Polarity Reversals under Sluicing[1]

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1. Overview

Sluicing, first noted by Ross (1969), is an ellipsis phenomenon in which the TP of an interrogative is elided, stranding an overt wh-phrase in the CP domain.

　　1)　　Bernie knows that someone in Iowa voted for Trump, but he doesn't know
　　　　　who [$_{TP}$ ~~*t* in Iowa voted for Trump~~]$_E$.

This project presents novel English data in which the elided content and the antecedent content in a sluiced construction contain opposite polarity.

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

Main Contributions:

✦ The data challenge current accounts of identity conditions on sluicing. They demonstrate that a greater mismatch between antecedent and elided content is possible than previously thought.

✦ The project shows that a complete theory of sluicing must account for the ability of pragmatically and contextually enriched meanings to serve as antecedents in sluicing constructions.

Structure of the Talk:

§2　OVERVIEW OF PREVIOUS ANALYSES: GIVENness and e-GIVENness; why e-GIVENness fails when applied to the polarity reversal data.

§3　A NEW PROPOSAL: the Sluicing Condition and its application.

§4　BEYOND NEG-RAISING: the Sluicing Condition applied to a greater variety of polarity reversal examples.

§5　CONCERNS OF OVERGENERATION: How a pragmatic theory of sluicing interacts with general discourse constraints.

§6　CONCLUSION

A METHODOLOGICAL PROLOGUE: The corpus examples given here were identified by undergraduate annotators trained by the Santa Cruz Ellipsis Project and were verified by graduate students and faculty working on the Ellipsis Project. Many examples presented have more than one possible interpretation for the pre-sluice. The claim is not that the pre-sluices provided here are the *only* interpretation available for each example, but merely that they are felicitous, freely available interpretations.

A DATA PROLOGUE: The analysis proposed here excludes three types of sluices that, to my knowledge, have not been explicitly excluded from previous analyses. I exclude these sluices because their licensing conditions are demonstrably different from that of embedded sluices.

> ROOT SLUICES: Acceptable with no (obvious) linguistic antecedent.

> 3)   **Context:** This sluice is taken from a post on the blog Jezebel about a particular kind of concert Miley Cyrus announced she would be holding.
>
>   "Miley has yet to confirm the news or provide further details—including, for example, 'why.'"[2]

> SEMI-IDIOMATIC USAGES: Acceptable in out-of-the-blue utterances.

> 4)   Mary got a new boyfriend – guess who!

> WHY-STRIPPING: See Yoshida et al. (2014).

> 5)   Why Trump?[3]

2. Previous Analyses

This section presents both Merchant's (2001) e-GIVENness theory of ellipsis and sluicing and the theory on which it is based, Schwarzschild's (1999) theory of GIVENness. I argue that e-GIVENness is too restrictive to account for the polarity reversal data and that a sluicing theory more closely aligned with GIVENness is needed.

2.1 GIVENness
Arguably the dominant semantics-based theory of sluicing in recent years is Merchant's (2001) theory of e-GIVENness.[4] e-GIVENness is a modification of Schwarzschild's (1999) theory of GIVENness. This subsection provides an overview of GIVENness.

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2   http://jezebel.com/a-miley-cyrus-nude-concert-is-the-most-miley-idea-ever-1736444064
3   Headline on Huffington Post: http://www.huffingtonpost.com/george-lakoff/why-trump_1_b_9372450.html
4   For the original syntactic isomorphy condition approach, see Ross (1969). For an LF copying approach, see Chung et al. (1995). I adopt here Merchant's objections to these theories outlined in his 2001 account—including arguments based on case-matching effects and preposition-stranding generalizations—and use e-GIVENness as a jumping-off point. See also Ginzburg and Sag (2001) for a QUD based approach which is not discussed in Merchant (2001); Barros (2014), which presents an account similar to Ginzburg and Sag (ibid.); and Barker (2013), which presents a categorial grammar approach.

Schwarzschild's (1999) GIVENness

Schwarzschild is concerned with constructing a theory of focus and deaccenting. He proposes, drawing upon Rooth's (1985, 1992) theory of focus, that an expression can be deaccented if it is GIVEN. To understand (e-)GIVENness, we need to first understand two preliminary concepts:

∃-type shifting: a type-shifting operation that raises expressions to type ‹t› and existentially binds unfilled arguments.[5]

For example, a VP of type ‹et› can be existentially-closed and raised to type ‹t›, as shown in (6).

6)   VP of type ‹et› = called Ben an idiot
         ∃-type shifting of VP = $\exists x . x$ called Ben an idiot[6]

The second concept is that of focus closure (F-closure).

F-closure (Schwarzschild 1999): The F-closure of α, written F-clo(α), is the result of replacing F-marked (focus-marked) parts of α with ∃-bound variables of the appropriate type (modulo ∃-type shifting).

An example of focus closure of a TP is given in (7).

7)   TP = [Abby]$_F$ called Ben an idiot
         F-clo(TP) = $\exists x . x$ called Ben an idiot

Schwarzschild's informal definition of GIVENness is given as follows:

GIVENness: Informally, GIVENness says that an expression can be deaccented if the existential focus closure of the expression is contextually entailed by the existential closure of an antecedent.

Schwarzschild (1999) Formal GIVENness Condition:
An utterance B counts as GIVEN iff it has an antecedent A and:
     a. if the semantic type of B is e, $<w,g> \in c \; \exists h \; [[\![A]\!]^g = [\![B]\!]^{g,h}]$
     b. If the semantic type of B is conjoinable:
     $\forall <w,g> \in c \; \exists h \; [ExClo([\![A]\!]^g)(w) \to ExClo([\![B]\!]^{g,h})(w)]$

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5   Existential type-shifting is needed in Schwarzschild's account in order to raise the type of any expression to that of a proposition, as the entailment conditions of GIVENness hold between propositions and not, for example, between VPs. The mechanism is adopted in Merchant (2001) in order to existentially close over the trace of a moved wh-phrase so that entailment holds over propositions in the elision and antecedent sites.

6   Semantics simplified throughout for expositional purposes.

Problems of GIVENness Applied to Ellipsis

GIVENness is not a theory of ellipsis (not Schwarzschild's concern). Merchant draws from the idea (see e.g. Rooth (1992)) that the licensing conditions for deaccenting and ellipsis are related, the strong version of which is to say that ellipsis is just an extreme version of deaccenting. However, applying GIVENness directly to ellipsis runs into a problem. Specifically, GIVENness fails to rule out impossible sluices such as (8).

8)   [Abby called someone an idiot]$_A$, but I don't know who [#~~Abby insulted *t*~~]$_E$.

Based on such examples, Merchant proposes that GIVENness alone is not strong enough to act as a licensing condition for ellipsis.

2.2 e-GIVENness

Merchant strengthens the theory of GIVENness by requiring that the entailment relationship between the antecedent expression and the elided expression be bidirectional instead of unidirectional. The theory is defined 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 that condition (ii) is the novel aspect of the theory. The entailment requirement here is that of <u>semantic entailment</u> and, unlike GIVENness, does not leave room for contextual entailment.

e-GIVENness correctly predicts the sluicing possibility in example (1), repeated below.

1)   Bernie knows that [$_{TP}$ someone in Iowa voted for Trump]$_A$, but he doesn't know who [$_{TP}$ ~~*t* in Iowa voted for Trump~~]$_E$.

<u>A entails F-clo(E)</u>: Yes.
$A = \exists x [\textbf{in Iowa}(x) \wedge \textbf{vote for Trump}(x)]$
$\text{F-Clo(E)} = \exists x [\textbf{in Iowa}(x) \wedge \textbf{vote for Trump}(x)]$

E entails F-clo(A): Yes.

$E = \exists x [\mathbf{in\ Iowa}(x) \wedge \mathbf{vote\ for\ Trump}(x)]$

$\text{F-Clo(A)} = \exists x [\mathbf{in\ Iowa}(x) \wedge \mathbf{vote\ for\ Trump}(x)]$

e-GIVENness also correctly rules out the problematic example given in (8), repeated below. Recall that (8) is the example that Merchant (2001) claims is unaccounted for by the unidirectional entailment account of GIVENness.

8)   [Abby called someone an idiot]$_A$, but I don't know who [#~~Abby insulted *t*~~]$_E$.

     A entails F-clo(E): Yes.   E entails F-clo(A): No.

     $A = \exists x.$Abby called x an idiot $E = \exists x.$Abby insulted x

     F-Clo(E) $= \exists x.$Abby insulted x F-Clo(A)$=\exists x.$Abby called x an idiot

Predictions of e-GIVENness for Polarity Reversal Data
     This section shows that e-GIVENness cannot capture the polarity reversal example in (2), repeated below.

2)   I don't think that Trump$_i$ will comply with the debate requirements, but I don't know why [$_{TP}$ ~~he$_i$ won't comply with the debate requirements~~]$_E$

A plausible antecedent expression in (2) is the TP [$_{TP}$ Trump$_i$ will comply with the debate requirements]$_A$.

Applying e-GIVENness to the two TPs yields the following:

9)   I don't think that [$_{TP}$ Trump$_i$ will comply with the debate requirements]$_A$ but I don't know why [$_{TP}$ ~~he$_i$ won't comply with the debate requirements~~]$_E$

     A entails F-clo(E): No.
     A = **comply with debate requirements**(t)
     F-Clo(E) = ¬**comply with debate requirements**(t)

     E entails F-clo(A): No.
     E = ¬**comply with debate requirements**(t)
     F-Clo(A) = **comply with debate requirements**(t)

Conclusion of applying e-GIVENness to (9): We find that there is no mutual entailment between the two TPs and e-GIVENness is not satisfied.

An alternate possibility is to include the matrix clause in the antecedent, thereby capturing its negation in the antecedent expression. This is shown in (10) below.

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

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

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

INTERIM CONCLUSION I: Bidirectional semantic entailment accounts are too restrictive and fail to
predict the existence of polarity reversal data.

3. A Modified Account

This section presents a modified theory of the identity conditions on sluicing and shows how the
theory derives the correct predictions for the polarity reversal example in (2).

3.1 Pragmatic Identity for Sluicing

Proposal: The identity condition licensing elision of a proposition in sluicing constructions is
pragmatic in nature.[7]

         Context *c*: the set of worlds compatible with what is accepted as true by participants in a
         conversation at a particular point in the conversation (cf. Stalnaker's (2002) *context set*).

         Local context *c$_L$*: the set of worlds compatible with the presuppositions of the local
         proposition.

The local context allows propositions to be entered into the discourse as temporary assumptions
without being entered into the global discourse context (Kadmon 2001 and citations within).

         Context update:
         a. If c_L entails the presuppositions of a proposition p, then $c_L + p = \{c_L \cap p\}$
         b. If c_L does not entail the presuppositions of p, then either:
                 i. undefined, or
                 ii. the presuppositions of p are accommodated, $c_L + p = \{(c_L \cap ps(p)) \cap p\}$

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7   Note that this is not a novel proposal. See e.g. Ginzburg and Sag (2001) for a QUD-based licensing approach.

Sluicing Condition: 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.

Informally, a TP can be elided iff it expresses a proposition that is entailed by the local context and is uniquely salient.

3.2 Accounting for Neg-Raising Polarity Reversal Sluices

Recall that the polarity reversal example given in (2) contains the neg-raising verb *think*.

11)   Hillary doesn't <u>think</u> that Trump will comply with the debate requirements.

       Available Interpretation: Hillary thinks that Trump will not comply with the debate requirements.

12)   Hillary doesn't <u>know</u> that Trump will comply with the debate requirements.

       Impossible Interpretation: Hillary knows that Trump will not comply with the debate requirements.

What is special about neg-raising verbs like *think* vs. non-neg raising verbs like *know*? In (11), '¬think that p' commits the speaker (in a defeasible way) to 'think that ¬p'.

   Gajewski's (2007) Excluded Middle Presupposition:
   (building on work by Abusch (2005), Bartsch (1973), and Horn (1972, 1978, 1989))
   The ability of matrix negation to scope below a neg-raising verb is due to a pragmatic convention.[8] Gajewski proposes that neg-raising verbs are conventionally associated with a pragmatic excluded-middle presupposition, while non-neg raising verbs are not.

Example (2) is repeated below in slightly simplified form as (13):

13)   [I don't think that Trump$_i$ will comply]$_{ANT}$, but I don't know why [~~he~~$_i$ ~~won't comply~~]$_{ELL}$.

Predictions of the Sluicing Condition for (13):

   i.   (13ANT) semantically asserts that it is not true that the speaker believes that Trump will comply.

   14)   Semantic Denotation of (13ANT):
          $$\llbracket ANT\rrbracket^{w,g} = \neg\forall w[w \in W_{dox,s} \rightarrow \mathbf{comply}(t)(w)]$$

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8   But see Collins and Postal (2014) for a re-emergence of the syntactic account of neg-raising.

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ii. The pragmatic excluded middle presupposition given below in (15)—conventionally associated with the verb *think*—requires that the speaker either believes that Trump will comply or believes that Trump will not comply.

15)   Excluded Middle Presupposition of (13):
$$[\forall w[w \in W_{dox,\,s} \rightarrow \mathbf{comply}(t)(w)] \vee \forall w[w \in W_{dox,\,s} \rightarrow \neg\,\mathbf{comply}(t)(w)]]$$

iii. (13ANT) + (15) derive the strengthened neg-raised interpretation: Because (13ANT) asserts that it is not true that the speaker believes that Trump will comply, it follows that the speaker believes that Trump will not comply.

16)   Strengthened Neg-Raised Interpretation of (13ANT):
$$\forall w[w \in W_{dox,\,s} \rightarrow \neg\,\mathbf{comply}(t)(w)]$$

Possible Trump Beliefs:

(15): Trump will comply or he won't comply.

(13ANT): ¬ Trump will comply.
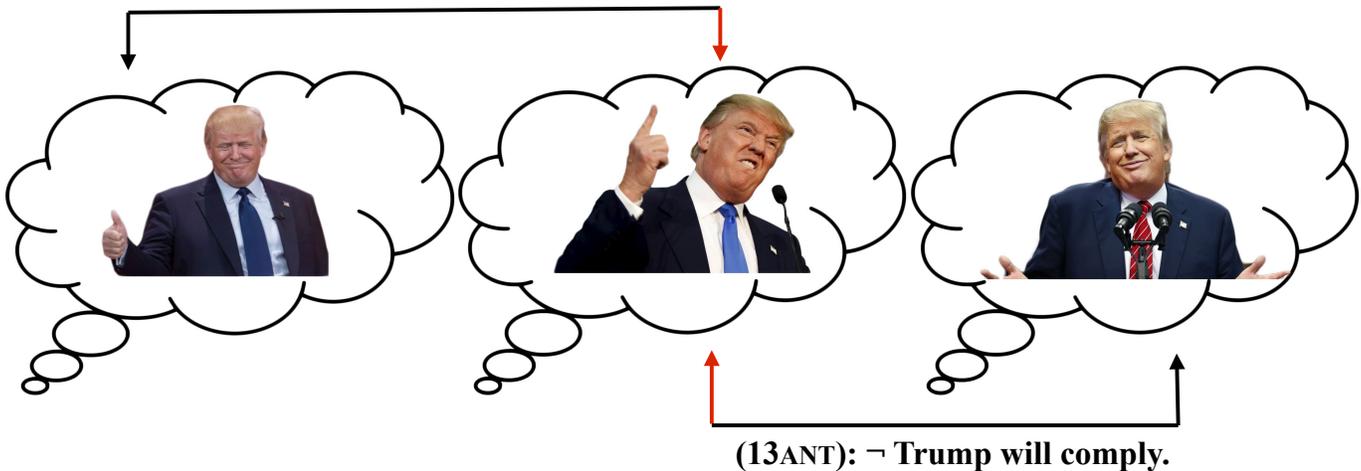
iv. The assertion of (16) yields a local context that entails (13ELL): The local context includes only those worlds in which Trump will not comply, which entails the elided proposition that Trump will not comply (in fact there is mutual entailment between the world sets).

17)   Context + (16):   Semantic Denotation of (13ELL):
$$\{w:\neg\mathbf{comply}(t)(w)\} \qquad [\![ELL]\!]^{w,g} = \{w:\neg\mathbf{comply}(t)(w)\}$$

v. The entailment satisfies the Sluicing Condition requirement that the elided proposition be entailed by its local context, and we predict felicitous elision of the proposition expressed by (13ELL).

Additional Formal Details of Applying the Sluicing Condition to (13):

i. $c = W$

ii. <u>Semantic Denotation of (ANT)</u>:
     $[\![\text{ANT}]\!]^{w,g} = \neg \forall w [w \in W_{\text{dox, s}} \rightarrow \textbf{comply}(t)(w)]$

iii. <u>Excluded Middle Presupposition of (ANT)</u>:
     $[\forall w [w \in W_{\text{dox, s}} \rightarrow \textbf{comply}(t)(w)] \vee \forall w [w \in W_{\text{dox, s}} \rightarrow \neg \textbf{comply}(t)(w)]]$

iv. <u>Strengthened Neg-Raised Interpretation of (ANT)</u>:
     $\forall w [w \in W_{\text{dox, s}} \rightarrow \neg \textbf{comply}(t)(w)]$

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 (see discussion of modal subordination in Roberts (1989) and of discourse subordination in Asher (1993)).

     $c_L \; for \, \text{ELL}: \; W \cap \{ w : w \in W_{\text{dox, s}} \} = \{ w : \neg \textbf{comply}(t)(w) \} = c_{\text{LE}}$

vi. <u>Semantic Denotation of (ELL)</u>:
     $ExClo ([\![\text{ELL}]\!]^{w,g}) = \{ w : \neg \textbf{comply}(t)(w) \}$

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).

     <u>Sluicing Condition</u>:
     $c_{\text{LE}} \subseteq ExClo ([\![\text{ELL}]\!])^{w,g} = \{ w : \neg \textbf{comply}(t)(w) \} \subseteq \{ w : \neg \textbf{comply}(t)(w) \}$

4. Beyond Neg-Raising

The polarity reversal analysis in §3.2 can be extended to cover similarly behaved examples with other categories of verbs:

4.1 Negative Non-factive Attitude Verbs: *Doubt*
In some contexts, to doubt a proposition *p* is to weakly believe ¬*p* (Asher (1987), Moltmann (1994), Anand & Hacquard (2013)).

18)   [modified corpus example 99105, Santa Cruz Ellipsis Project]
        [We doubt that [Iraq$_i$ will comply with the mandate]$_p$]$_{ANT}$, but we don't know why [~~they$_i$ won't comply with the mandate~~]$_{ELL}$

Anand and Hacquard (2013) propose that *doubt that p* has three meaning components:

1. FELICITY CONDITIONS
In order to felicitously assert that *s doubts that p*, *s* must be uncertain about the truth of *p*.

2. SEMANTIC POSSIBILITY ASSERTION
Doubt semantically encodes a weak possibility assertion about *p*; that is, *s doubts that p* commits *s* to entertaining the doxastic possibility of *p*. The doxastic possibility requirement of *p* is extremely weak, though. This is presumably the difference between the speaker doubting *p* and believing that ¬*p*.

3. PREFERENCE ASSERTION
Doubt expresses a preference assertion that ¬*p* is more likely to the speaker than *p*. The preference assertion that ¬*p* is more likely to the speaker than *p* is what does the work for our purpose here.

Claim: If to doubt a proposition *p* is to believe weakly that it is not the case that *p* or to have a preference for ¬*p*, then the inference *doubt p → believe ¬p* will hold in contexts in which the speaker's preference for, or belief that, ¬*p* becomes salient or strong enough to push the commitments of the speaker to ¬*p* over *p*.

Predictions of the Sluicing Condition for (18):

i.   In order to felicitously assert (18ANT), [We doubt that Iraq will comply with the mandate], the speaker must be uncertain about whether the embedded proposition *p*, [Iraq will comply with the mandate], is true or not true.

> Formal Felicity Condition on Assertion of ANT:
> $[\![ANT]\!] = [\![\textbf{doubt}(p)(s)(w)]\!]^{w,S,g}$ is defined iff
> $[\exists w'[w' \in S' \land w' \in p] \land \exists w''[w'' \in S' \land w'' \notin p]]$, such that $S' = DOX_{s,w}$
>
> S' here is an *information state*, or the set of possible worlds that the belief holder is actively entertaining and which is quantified over by attitude verbs (Veltman 1996). For a belief holder to be uncertain of *p*, her information state must contain a non-trivial set of worlds in which *p* is true and a non-trivial set in which *p* is false.

ii. If felicitous, the utterance of [We doubt that Iraq will comply with the mandate] semantically asserts that the speakers believe that the proposition [Iraq will comply with the mandate] is <u>possibly true</u>.

> <u>Formal Semantic Doxastic Requirement of ANT</u>:
> $$\exists w'[w' \in W_{DOX,s} \wedge w' \in p]$$
>
> The semantics requires only that some world in the information state of the belief holder be one in which p is true.

iii. Assume a Question Under Discussion (or QUD) (Roberts 1998/2012): Will Iraq comply with the mandate? The QUD splits the future of the discourse into two spaces:

> <u>Future Discourse Space:</u>
> I. $\{w: \textbf{comply}(mandate)(iraq)(w)\}$ or,
> II. $\{w: \neg\textbf{comply}(mandate)(iraq)(w)\}$

The utterance of (18ANT), [We doubt that Iraq will comply with the mandate], asserts the speakers' preference for discourse space II, [Iraq will not comply with the mandate], over discourse space I, [Iraq will comply with the mandate].

> Formally, this is assumed by Anand and Hacquard to be a probability ordering on propositions via direct comparison of the worlds contained within those propositions, cf. Kratzer's (1991) better possibility ordering. I will remain agnostic here, as the details of such an ordering is orthogonal to the current discussion.

iv. In context, the assertion of the speakers' preference toward discourse space (II) licenses the strengthened inference that <u>the speakers believe that Iraq will not comply with the mandate</u>.

19)   <u>Strengthened Inference of Belief of (18ANT)</u>:
    $$\forall w[w \in W_{dox,s} \rightarrow \neg\textbf{comply}(mandate)(iraq)(w)].$$

v. The inference in (19) yields a local context that entails (18ELL): The local context includes only those worlds in which Iraq will not comply, which entails the elided proposition that Iraq will not comply (in fact there is mutual entailment between the world sets).

20)   <u>Context + (19)</u>:
    $$\{w: \neg\textbf{comply}(mandate)(iraq)(w)\}$$

Semantic Denotation of (18ELL):

$[\![E]\!]^{w,g} = \{w: \neg\textbf{comply}(\text{mandate})(\text{iraq})(w)\}$

Formal Local Context Updated with Assertion of ANT:

$W \cap \{w: w \in W_{\text{dox,s}}\} = \{w: \neg\textbf{comply}(\text{mandate})(\text{iraq})(w)\} = c_{\text{LE}}$

The assertion of ANT creates a subordinating local context c_{LE} in which the set of worlds under consideration is that compatible with the speakers' doxastic state.

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vi. The entailment satisfies the Sluicing Condition requirement that the elided proposition be entailed by its local context, and we predict felicitous elision of the proposition expressed by (18ELL).

Formal Application of Sluicing Condition:

$c_{\text{LE}} \subseteq ExClo([\![\text{ELL}]\!]^{w,g}) = \{w: \neg\textbf{comply}(\text{mandate})(\text{iraq})(w)\} \subseteq \{w: \neg\textbf{comply}(\text{mandate})(\text{iraq})(w)\}$

Similarity to neg-raising verbs: In neg-raising examples such as (13), matrix negation is interpreted within an embedded proposition: for a proposition *p*, ¬*think p* → *think* ¬*p*. While *think* requires overt negation in the antecedent in order to negate the embedded proposition, *doubt* negates the embedded proposition as a property of its lexical semantics.

4.2 *Remember*
Can we appeal to a syntactic account of neg-raising or a deconstructionist account of negative attitude verbs? In some contexts, to not remember an eventuality *e* is to believe that *e* did not happen (see Karttunen's (1971) 'implicative' verb, Higginbotham's (2003) obligatory *de se* interpretation).

21) [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. . .

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

Remember is not a neg-raiser nor is it a negative verb. In certain contexts, it licenses the pragmatic inference that ¬remember *p* → ¬*p*.

Summarizing so far: Neg-raising verbs like *think*, negative attitude verbs like *doubt*, and *remember* all license polarity reversal sluices by (some kind of) matrix negation in the antecedent scoping pragmatically into the embedded proposition of the antecedent.

And now for something completely different.

4.3 Exclusive Disjunction

22)   [corpus example 22987, Santa Cruz Ellipsis Project]
       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 scale in favor of the decision.

       Sluice: "Senator McCain said, 'Do it by December 15 or explain why [~~you didn't do it by December 15~~],' and the commission jumped to it and did it that very day," Campbell told the Globe.

23)   [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: [John$_j$ either didn't do an extra credit problem]$_{ANT}$, or he$_j$ didn't mark which one$_i$ [~~he$_j$ did t_i~~]$_{ELL}$.

Karttunen's (1974b) Local Context for Exclusive Disjunction:
For propositions p, q such that $p \vee q$ is uttered in a context c:
       c_L for $p = c$,
       c_L for $q = c + \neg p$.

Informal Application of the Sluicing Condition to (23):

i. Assertion of Exclusive Disjunction in (23):

(23) asserts that either (ANT) **John didn't do an e.c. problem** or (ELL) **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.

ii. Karttunen's Local Context for Disjunction:

$c_{\text{L-ANT}}$ for **John did not do an e.c. problem** = c

$c_{\text{L-ELL}}$ for **John did an e.c. problem** = $c + \neg_{\text{ANT}} = c + \neg[$**John did not do an e.c. problem**$]$ = **John did an e.c. problem**

iii. Sluicing Condition:

(ELL) **John did an e.c. problem** must be entailed by its local context.

($c_{\text{L-ELL}}$) **John did an e.c. problem** → (ELL) **John did an e.c. problem**

iv. The Sluicing Condition is satisfied and we correctly predict felicitous elision in (23).

Formal Application of the Sluicing Condition to (23):

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

ii. Denotation and Existential Closure of ELL:[9]
$$ExClo([\![\text{ELL}]\!]^{w,g}) = \{w : \exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(j)(w)]\}$$

iii. Karttunen's Local Context for ANT and ELL:
$$c_{\text{L-ANT}} = c = W$$
$$c_{\text{L-ELL}} = c + \neg\text{ANT} = W \cap \{w : \neg\neg\exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(j)(w)]\}$$

iv. Sluicing Condition:
$$c_{\text{L-ELL}} \subseteq ExClo([\![\text{ELL}]\!]^{w,g}) = \{w : \neg\neg\exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(j)(w)]\}$$
$$\subseteq \{w : \exists x[\textbf{extra credit problem}(x)(w) \wedge \textbf{do}(x)(j)(w)]\}$$

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9 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

4.4 *Until*

Another class of examples contains polarity-sensitive punctual *until*.[10] [11]

> 24)   [corpus example, Santa Cruz Ellipsis Project]
>   "And that's a point where I intend to put my thumb on the scale and not take it off until somebody can give me a good reason why [~~I should take it off~~]."

See Anand et al. (2015) for a discussion of modality mismatches under sluicing.

> 25)   [corpus example 94827, Santa Cruz Ellipsis Project]
>   **Context:** Some directors said they viewed [President] Clinton's proposals 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 has been in this country 200 years, but they've never talked about it until now," said B. Frank Strickland of Lakeland, Ga.
>
>   **Sluice:** "I don't know why [~~they're talking about it now~~]. But I do know tobacco does not do what alcohol and dope do to people."

INTERIM CONCLUSION II: The proposal that the licensing condition for sluicing is sensitive to (i) the pragmatic enrichment of the antecedent content and (ii) the local context of the ellipsis site correctly accounts for the polarity reversal sluices shown here.

5. Concerns of Overgeneration

The account proposed here jettisons Merchant's (2001) bidirectional entailment account in favor of a unidirectional contextual entailment account more closely aligned with Schwarzschild's GIVENness theory. Can the account capture the data that motivated Merchant's bidirectional entailment condition?

Recall our example from §2:

> 26)   [Abby called someone an idiot]$_A$, but I don't know who [#~~Abby insulted t~~]$_E$.

Merchant proposes that E must semantically entail A in order to rule out the impossibility of the sluice in (26). However, Dayal and Schwarzschild (2010) point out that the un-elided form of (26) is also infelicitous:

> 26')   #Abby called someone an idiot, but I don't know who she insulted.

---

discourse. As the d-linking is orthogonal to the example here, I suppress this issue for the sake of expositional clarity.

10 I use here an analysis of *until* along the lines of Karttunen (1974a) and de Swart (1996), in which there are two lexical items *until*s: a durative *until* and a punctual, NPI *until*. A defense of this choice is found in the manuscript of this talk.

11 I have not found examples with durative *until*.

They propose that the infelicity of (26) is attributed not to an ill-formed sluice, but to the infelicity of the underlying question of the sluice. I adopt their proposal in the following condition:

> *The Well-Formedness Condition on Sluicing*:
> If the underlying question of a sluice is infelicitous, then the corresponding sluice will not be well-formed.[12]

The Well-Formedness Condition on Sluicing rules out on independent grounds the examples, such as (26), that motivate Merchant's bidirectional entailment condition. By doing so, it obviates the need for the condition.

How, though, does one account for the infelicity of (26')?[13]

> *Maximize Presupposition* (Heim 1991):
> Given two contextually equivalent alternatives, speakers must use the alternative whose presuppositions are stronger and happen to be met in the context of use.

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

Maximize Presupposition captures exactly the generalization that we want: a question must ask for only new information in a discourse and must presuppose the existence of any partial answers that are already available. Additionally, Maximize Presupposition relates this characteristic of questions to a more general constraint on felicitous utterances in a discourse.

INTERIM CONCLUSION III (PRELIMINARY): The data motivating the bidirectional entailment condition of e-GIVENness can be accounted for independently of a theory of sluicing.

But, a problem. Dayal and Schwarzschild do not discuss sluices such as the following.

28)   [Abby called [Joe]$_F$ an idiot]$_A$, but I don't know who [else]$_F$ [#Abby insulted t]$_E$.

The Well-Formedness Condition does not rule out such examples. *Else* adds the presupposition necessary to satisfy Maximize Presupposition and the underlying question is therefore felicitous. e-GIVENness correctly rules out the impossible ellipsis site in (28), assuming F-marking on *Joe*:

---

12 Note that the term *infelicitous* was chosen here in order to allow for the proposed amelioration of islands under sluicing (see Merchant 2001).

13 See also discussions in Romero (1997) and Barros (2014). Barker (2013) proposes to capture this generalization with his Answer Ban constraint; however, the Answer Ban is intended to apply exclusively to sluices, while this is clearly a more general constraint on questions in discourse.

A entails F-clo(E): Yes.   E entails F-clo(A): No.
 A = Abby called Joe an idiot   E = $\exists x.$ Abby insulted x
 F-Clo(E) = $\exists x.$ Abby insulted x F-Clo(A) = $\exists x.$ Abby called x an idiot

A purely unidirectional entailment condition, however, will not:

 A entails E: Yes
  A = Abby called Joe an idiot
  E = $\exists x.$ Abby insulted x

However, the account proposed here is not a purely unidirectional entailment account. It requires the proposition expressed by the elided TP to be uniquely salient in its local context. The Sluicing Condition is repeated below.

> **Sluicing Condition:** 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.

Looking again at (28):

28)   [Abby called [Joe]$_F$ an idiot]$_A$, but I don't know who [else]$_F$ [#~~Abby insulted~~ t]$_E$.

The proposition expressed by E, $\exists x.$ Abby insulted x, is not uniquely salient in its local context.

What is saliency? Difficult to define in a rigorous manner. One test:

> **Test for saliency:** p is salient at time t if p can be picked out by a propositional discourse anaphor, such as *that*, at time t.

That positive polarity sentences license the propositional discourse anaphor *that* is pointed out in Webber (1988), among others. That negative sentences also license discourse anaphora is observed in Asher (1993), Hwang (1992), and de Swart (1996).

29)   John didn't know$_i$ the answer to the problem. This$_i$ lasted until the teacher did the
        solution on the board.   (Asher 1993, pg. 53)

The propositional discourse anaphor *that* is anaphoric to 'activated' entities in the sense of Gundel et al. (1990); that is, it is anaphoric to entities that the speech participants are currently aware of, i.e. have access to due to the entities' presence in the immediate discourse context. This type of anaphoric reference to the sluiced content is possible in the polarity reversal cases:

30)   **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. . .

       H: I don't know why [~~I wasn't scared~~]ᵢ, but I really can not remember being scared.
       B: Thatᵢ's impossible! You were just a child.

In (30), the 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 judged to be "It's impossible that you weren't scared."

INTERIM CONCLUSION III (FINAL): The data motivating the bidirectional entailment condition of e-GIVENness can be accounted for by appealing to general constraints regulating coherent discourses and by restricting the elision of propositions to those that are salient in context.

6. Conclusion

SUMMARY OF MAIN RESULTS

✦ Incorporated novel data not previously discussed in the sluicing literature.

✦ Demonstrated that a complete theory of sluicing must account for the availability of pragmatically and locally enriched meanings to act as licensers for the ellipsis site of sluicing constructions.

FINAL THOUGHTS

✦ This presentation shows a way in which a pragmatic theory of sluicing can account for data that are challenging for non-pragmatic accounts.

✦ The account presented here is not intended to be an exhaustive explanation of the many interesting and challenging facets of sluicing. Two possible ways to move forward:

   ◆ Pursue a purely pragmatic approach to sluicing (in progress).

   ◆ Pursue a hybrid approach to sluicing involving both pragmatic and syntactic restrictions (see e.g. Chung (2006, 2013)).

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