal & Schwarzschild (2010) and discussion in §3.2 below).

(14) Joe, [who once killed a man in cold blood]$_A$, doesn't even remember which man [~~he once killed in cold blood~~]$_E$.

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 which 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, 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's (2013) scopability analysis proposes that sluicing is 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. Scopability is undertaken in a type logical (categorial) grammar that allows a tight connection between syntactic and semantic content (Barker 2007). 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 et. al (1995). Chung et al. notice 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. For example, (15) only allows a reading in which the indefinite *a book* takes wide scope over the quantifier *everyone* (Barker pg. 191).

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

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 (15), 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

9 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 containing double negation.

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 imposes 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.[10] 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 three parts. The first subsection discusses a constraint proposed in Dayal & Schwarzschild (2010) that rules out much of the data that have been discussed in the sluicing literature (see also Romero 1998). Section 3.2 expands upon the first section by outlining conditions that must hold for felicitous question-asking in a coherent discourse. The purpose of the first two subsections is to show that much of the data that have been raised as problematic for sluicing constructions in the literature can be ruled out on independent grounds and, therefore, should not be ruled out by a sluicing theory specifically. Section 3.3 presents a new identity condition on sluicing called Local Givenness.

3.1 The Well-Formedness Condition

Dayal and Schwarzschild (2010) are concerned with the observation that sluices with definite correlates are often bad. Their main observation is that such sluices are bad because their pre-sluice, or unelided form, is pragmatically infelicitous. For example, in (16a) the sluice is not possible; however, the pre-sluice form in (16b) is also infelicitous.

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

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

Based on this observation, I propose the following condition on sluicing (see also discussion in Romero 1998, Dayal & Schwarzschild 2010):

10 Note that Ginzburg & Sag (2001) and Barros (2014) take a different approach, combining syntactic and pragmatic constraints. However, a drawback of these accounts is that, while they successfully predict the case matching facts (see §5.2 below), they fail to provide any theory of *why* these facts hold; they are merely stipulated in independent constraints. Ultimately, we desire that a full account of sluicing will not only capture the data, but will do so with explanatory force.

The Well-Formedness Condition on Sluicing:
If a pre-sluice is infelicitous, then the corresponding sluice will not be well-formed.

Note that the term *infelicitous* was chosen here in order to allow for the proposed amelioration of islands under sluicing (Merchant 2001). 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. By adopting the Well-Formedness Condition, we are able to rule out examples like (16a) independently, obviating the need to account for such sluices in our theory of ellipsis.

3.2 Partial Answers

The question that is naturally raised at this point is why examples like (16a) are infelicitous. I propose that they are infelicitous because it is infelicitous to ask a question that already has a partial answer available in the discourse (Romero 1997, Fitzpatrick 2005, Barros 2014, a.o.).[11] For example, B's question in (17) is infelicitous without the inclusion of *other*:

(17) A: I saw some tigers today at the zoo.
B: {What/which} #(OTHER) animals did you see today at the zoo?[12]

B's response is infelicitous without *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?'. The contribution of *other* here is the same as the contribution of *else* in questions such as 'Who else did you see?'.[13] In this case, it contributes a presupposition that A has seen *some* particular animal at the zoo that day. This presupposition of the question follows directly from A's previous utterance. Similarly to (17), the sluice in (18) is also infelicitous without the addition of *other*.

(18) I know Mary saw some tigers today at the zoo, but I don't know which #(OTHER) animals [Mary saw today at the zoo].

Once again, the speaker cannot ask a question to which she has previously asserted a partial answer. The infelicity of the question in (18) is ameliorated by the addition of *other*, which adds the presupposition that the speaker knows that Mary saw some particular animal at the zoo.

Unlike previous discussions of this discourse requirement on questions, I propose that the

11 See also Barker's (2013) Answer Ban and Ginzburg's (2012) Question Introduction Appropriateness Condition. While the Answer Ban was intended to apply to sluices, this is clearly a more general constraint on questions in a discourse. The QIAC deals with the resolution (complete answers) of questions in the discourse.

12 Where *animals* is given a kind reading, so the relevant alternatives are tigers, lions, llamas, etc.

13 *Else* seems to contribute a lexicalized meaning of *other than x*, where *x* is the relevant entity mentioned previously in the discourse.

behavior be accounted for using Heim's (1991) *Maximize Presupposition*:

> *Maximize Presupposition*:
> Given two contextually equivalent alternatives, speakers must use the alternative whose presuppositions are stronger and happen to be met in the context of use.

Maximize Presupposition captures exactly the generalization that we want, which is that a question must ask for only new information in a discourse and must presuppose the existence of any partial answers that are already available.[14] The additional benefit of using Maximize Presupposition is that it relates this characteristic of questions to a more general constraint on felicitous utterances in a discourse, making it unnecessary to posit a separate constraint purely for questions.

3.3 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, and the third independently motivates the theory by applying it to several non-polarity reversal sluices.

Context Update and Dynamic Interpretation Systems

I use here a dynamic interpretation system outlined in Kadmon (2001) and based on Heim's File Card Semantics (1983a) and Context Change Potential (CCP) system (1983b). The motivation behind a dynamic interpretation system is the idea that, as interpreters of language, we process semantic content incrementally. More specifically, dynamic interpretation systems aim to capture the observation that clausal interpretation may crucially rely on the interpretation of previous intrasentential clauses. Put another way, we as interpreters do not wait until the end of a sentence to process its semantic content and update the linguistic context. Instead, we process semantic content incrementally, updating the context at the completion of a proposition or earlier. Because of this incremental processing, 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 processing have been of particular interest in studies of presupposition projection (Stalnaker 1973, 1974; Karttunen 1974; Gazdar 1979; Karttunen & Peters 1979; Heim 1983b; Soames 1989; Beaver 2001; a.m.o.) and anaphora (Geach 1962, Evans 1977, Roberts 1989, Heim 1990, Kamp & Reyle 1993, Simons 1997, 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

14 The account here is not reliant on any particular theory of interrogatives and could be instantiated by the traditional approach of Hamblin (1973) and Karttunen (1977), or in a partition semantics approach as laid out in Groenendijk & Stokhof (1981, 1984) and Lahiri (2002), a.o.

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, 2010a, 2011b). 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 of the actual world 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; no special meaning is attached to the term beyond that explained above and defined in the remainder of this section.

In Heim's (1983b) CCP system, the context is defined in a standard manner as a set of worlds (or set of world-assignment pairs).[15] Instead of a standard truth-conditional semantics, however, operators contribute a context change potential, which is a partial function from contexts to contexts. CCPs 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 either:
    i. undefined, or
    ii. the presuppositions of p are accommodated, $c + p = \{(c \cap \text{ps}(p)) \cap p\}$

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

NEGATION: $c + \neg p = c \setminus (c + p)$[16]
CONJUNCTION: $c + (p \wedge q) = (c + p) + q$
DISJUNCTION: $c + (p \vee \text{q}) = c + (c \setminus p) + q$
CONDITIONAL: $c + (\text{If } p, q) = c \setminus (c + p \setminus (c + p + q))$

15 The idea of possible worlds goes back at least to Gottfried Wilhelm Leibniz, and was developed in modern work by Carnap (1947), Hintikka (1957, 1961), and Kripke (1959, 1963a,b), a.o.

16 Where $c \setminus p$ indicates the intersection of c with the complement of p. This is notated in Kadmon (2001) as $-$, though the traditional notation is kept here.

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 CCPs of these complex expressions are derived compositionally from the CCPs of their constituents. Let's look at the conditional example in (19) to illustrate.

(19) If [the tax bill passes]$_p$, [the University of California will be concerned]$_q$.

Let's assume for expositional simplicity that the context at the beginning of the sentence in (19) is the set of all worlds, *W*:

i. $c = W$, or the set of all worlds and the local context of the antecedent *p*.

ii. $c + p$: We intersect *p* with *W*, which yields the set of worlds in which the tax bill passes. This is the local context of *q*.

iii. $c + p + q$: This intersects *W* with the propositions expressed by *p* and *q*, which yields the set of worlds in which the tax bill passes and UC is concerned.

iv. We intersect the results of (ii) with the complement of the results of (iii), which gives us the worlds in which the tax bill passes and UC is not concerned.

v. Finally, we intersect (i) with the complement of the results of (iv), which gives us the set of worlds in which the tax bill passes and UC is concerned.

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. The interested reader is encouraged to reference Karttunen (1974), Heim (1983b), Kadmon (2001), and Schlenker (2010a, 2011a) for additional discussion of these operator rules, as well as their respective benefits and drawbacks.

In summary, I use a basic Heimian account here because the CCP account is widely known and is sufficient to capture the data we are concerned with. However, the Local Givenness account that is developed here crucially does not rely on the use of this 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 Schlenker (2009, 2010a, 2011b).

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's (1999) 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 proposition would be uttered. Formally, 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.

Application of Local Givenness

This subsection applies the theory of Local Givenness to non-polarity reversal examples. The examples were chosen to display the generalizability of the theory and to show that it correctly accounts for examples that are not polarity reversals. The first example is one in which the elided content is clearly not entailed by the global discourse context.[17]

(20) Roy says that he received a PhD, but from whom? Probably no-one. It's debatable whether he even graduated from high school.

There are two possible interpretations of the sluicing site:

a. Roy_i says that he_i received a PhD, but from whom_t [~~does Roy_i say that he_i received a PhD t_t~~]$_E$?
b. Roy_i says that he_i received a PhD, but from whom_t [~~did he_i receive a PhD t_t~~]$_E$?

I take the reading in (a) to be straightforwardly calculable as entailed in its context under a standard treatment of conjunction in which p = Roy says that he received a PhD.[18] I focus then on the embedded reading given in (b). Note that, as follows from the rules given above, a local context of an expression p is not influenced by information following p in the discourse (see also discussion in Schlenker 2010a). Therefore, the fact that the sluice is followed by information that suggests that the speaker disbelieves Roy's claim is irrelevant to our derivation. Recall that Local Givenness does not require the elided proposition to be entailed by the global context or the context set of the conversation, but only that it is entailed by the local context (see discussion earlier in this section). I argue that in (b), we interpret the elided proposition in a context which entails the proposition that Roy received a PhD; that is, the local context for E is the set of worlds in which Roy received a PhD.

I assume here the following (simplified) denotation of *say:* $\llbracket \text{say} \rrbracket^{w,g} = \lambda p.\lambda x.\, \mathbf{say}(p)(x)$

17 I thank an anonymous reviewer for noting that discussions of such examples would be helpful.
18 For a contemporary analysis of the denotation of *but* as a conjunction, see Toosarvandani (2014).

Let's assume for maximal generality that our starting context is W, the set of all possible worlds:[19]

i. $c = W$

We have the following proposition expressed by the first clause of the conjunction in (b):

ii. $\lambda w[\textbf{say}[\lambda w.\exists x[\textbf{phd}(x)(w) \wedge \textbf{received}(x)(\mathrm{r})(w)]](\mathrm{r})(w)]$

Step (ii) provides the derivation of the entire first conjunct. We can now ask what effect on the local context this clause has. The matrix verb *say*, in particular, is in the set of communicative assertive verbs. These verbs 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 2010a, Anand & Hacquard 2014). In this example, this means that the proposition expressed by the embedded clause, that Roy received a PhD, is entered into the local context produced by the first disjunct.

Step (iii) shows that the proposition in (ii) restricts the local context to worlds in which Roy received a PhD; this is achieved by intersecting the context W with the proposition that Roy received a PhD.

iii. $W + \lambda w[\textbf{say}[\lambda w.\exists x[\textbf{phd}(x)(w) \wedge \textbf{received}(x)(\mathrm{r})(w)]](\mathrm{r})(w)] =$
$\{w: [\exists x[\textbf{phd}(x) \wedge \textbf{received}(x)(\mathrm{r})]\}$

The local context for q is now the set of worlds in which Roy was awarded a PhD. This entails the proposition expressed by q, and we predict felicitous elision of the proposition.

iv. $\{w: \exists x[\textbf{phd}(x)(w) \wedge \textbf{received}(x)(\mathrm{r})(w)] \subseteq \mathit{ExClo}(\llbracket E \rrbracket^{g,w}) =$
$\{w: \exists x[\textbf{phd}(x)(w) \wedge \textbf{received}(x)(\mathrm{r})(w)]$

I have demonstrated here a communicative assertive verb asserting its complement clause into the local context. However, this is an example of a larger, more general observation that embedding verbs are able to assert their clausal complement as either true or as the main point of the utterance. This observation has been discussed in detail by Hooper (1975) and Simons (2007, 2013). The observation more specifically is that clausal complements of embedding verbs such as *see*, *think*, and *believe* can behave in discourse as independent propositions that can be

19 An anonymous reviewer raises a concern about the assumption used in step (i) that the context is the set of all possible worlds. This does not hold of most conversations, as we rarely if ever start a conversation with the assumption of total ignorance of the real world. I make this assumption here in order to be maximally generalizable. Adding additional propositions into the context in step (i) will not alter the derivations in any significant way, as the context need only be a subset of the entailed proposition. In the case of a more complex context than given above, the context will be a strict subset of the entailed proposition. 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.

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 the proposals given previously and treat the complements of such verbs as entering into the local context.[20]

The next example shows that the account correctly predicts sluicing out of appositives, as is shown to be empirically available in example (14). 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, and can also in the right circumstances behave as as-issue content in their projection and truth conditional behavior (Potts 2005, Amaral et al. 2007, Syrett & Koev 2015, AnderBois et al. 2015, 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 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 et al. 2015).[21] A slightly simplified version of example (14) is repeated below in (21).

(21) Joe^{x}_{j}, $[\text{who}^{x}$ killed a man in cold blood $]_{\text{A}}$, doesn't know which man_{i}
$[\sout{\text{he}_{j}\text{ killed }t_{i}\text{ in cold blood}}]_{\text{E}}$.

i. The appositive content of (21) immediately updates the global context set c:
$c = W \cap \{w: \exists x[\mathbf{man}(x)(w) \wedge \mathbf{kill\ in\ cold\ blood}(x)(\text{j})(w)]\} =$
$\{w: \exists x[\mathbf{man}(x)(w) \wedge \mathbf{kill\ in\ cold\ blood}(x)(\text{j})(w)]\}$

ii. The existential closure of E is given as follows:
$ExClo[\![\text{E}]\!]^{w,g} = \{w: \exists x[\mathbf{man}(x)(w) \wedge \mathbf{kill\ in\ cold\ blood}(x)(\text{j})(w)]\}$

iii. 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:
$\{w: \exists x[\mathbf{man}(x)(w) \wedge \mathbf{kill\ in\ cold\ blood}(x)(\text{j})(w)]\} \subseteq ExClo[\![\text{E}]\!]^{w,g}$

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

20 This can be achieved formally via a form of local accommodation, see discussions in Roberts (1989, 2015) and Kadmon (2001, Chapter 9).

21 See AnderBois et al. (2015) for a detailed exposition of the theory which is simplified here for expositional purposes. Note that while their account is created to allow for the free occurrence of ellipsis over borders, they rely on the account of AnderBois (2014) to rule out sluicing specifically. I adopt here the Maximize Presupposition explanation for why the sluicing examples in AnderBois (2014) are improved by using a d-linked remnant (see discussion above).

to Potts (2005), del Gobbo (2007), Nouwen (2007, 2014), Schlenker (2010b), and AnderBois et al. (2015), a.o. for additional details.

This subsection has independently motivated the Local Givenness theory using examples that are also captured under Merchant's e-GIVENness theory. The contextual entailment condition of Local Givenness is a less restrictive condition than the bidirectional semantic entailment condition of e-GIVENness, and therefore predicts not only those sluices predicted by e-GIVENness but also sluices that the bidirectional entailment condition is too restrictive to capture. The following section turns to deriving polarity reversal sluices.

4. Deriving Polarity Reversal Sluices

The following sub-sections apply Local Givenness to three main categories of polarity reversal sluices.[22] 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.

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 below as (22):

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

That neg-raising is the relevant property in (22) can be seen by swapping the neg-raising verb *think* with the non-neg raising verb *hope*, as in (23a). Example (23a) cannot receive the polarity reversal interpretation; the only available interpretation is that in which the matrix clause acts as antecedent, given in (23b).

(23) a. Mary doesn't hope that Trump$_i$ will comply, and she can't explain why [# ~~he$_i$ won't comply~~]$_E$.

b. Mary doesn't hope that Trump will comply, but she can't explain why [she$_i$ ~~doesn't hope that Trump will comply~~]$_E$.

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 arguably the dominant approach in the literature, I use here the account of neg-raising given in Gajewski (2007).[23] Gajewski's account draws importantly on an idea from Bartsch (1973) that the inference from the literal interpretation of a neg-raising sentence like (22$_A$), where negation takes matrix scope, to the neg-

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

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

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 (22_A) 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 (22_A) combined with this presupposition then pragmatically entails that the speaker in (22) has a belief that Trump 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 cancellable 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 are not. 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.

To summarize this discussion, 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 providing a more principled explanation for why some verbs allow neg-raising and others do not.

With this theoretical background in place we can now return to example (22). I have proposed that the assertion of (22_A) combined with the excluded-middle presupposition invoked by the verb *think* entails that the speaker in (22) has the belief that Trump will not comply. Formally, this is expressed as follows:

(22) [I don't think that Trump$_i$ will comply]$_A$, but I don't know why [~~he$_i$ won't comply~~]$_E$.

(22')[24] $[\![\text{I don't think that Trump will comply}]\!]^{w,g}_A = \neg \forall w[w \in \mathrm{W}_{\mathrm{dox,\,s}} \rightarrow \mathbf{comply}(\mathrm{t})(w)]$

Via the excluded middle presupposition conventionally associated with the verb *think*, A presupposes the following:

Excluded Middle Presupposition of (22_A):
$[\forall w[w \in \mathrm{W}_{\mathrm{dox,\,s}} \rightarrow \mathbf{comply}(\mathrm{t})(w)] \vee \forall w[w \in \mathrm{W}_{\mathrm{dox,\,s}} \rightarrow \neg\, \mathbf{comply}(\mathrm{t})(w)]]$

24 Where *dox, s* indicates the doxastic alternatives of the speaker.

The denotation of *think* assumed here can therefore be given as follows (Uegaki 2015):

$$[\![\,\text{think}\,]\!]^{w,g} = \lambda p.\lambda x:[\,\forall w[\,w \in \mathrm{W}_{\text{dox, x}} \rightarrow p(w)\,] \vee \forall w\,[\,w \in \mathrm{W}_{\text{dox, x}} \rightarrow \neg\, p(w)\,]\,].\ [\,\forall w[\,w \in \mathrm{W}_{\text{dox, x}} \rightarrow p(w)\,]\,]$$

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 (22) has a belief that Trump will not comply.

The following steps apply Local Givenness to (22).

i. Starting Context:
$c = W$

ii. (22_A) asserts that it is not true that the speaker believes that Trump will comply.

Semantic Denotation of (A):
$[\![\,\mathrm{A}\,]\!]^{w,g} = \neg \forall w[\,w \in \mathrm{W}_{\text{dox, s}} \rightarrow \mathbf{comply}(\mathrm{t})(w)\,]$

iii. The pragmatic excluded middle presupposition of (22_A)—conventionally associated with the verb *think*—requires that the speaker either believes that Trump will comply or believes that Trump will not comply.

Excluded Middle Presupposition of (A):
$[\,\forall w[\,w \in \mathrm{W}_{\text{dox, s}} \rightarrow \mathbf{comply}(\mathrm{t})(w)\,] \vee \forall w\,[\,w \in \mathrm{W}_{\text{dox, s}} \rightarrow \neg\, \mathbf{comply}(\mathrm{t})(w)\,]\,]$

iv. Step (ii) + (iii) derive the strengthened neg-raised interpretation: Because (ii) asserts that it is not true that the speaker believes that Trump will comply, it follows from (iii) that the speaker believes that Trump will not comply. The utterance of (22_A) thus asserts the strengthened meaning given below.

Strengthened Neg-Raised Interpretation of (A):
$\forall w[\,w \in \mathrm{W}_{\text{dox, s}} \rightarrow \neg\, \mathbf{comply}(\mathrm{t})(w)\,]$

v. The assertion in step (iv) creates a local context c_L in which the worlds under consideration are only those compatible with the speaker's doxastic state, namely those worlds in which Trump does not comply.

c_L for E: $\quad \mathrm{W} \cap \{w\colon w \in \mathrm{W}_{\text{dox, s}}\} = \{w\colon \neg\, \mathbf{comply}(\mathrm{t})(w)\} = c_{\mathrm{LE}}$

vi. The existential closure of E yields the set of worlds in which Trump does not comply. Because existential closure is a type-lifting operation that binds unfilled arguments in

order to lift an expression to type t (Schwarzschild 1999), existential closure over the trace of *why* is vacuous (see §5.2 below for additional discussion).

Denotation of (E):
$ExClo(\llbracket \mathrm{E} \rrbracket)^{w,g} = \{w: \neg \mathbf{comply}(\mathrm{t})(w)\}$

vii. The local context includes only those worlds in which Trump will not comply, which entails the elided proposition that Trump will not comply (in fact there is mutual entailment between the world sets).

Local Givenness:
$\mathrm{c}_{\mathrm{LE}} \subseteq ExClo(\llbracket \mathrm{E} \rrbracket)^{w,g} = \{w: \neg \mathbf{comply}(\mathrm{t})(w)\} \subseteq \{w: \neg \mathbf{comply}(\mathrm{t})(w)\}$

The entailment satisfies the Local Givenness requirement that the elided proposition be entailed by its local context, and we predict felicitous elision of the proposition expressed by (22_{E}).

4.2 Polarity Reversals Are Not Syntactic: *Remember* Polarity Reversals

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

Example (24) is a corpus polarity reversal sluice containing *remember*.

(24) [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 communist takeover.

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

Example (24) is illustrative in that it appears to behave like the neg-raising examples; specifically, $\neg$*remember p* is interpreted in context as entailing $\neg p$. 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 (25) is perfectly acceptable, while A's utterance in (26) is grammatical but a bit unwieldy.

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

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

Karttunen (1971) classifies *remember* as an *implicative* verb. As such, *remember* has the following properties when taking an infinitival complement: *remember* $p \rightarrow p$, $\neg$*remember* $p \rightarrow \neg p$. For example, in (27) below there is a strong intuition that the assertion of the sentence commits the speaker to believing that she did not shut the door.

(27) 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 (28) has both a possible *de re* and a possible *de se* reading, (29) carries only the *de se* reading, under which John remembers he himself going to the movies.

(28) John remembered his going to the movies.
(29) John remembered going to the movies. [Higginbotham 7&10]

Based on these discussions, I propose that the licensing of the inference $\neg$*remember* $p \rightarrow \neg p$ in (24) is licensed by two defeasible contextual assumptions. The first assumption is that the speaker has a memory about the particular event represented by p.[25] That is, the speaker is informed about the event under discussion. This is parallel to the Competence Assumption that is used by researchers in computing scalar implicatures (van Rooij & Schulz 2004, Guerts 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 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 (24).

(24) I don't know why [~~I wasn't scared~~]$_{E}$, but [I can not remember being scared]$_{A}$.

25 I abstract away here from concerns about negative events, and assume that the event in question in (24) exists and that it was either an event of being scared or an event of being 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 $e \not\sqsubseteq S$ (cf. Krifka (1989) and de Swart (1996) in which the following definition of event negation is used: $\lambda P.\lambda s.[\,\mathrm{MAX}(s) \wedge \neg\exists e[\,P(e) \wedge e \sqsubseteq s\,]\,]$).

i. Starting Context:
$c = W$

ii. 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.

Assumption of Speaker Memory:[26]

$$[\forall w[w \in W_{\text{MEM,s}} \rightarrow \exists e \exists t[\neg \textbf{scared}(s)(e)(w) \wedge \text{AT}(t)(e)(w)]] \vee \forall w[w \in W_{\text{MEM,s}} \rightarrow \exists e \exists t[\textbf{scared}(s)(e)(w) \wedge \text{AT}(t)(e)(w)]]]$$

iii. The semantics of A 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. $\text{W}_{\text{MEM,s}}$ here acts as an information state of the speaker containing all those worlds compatible with the memory of the speaker.

Semantic Denotation of A:
$$[\![\text{A}]\!]^{w,g} = \neg \forall w[w \in \text{W}_{\text{MEM,s}} \rightarrow \exists e \exists t[\textbf{scared}(s)(e)(w) \wedge \text{AT}(t)(e)(w)]]$$

iv. 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 following:

Enriched Denotation of A:
$$\forall w[w \in \text{W}_{\text{MEM,s}} \rightarrow \exists e \exists t[\neg \textbf{scared}(s)(e)(w) \wedge \text{AT}(t)(e)(w)]]$$

v. Under the assumption that the speaker's memories of the past represent the speaker's beliefs about the history of the actual world, we can infer the following from Step (iv).

Assumption of Speaker Consistency:
$$\forall w[w \in \text{W}_{\text{DOX,s}} \rightarrow \exists e \exists t[\neg \textbf{scared}(s)(e)(w) \wedge \text{AT}(t)(e)(w)]]$$

vi. Step (v) pragmatically asserts that the speaker was not scared. The context is then updated with this proposition.

Context Update:
$$\text{W} \cap \{w: \exists e \exists t[\neg \textbf{scared}(s)(e)(w) \wedge \text{AT}(t)(e)(w)]\}$$
$$= \{w: \exists e \exists t[\neg \textbf{scared}(s)(e)(w) \wedge \text{AT}(t)(e)(w)]\} = \text{c}_{\text{LE}}$$

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

26 Contextual domain restriction assumed throughout.

viii. Local Givenness:

$c_{LE} \subseteq [\![E]\!] = \{w: \exists e \exists t[\neg \textbf{scared}(s)(e)(w) \wedge \text{AT}(t)(e)(w)]\} \subseteq$
$\{w: \exists e \exists t[\neg \textbf{scared}(s)(e)(w) \wedge \text{AT}(t)(e)(w)]\}$

The existential closure of E is entailed by its local context, and we correctly predict felicitous elision of E.[27] An anonymous reviewer correctly observes that the derivation here is very similar to the derivation of the neg-raising example in (22), as both rely on the excluded middle. However, while I follow Gajewski in the proposal that neg-raising verbs induce an excluded middle presupposition, the pragmatic inferences utilized for *remember* are less automatic and more easily defeatable than the presuppositions for neg-raising verbs. We can easily find contexts in which both the Assumptions of Speaker Memory and Speaker Consistency fail to hold, and as expected in such contexts the inference $\neg$*remember p* $\rightarrow \neg p$ also fails to hold.

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. I show here that a pragmatically enriched bidirectional entailment account still fails to generate the full range of polarity reversal data. The polarity reversal examples discussed in this section involve exclusive disjunction. An example is given in (30).

(30) [constructed example]
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$_i$ [~~he$_j$ did t_i~~]$_E$.

In (30), we see that negation is present in the antecedent but not in the ellipsis site.[28] An utterance of (30) asserts that either (A) *John didn't do an e.c. problem* or (E) *John did an e.c. problem*. The disjunction is exclusive because the two disjuncts are opposites: they cannot both be true (or false) at the same time. The analysis of (30) uses the CCP dynamic rule for conjunction listed above and repeated below (Karttunen 1974; Heim 1983b; Kadmon 2001).

27 Note that the cataphoric nature of (24) was set side for our purposes. I don't investigate the interesting properties of these sluices here, besides noting that they appear to involve some sort of processing hold in which the sluice is not interpreted until a relevant antecedent is encountered, analogous to instances of pronominal cataphora.

28 Thank you to Jason Merchant (p.c.) for pointing out that these data run counter to the claim made in Merchant (2013a, 15) that negation present in the antecedent of a sluicing construction requires a corresponding negation present in the ellipsis site.

DISJUNCTION FOR PROPOSITIONS:
For propositions p, q such that $p \vee q$ is uttered in a context c:
c_L for $p = c$,
c_L for $q = c + (c \setminus p)$

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 exclusive disjunctions. The steps below show how Local Givenness correctly predicts the availability of the sluice in (30).

The following steps apply Local Givenness to the disjunction in (30).

i. Starting Context:
$c = W$

ii. Denotation of A:
$[\![\text{A}]\!]^{w,g} = \{w: \neg\exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(\text{j})(w)]\}$

iii. Denotation and Existential Closure of E:[29]
$ExClo([\![\text{E}]\!]^{w,g}) = \{w: \exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(\text{j})(w)]\}$

iv. Local Contexts for A and E:
$c_{\text{LA}} = c = W$

$c_{\text{LE}} = W \cap \{w: \neg\neg\exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(\text{j})(w)]\}$

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

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.

29 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.

The possibility of polarity reversal sluices in disjunction constructions illustrates the necessity of local contextual entailment in the current account. The global context of (30) 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 (30) 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 (30) will yield bidirectional entailment of the propositions. Instead, the crucial licensing factor in this example is the disjunctive operator—which contributes its heritage properties[30] to A and E—and not the propositional content of A and E themselves.

4.4 Polarity Reversals are not Entailment at LF: More Disjunction Polarity Reversals

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:

(30') Either [not [John$_j$ did an extra credit problem]$_{A]}$, or he$_j$ didn't mark which one$_i$ [~~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 below:[31]

(31) [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

30 See Karttunen and Peters (1979), Heim (1983b), and Kadmon (2001), a.o.
31 I thank an anonymous reviewer for encouraging the inclusion of such an example.

explains why [~~the Board didn't grant the license by December 15~~]' and the commission jumped to it and did it that very day," Campbell told the Globe.

In this example, the reversal takes place in the opposite direction of those discussed so far: the example contains a positive antecedent and a negative elided phrase. There is no possibility of scoping the negation out of the elided phrase; because it is unpronounced, the negation is uncontroversially inside of the ellipsis site. A derivation of the sluice is given below.

The following steps apply Local Givenness to the disjunction in (31).[32]

(31) Either [the Board$_i$ grants the license by December 15]$_A$ or it$_i$ explains why [~~the Board$_i$ didn't grant the license by December 15~~]$_E$:

i. Starting Context:
$c = W$

ii. Denotation of A:
$[\![\mathrm{A}]\!]^{w,g} = \{w\text{: } \textbf{grant the license by December 15}(\mathrm{b})(w)\}$

iii. Denotation and Existential Closure of E:
$ExClo([\![\mathrm{E}]\!]^{w,g}) = \{w\text{: } \neg \textbf{ grant the license by December 15}(\mathrm{b})(w)\}$

iv. Local Context for A and E:
$c_{\mathrm{LA}} = c = W$
$c_{\mathrm{LE}} = W \cap \{w\text{: } \neg\textbf{grant the license by December 15}(\mathrm{b})(w)\} =$
$\{w\text{: } \neg\textbf{grant the license by December 15}(\mathrm{b})(w)\}$

v. Local Givenness:
$c_{\mathrm{LE}} \subseteq ExClo([\![\mathrm{E}]\!]^{w,g}) = \{w\text{: } \neg\textbf{grant the license by December 15}(\mathrm{b})(w)\}$
$\subseteq \{w\text{: } \neg\textbf{grant the license by December 15}(\mathrm{b})(w)\}$

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.

This section has discussed the possibilities of accounting for the polarity reversal sluices

32 Note that the disjunction does not consist of imperatives, as may appear at quick glance. Imperatives do not have overt subjects, and the subject must refer to an addressee (Portner 2005, 2007; Kaufmann 2012; von Fintel & Iatridou 2017 a.o.). Additionally, imperatives are argued to express speaker preference (Condoravdi & Lauer 2011, 2012, a.o.). However, this construction does not require the speaker to have a preference for either disjunction. For example: Either Ohio State wins the football game or their fans riot (but both are terrible outcomes). The propositions instead express a simple present futurate (Prince 1971, Dowty 1979, Vetter 1973, Copley 2014, a.o.). For expositional clarity, and because concerns of tense are orthogonal to the current project, I set aside the interesting nature of this use of tense and focus on the core propositional content.

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 will address some concerns that have historically been levied against non-structural ellipsis accounts.

5. Concerns of Overgeneration

The analysis that is proposed here is necessarily more permissive than existing syntactic or semantic entailment accounts of sluicing; this additional permissiveness is required in order to capture the structural and semantic differences between the antecedent and elided phrases in polarity reversal sluices. This section discusses three concerns of overgeneration that could be raised for the current account. The first is a concern that pragmatic accounts over-predict which propositions can be felicitously elided. Another concern, which arises for any non-structural sluicing account, is the ability to account for data that have been used to motivate a (limited) syntactic identity requirement for sluicing (e.g. Chung 2006/2013). The last concern is unique to the current project. The reader may have observed that the polarity reversal sluices discussed here consist largely of *why* sluices. One may ask, then, whether the phenomenon is generalizable to other classes of remnants. This section discusses these questions and shows that these concerns are surmountable.

5.1 An Appeal to Saliency

One concern about a purely unidirectional contextual entailment account of sluicing is that it overgenerates. For example, impossible sluices like in (32) are not ruled out by a purely unidirectional contextual entailment account, nor are they ruled out by the Well-Formedness Condition (as the content in the ellipsis site is both entailed in its local context and can be felicitously uttered overtly).[33]

(32) [Abby called JOE an idiot]$_A$, but I don't know who$_i$ else [#~~Abby insulted t_i~~]$_E$.

To address this concern, I borrow into the current account a solution from existing theories of sluicing: the notion of saliency. Specifically, I require that the elided proposition be uniquely salient. The observation that salience is important to sluicing is not a novel contribution and has been made by many previous researchers working on ellipsis. Because of this, explicit saliency requirements are built into most if not all existing sluicing accounts, including each sluicing theory discussed in §2. For example, e-GIVENness (Merchant 2001) requires that the elided constituent, E, have "a salient antecedent," Inquisitive Entailment (AnderBois 2014) requires "some salient antecedent CP," and Barker's (2013) 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, although we lack a rigorous definition of it, saliency is intricately

33 Thank you to Sandy Chung (p.c.) for this observation.

tied to our ability to elide and recover propositional or sub-propositional phrases in conversation.

The specific requirement that the elided proposition must be 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.[34] For example, in the desired interpretation of (33a) and (33b) below, the remnants *who* are linked to a discourse referent that was introduced, via *some pedestrian*, within a discourse subordinated relative clause (Cantor 2013):

(33) a. #That John rented a car that hit some pedestrian surprised everyone, 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~~].

The low saliency of the subordinated referent leads to low recoverability and infelicity.[35]

Recall that sluicing out of appositives, which are canonically considered to be discourse subordinate and not-at-issue, has also been argued to be infelicitous. However, as we saw in examples (13) and (14), argument sluices out of appositives are felicitous when the remnant is d-linked. Similar to appositives, d-linking the remnants from (33), as shown in (34), also leads to acceptability. The increase in acceptability is driven by the boost in salience the d-linking provides to the relevant discourse referent, which in each example is in a subordinate proposition in the discourse. The d-linked phrase, in essence, forces the subordinated proposition to become the most salient at that point of the discourse, which facilitates the processing of the sluice.

(34) a. That John rented a car that hit some pedestrian surprised everyone, 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$_i$ [~~a car that hit t_i crashed into the wall last night~~].

[Cantor 2013, pg. 27-28]

Determining the saliency of a given proposition is, of course, not trivial. While the previous sluicing accounts discussed in this section provide no rigorous definition of what is means for a given proposition to be salient qua ellipsis, other theories have encoded saliency in discourse organizational terms. For example, Ginzburg & Sag (2001) and Barros (2014) encode

34 Note that the formulation of this constraint here predicts that the saliency requirement is not a grammatical requirement on ellipsis, but a cognitive or discourse constraint on the ability of that proposition to be recovered in the discourse. This make interesting predictions that, due to space constraints, cannot be explored here.

35 The most salient referent is *everyone*, which leads to an infelicitous interpretation of the question. Note the improvement if an existential quantifier is used instead:

That John rented a car that hit some pedestrian surprised someone$_i$, but the report didn't say who$_i$.

the notion of saliency as relevance to a Question under Discussion (QUD) (Roberts 1996/2012), and require the interpretations of sluices to be resolved to a Maximal Question under Discussion.[36] Similarly, Frazier & Clifton (2005) encode saliency 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 2015). In their proposal, this preference follows from the greater saliency, or availability, of the main assertion in the discourse structure.

As mentioned by Frazier & Clifton (2005), the licensing for discourse anaphora is, along with ellipsis, also known to be a linguistic phenomenon that is sensitive to discourse organization and salience. For example, the anaphor *that* is known to specifically license propositional anaphora of salient propositions (Webber 1988, Gundel et al. 1990, Asher 1993, Hwang 1992, and de Swart 1996, a.o.). As we can see in (35), B's response is more easily interpreted as a reply to the matrix assertion about Dianne winning the race than it is as a reply to the claim about her age (see also Syrett & Koev 2015).

(35) A: Dianne, who's 84 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 example (36) below.[37]

(36) 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 (36), the deictic demonstrative *that* is anaphoric to the sluiced proposition *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."[38] The ability to pick out the elided proposition with an anaphor that selects salient propositions suggests independent evidence that, at least in the example above, the elided proposition is salient in the context.

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

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

38 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. For example, in (i) the proposition expressed by the sentence *Roy would win the election* can be referred to with *that*, but it is clearly not entailed by the local or global context.

(i) Roy$_i$ was mistaken that [he$_i$ would win the election]$_j$; that$_j$ was never a possibility.

There are also likely constraints on *that* that are not constraints on sluicing. For example, Murray (2014) argues that not-at-issue content, such as content contributed by the canonical use of appositives, does not necessarily automatically introduce a discourse referent. Therefore, although we predict that not-at-issue content can be sluiced, we would not necessarily predict that such a sluiced proposition could be referenced with *that*. The set of propositions that can be sluiced and the set of propositions that can be referred to with *that* are therefore likely overlapping but not identical sets.

In summary, Local Givenness follows previous theories of sluicing in building in a saliency requirement, which in the current theory holds of the elided proposition. The requirement is motivated by the need to constrain the interpretation of sluicing sites to propositional content that is salient and recoverable in the discourse at the time of utterance. The saliency constraint is integrated into the final version of Local Givenness, provided below.

> **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 uniquely salient.

This saliency requirement correctly rules out, for example, the infelicitous sluice in (32), as the proposition expressed by the ellipsis site, $\exists x.\textbf{insult}(x)(a)$, is not salient.

The next section discusses concerns that have been levied specifically against non-structural accounts of sluicing. The section pushes back on the claim that all sluicing accounts must contain a structural component by proposing a tentative way forward for a purely semantic/pragmatic account of sluicing. While I do not regard this discussion as complete or conclusive, I hope that it can contribute to resolving some of the interesting and challenging facts that have historically motivated a structural component of sluicing.

5.2 Case Matching and Chung's Generalization

A concern of 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 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, and uses the case matching facts as 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 syntactic identity condition, proposed in Chung (2006/2013) to challenge purely semantic and pragmatic accounts of sluicing, is a generalization that has since been named Chung's Generalization. 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. The Generalization captures the paradigm given below in (37-39).

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

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

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

Chung proposes that semantic accounts cannot capture these data because the act of flirting entails the act of flirting with someone and vice versa, so bidirectional semantic entailment holds between the antecedent and elided clauses in (37-39). If these facts are true, then they look troubling for any account that relies purely on meaning equivalency between the ellipsis and antecedent sites.

Semantic accounts since this observation have stipulated the constraint, e.g. AnderBois (2014) follows Merchant (2007) in adopting 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 that No New Morphemes cannot be the generalization needed. For instance, example (31), repeated here as (40), contains a negation morpheme (bolded) in the ellipsis site that is not present in the antecedent site.

(40) Senator McCain said, "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"

The morphemes contained within the ellipsis site of (40) are not a subset of the morphemes contained within the antecedent, in opposition to the predictions of No New Morphemes. It appears, then, that we are in need of a new constraint to explain Chung's facts.[39]

A possible alternative explanation for Chung's Generalization is the current account's reliance on salience and existential closure. The essence of the proposal is that contextual entailment need hold only over content that is elided in the ellipsis site, and not over content that vacates the site before ellipsis occurs. The intuition being that if the content isn't elided, then it needn't meet the conditions for ellipsis.[40] Formally, the proposal relies on the fact that existential closure applies only to argument constituents. As noted, existential closure is a type-lifting operation that binds unfilled arguments in order to lift an expression to type t: "assume a sort of type-shifting operation that raises expressions to type t, by existentially binding unfilled arguments" (Schwarzschild 1999, 6). That is, the goal of the existential closure operation is to generate propositional content from sub-propositional content so that the material can, for example, participate in entailment relationships. In examples like (44), then, we might expect that existential closure will not apply, as the expression is already of type t and therefore

39 An alternative approach to what follows is the account given in Kroll & Rudin (2017) and Rudin (to appear). This account appeals to independent syntactic and pragmatic conditions on sluicing and argues that the constraints together capture the entire array of sluicing facts. The account alternatively laid out here is an attempt to push forward a non-structural account of sluicing in order to see what facts can be captured without an appeal to syntactic structural constraints. The delineation of pragmatic/semantic and syntactic constraints on sluicing is a project in and of itself and requires much more space than is possible to give here; however, I hope to provide a modest beginning to such an attempt.

40 This proposal shares the spirit of Rudin (to appear), who independently proposes that syntactic identity holds between an antecedent and the syntactic material within an ellipsis site vP domain, excluding any material that has vacated the vP prior to ellipsis. The intuition, that ellipsis identity conditions care only about material left in the ellipsis site and not material that vacates it prior to ellipsis, is the same.

propositional (Schwarzschild (ibid.) following Cresswell (1973)). Indeed, this follows from the definition of existential closure given by Schwarzschild (ibid., 9): If $\omega \in D_t$, then $ExClo(\omega) = \omega$.

(41) [John is flirting]$_A$, but I don't know with who$_i$ [~~John is flirting t_i~~]$_E$.
$[\![E]\!]^{w,g} = \mathbf{flirt}(j)$

Local Givenness is satisfied, as A and ExClo(E) in (44) express the same proposition. This treatment of adjunct traces is also needed to correctly predict cases of aggressive sprouting, as in (42), in which the adjunct trace corresponds to the expression *with whose help*.

(42) [John$_i$ is baking a cake]$_A$, but I don't know with whose help$_j$ [~~he$_i$ is baking a cake t_j~~]$_E$.

Existential closure over E in (42) returns the proposition $\exists x[\mathbf{cake}(x) \wedge \mathbf{bake}(x)(j)]$, which is entailed in its local context because it expresses the same proposition expressed in A.

In an example like (43) below, we expect existential closure to apply to the trace because the trace is the complement of the preposition *with*. Correspondingly, the type of the entire expression is not of propositional type t (Schwarzschild ibid.):

For any conjoinable type ‹a,b›:
If $\omega \in D_{\langle a,b \rangle}$, then $ExClo(\omega) = \exists u \in D_a [ExClo(\omega(u))]$

(43) [John is flirting with someone]$_A$, but I don't know who$_i$ [~~John is flirting with t_i~~]$_E$.
$ExClo([\![E]\!]^{w,g}) = \exists x[\mathbf{flirt}(j)(x)]$

Local Givenness is again satisfied in (43), as the two propositions are identical. In examples like (46), we expect existential closure to apply to the argument trace of the preposition, as in (44).

(44) [John is flirting]$_A$, #but I don't know who [~~John is flirting with t~~]$_E$.
$ExClo([\![E]\!]^{w,g}) = \exists x[\mathbf{flirt}(j)(x)]$
$[\![A]\!]^{w,g} = \mathbf{flirt}(j)$

In this case, A and ExClo(E) do not express the same proposition. However, A is said to entail the existential closure of E, as the act of flirting entails the act of flirting with someone. However, Local Givenness has an additional requirement, which is that the proposition expressed by the ellipsis site must be uniquely salient in its local context. It is plausible that the ExClo(E) in (46) satisfies the entailment condition of Local Givenness but fails to satisfy its saliency condition, which is based not on entailment but on the prominence of the proposition in the discourse.

Something remains to be said, then, about argument sprouting, as in (45). Because the elided phrase in both (45a&b) is propositional, existential closure over each TP will yield the proposition **eat**(j). However, this risks contradicting the argument presented for (46), in that the

proposition **eat**(j) may not be uniquely salient in context over the antecedent proposition ∃*x*[**eat**(*x*)(j)].

(45) a. [John ate]$_A$, but I don't know what$_i$ [~~John ate t_i~~]$_E$.
b. [John ate something]$_A$, but I don't know what$_i$ [~~John ate t_i~~]$_E$.

I believe this is not a problem. There is evidence that the propositions expressed in the antecedent and elision site of (45b) are more closely related than those in (46). For example, (41a&b) assert the antecedents of (45b) and (46), respectively, followed by an additional assertion of their respective elided propositions.[41]

(46) a. #John was eating, in fact this time John was eating SOMEthing.
b. OK/? John was flirting, in fact this time John was flirting WITH someone.

Example (a) is judged by native speakers to be much more degraded than (b), suggesting that the redundancy in (a) is greater than in (b). It is plausible, then, that the elided proposition in (45a) is indeed uniquely salient in context, as it is closely (cognitively or semantically) related to the antecedent proposition.

A third syntactic identity condition that Chung proposes is the Case condition, which is defined below.

> *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.

Chung (2013, 48) argues for the Case condition based in part on the data in (47):

(47) #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 (47) 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

41 Thank you to Dan Hardt and Deniz Rudin (p.c.) for suggesting redundancy as a possible test for salience.

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]." Note that no possible alternative antecedent is available in the discourse; that is, the discourse was constructed in such a way as to preclude the possibility that an antecedent for the sluice could be found not in the preceding sentence but in the preceding discourse.[42] If the infelicity of (47) is truly rooted in syntactic ill-formedness, as Chung claims, it is mysterious why the example becomes acceptable in context. A closer investigation of the data used to motivate the Case condition is warranted; however, this is outside the scope of the current project.

To summarize this section, I have shown that it is not conclusive that case matching and Chung's Generalization consist of true counterexamples to a non-structural account of sluicing. While the polarity reversal data require us to abandon the stipulated No New Morphemes constraint, I believe that an explanatory accounting of the facts along the lines of what has been proposed here is a tenable way forward.

5.3 Limited Explanatory Power

The observant reader may have noted that the polarity reversal examples given so far have contained only *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. This section shows that polarity reversal examples are indeed available with a greater class of remnants.

Manner *how* polarity reversal sluices are possible and have been found in corpus data:

(48) [corpus example, Santa Cruz Ellipsis Project]
Context: No one expects Apple to stand still, however, and that fuels the speculation. "I don't think Steve Jobs will let it be a boring MacWorld,"
Sluice: "we just don't know how [~~he won't let it be a boring MacWorld~~]."

Degree *how* polarity reversal sluices are also possible.

(49) [constructed example]
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,

42 Note that 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 such a strategy would only be available here in a specific context.

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: [John$_j$ either didn't do any extra credit problems]$_A$, or he$_j$ didn't tell us how many$_i$ [~~he$_j$ did t_i extra credit problems~~]$_E$.

Polarity reversal examples containing an argument remnant can also be constructed under conditions that ensure the elided proposition is uniquely salient and entailed in its local context.

(50) I don't think that NO one came to the party, I'm just not sure WHO$_i$ [~~t_i came to the party~~].

In summary, while many naturally-occurring polarity reversal sluices found so far contain *why* as the remnant, different classes of remnants are possible as long as the requirements of Local Givenness and the other constraints discussed here are met.

6. 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 shows that, counter to its dominant treatment in the syntactic literature, sluicing is an inherently pragmatics-sensitive phenomenon subject to contextual licensing. I argue 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 verb phrase ellipsis (VPE):

(51) **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~~]."

[James McCloskey, p.c.]

The full scope of ellipsis possibilities is still being discovered; for example Merchant (2013) observed that VPE allows voice mismatches, a mismatch that had previously been thought impossible. It remains to be explored 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, many additional challenges to developing a complete theory of sluicing and ellipsis, of course, remain.

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Formal Appendix A

Another class of polarity reversal sluices contains non-factive negative attitude verbs. These verbs form a natural class grouped by Asher (1987) as Negative (Indefinite and Definite) Non-factives (NIDN). I assume here a standard definition of negative verbs as generally those that admit downward entailing inferences, in the sense of Ladusaw (1979). Example (i) illustrates a naturally occurring example.

(i) [modified corpus example 99105, Santa Cruz Ellipsis Project]
[We doubt that [Iraq will comply with the mandate]$_p$]$_A$, but we don't know why
[~~Iraq won't comply with the mandate~~]$_{E/\neg p}$.

Following Anand & Hacquard (2013), we can think of an assertion of *doubt that p* as having three meaning components. The first is a felicity condition that *s* is uncertain about the truth of *p*. The second is that *doubt* semantically encodes a weak possibility assertion about *p*; that is, *s doubts that p* commits *s* to entertaining the doxastic possibility of *p*. Last, *doubt* expresses a preference assertion that $\neg p$ is more likely to the speaker than *p*. Formally, this is expressed as a probability ordering on propositions via direct comparison of the worlds contained within those propositions (cf. Kratzer's (1991) better possibility ordering). The preference assertion that $\neg p$ is more likely to the speaker than *p* is what does the work for our purpose here.

Application of Local Givenness to (i):

i. Starting Context:
$c = W$

ii. In order to felicitously assert (i_A), the speaker must be uncertain about whether *p* or $\neg p$.

Felicity Condition on Assertion of A:
$[\![\text{A}]\!] = [\![\textbf{doubt}(p)(s)(w)]\!]^{w,S,g}$ is defined iff
$[\exists w'[w' \in S' \wedge w' \in p] \wedge \exists w''[w'' \in S' \wedge w'' \notin p]]$, such that $S' = DOX_{s,w}$

If felicitous, the utterance of A semantically asserts that the speaker believes that p is possibly true.

Doxastic Requirement on A:
$\exists w'[w' \in \text{W}_{\text{DOX,s}} \wedge w' \in p]$

iii. A also asserts a preference for $\neg p$ over p. In context, the assertion of this preference licenses the strengthened inference that the speaker believes that $\neg p$.

Assume a QUD: Will Iraq comply with the mandate? This QUD splits the future of the discourse into two spaces:

I. $\{w: \textbf{comply}(\text{mandate})(\text{iraq})(w)\}$ or,
II. $\{w: \neg \textbf{comply}(\text{mandate})(\text{iraq})(w)\}$

The assertion of A expresses a preference of the speaker toward future discourse space (II), licensing the stronger inference of belief that
$\forall w[w \in \text{W}_{\text{dox,s}} \rightarrow \neg \textbf{comply}(\text{mandate})(\text{iraq})(w)]$.

iv. The assertion of A pragmatically asserts that Iraq will not comply with the mandate.

Local Context Updated with Assertion of A:
$\text{W} \cap \{w: w \in \text{W}_{\text{dox,s}}\} = \{w: \neg \textbf{comply}(\text{mandate})(\text{iraq})(w)\} = \text{c}_{\text{LE}}$

v. Semantic Denotation of E:
$ExClo([\![\text{E}]\!]^{w,g}) = \{w: \neg \textbf{comply}(\text{mandate})(\text{iraq})(w)\}$

vi. Local Givenness:
$\text{c}_{\text{L}} \subseteq q = \{w: \neg \textbf{comply}(\text{mandate})(\text{iraq})(w)\} \subseteq \{w: \neg \textbf{comply}(\text{mandate})(\text{iraq})(w)\}$

Step (vi) shows that Local Givenness is satisfied and we correctly predict felicitous elision of E in (i).

Formal Appendix B

Another class of examples in which polarity reversal sluices have been found is that containing NPI punctual *until.*[43] Example (ii) illustrates a naturally occurring example.

(ii) [corpus example 94827, Santa Cruz Ellipsis Project]
Context: Some directors said they viewed Clinton's proposals [to regulate teenagers' access to tobacco]$_A$ as part of a larger campaign to increase government restrictions on the tobacco industry, and several criticized the administration for emphasizing to teenagers the adverse effects of smoking rather than of alcohol and drugs. "Tobacco$_i$ has been in this country 200 years, but [the administration$_j$ has never talked about it$_i$ until now]$_A$," said B. Frank Strickland of Lakeland, Ga.

Sluice: "I don't know why [~~they$_j$ are talking about it$_i$ now~~]$_E$. But I do know tobacco does not do what alcohol and dope do to people. Yet they jump on tobacco. Why don't they jump on the dope crowd?"

The division of pragmatic and semantic labor with *until* is debated in the literature (Karttunen 1974a, de Swart 1996, Giannakidou 2002, and Condoravdi 2008).[44] I adopt a version of de Swart's (1996) truth conditions containing the actualization of the event, though nothing crucial in the account here hinges on this choice. The truth conditions for an utterance with punctual *until* can therefore be expressed as follows:

$$[\![\text{until}]\!]^g = \lambda Q.\lambda P.\lambda e.\exists t \exists t'\exists t'''[Q(t') \wedge P(e) \wedge AT(e,t''') \wedge \neg\exists e'\exists t'''[P(e') \wedge AT(e,t'') \wedge t \leq t'' < t']]$$

Where Q expresses the clock expression in the until phrase, P is a property expressing some eventuality e, the variables *t* are times with the domain T of times (points or intervals on the time axis and a precedence relation providing a total order on T) and AT maps eventualities to their location on the time axis. AT(e,t) represents that eventuality *e* holds at *t*.

APPLICATION OF LOCAL GIVENNESS TO (ii):

i. Denotation for (ii$_A$):
∃e∃t∃t'∃t'''[**n**(t') ∧ **administration talking about tobacco**(e) ∧ AT(e, t''') ∧
¬∃e'∃t''[**administration talking about tobacco**(e') ∧ AT(e,t'') ∧ t ≤ t'' < t']]

(ii$_A$) asserts the following:
a) that there exists an event *e* of the administration talking about tobacco and *e* occurs at time *t'''*;
b) there is a time *t'* which is the lower bound of time at which *e* can occur;
c) there is no event of the administration talking about tobacco that occurs before *t'*;
d) there is a contextually determined time interval *t* < *t'* within which *e* is expected to occur (accounting for the feeling of 'lateness' of *e* (Karttunen 1974a)).

43 See Karttunen (1974a) and de Swart (1996) a.o. for a discussion of punctual vs. durative *until*.

44 All cited theories motivate a lexical distinction between punctual *until* and durative *until*. See Smith (1974), Mittwoch (1977), and Declerck (1995) for alternative accounts.

ii. The context of (ii) implicates that the event did not occur later than the time denoted by Q, or the utterance time; therefore $t''' = t'$.

Temporally Enriched Denotation of (ii_A):
∃e∃t∃t'[**n**(t') ∧ **administration talking about tobacco**(e) ∧ AT(e, t') ∧
¬∃e'∃t"[**administration talking about tobacco**(e') ∧ AT(e,t") ∧ t ≤ t" < t']]

iii. Context Update with (ii_A):
c_{LE} = W ∩ {w: ∃e∃t∃t'[**n**(t')(w) ∧ **administration talking about tobacco**(e)(w) ∧ AT(e, t')(w) ∧ ¬∃e'∃t"[**administration talking about tobacco**(e')(w) ∧ AT(e,t")(w) ∧ t ≤ t" < t']]}

iv. Denotation of (ii_E):
{w: ∃e∃t'[**administration talking about tobacco**(e)(w) ∧ **n**(t')(w) ∧ AT(e,t')(w)]}

v. Local Givenness:
$c_{LE} \subseteq ii_E$ = {w:∃e∃t∃t'[**n**(t')(w) ∧ **administration talking about tobacco**(e)(w) ∧ AT(e, t')(w) ∧ ¬∃e'∃t"[**administration talking about tobacco**(e')(w) ∧ AT(e,t")(w) ∧ t ≤ t" < t']]} ⊆ {w: ∃e∃t'[**administration talking about tobacco**(e)(w) ∧ **n**(t')(w) ∧ AT(e,t')(w)]}

Step (v) shows that the local context of E entails the proposition expressed by E and Local Givenness is satisfied.[45]

45 Karttunen (1974a) observes that punctual *until* focuses on the onset of the event denoted by the main clause as opposed to the absence of that event in the time period leading up to Q. A proposition expressing the realization of the event will therefore also be more salient in the context than the proposition expressing the negation of that event. I believe that speaker variation on this example is due to individual variation on the relevant level of saliency needed for elision. See §5.1 for a discussion of the saliency requirement.