

The semantics of sluicing: beyond truth-conditions*

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1 Introduction

One of the central issues in the study of ellipsis, and of sluicing in particular, has been the question of what relationship has to hold between the ellipsis site itself and the antecedent material in surrounding discourse. To take two basic examples, (1-2), the question is what conditions must the A(ntecedent) clause meet in order to allow for the ellipsis of the E(lided) clause.

- (1) [John ate something]_A, but I don't know [what ~~John ate~~]_E.
- (2) [John ate the taco]_A, but I don't know [when ~~John ate the taco~~]_E.

Following Ross (1969)'s pioneering work, most authors have taken the condition to be syntactic isomorphy of one sort or another. More recently, Merchant (2001) has pointed out a number of problems for such theories, proposing instead that a semantic condition is needed. In particular, Merchant (2001) argues that sluicing is licensed if and only if the existential closures of the A and E clauses entail one another symmetrically.

Under this theory, then, the E clause will necessarily have existential truth-conditions, due to the existential closure of the trace of the *wh*-word. In examples like (1) – what Chung et al. (1995) dub ‘merger’ – there is an overt indefinite (the ‘inner antecedent’) in the A clause, in this case, the indefinite *something*. In cases of so-called ‘sprouting’, like (2), the existential claim (in this case, that there is some time *t* such that John ate the taco at *t*) is taken to be entailed by the A clause alone. In essence, then, Merchant (2001) relies on there being indefinites in the A clause even in cases which are present in the semantics of the A clause, but not pronounced; that is to say, indefinite implicit arguments or at least entailments.

In this paper, we present several kinds of data in English which pose a challenge to an account built on symmetric entailment both for merger cases and for sprouting. Rather than arguing against a semantic condition, however, we will argue that the data are best captured under an analysis which shares its basic architecture with Merchant (2001) and Chung (2006)¹, but makes use of a semantics which comprises not only truth-conditional

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¹Chung (2006) and other subsequent work has a hybrid approach in which a semantic condition is supplemented by some sort of morphosyntactic condition, but one which is less stringent than full-blown isomorphy. We follow such an approach, as seen in §5.

information, but also *issues* in the sense of inquisitive semantics (Groenendijk (2007)), Groenendijk & Roelofsen (2009), and AnderBois (2012a) *inter alia*). The central intuition is that assertions not only contribute information, but also introduce issues which may be taken up in future discourse (similar to questions). Sluicing, we claim, is sensitive to both kinds of meaning, the result being that sluicing is licensed only in case the issue introduced by the question in the E clause is one which the A has already introduced (this is not quite true for certain cases of sprouting, see §5).

At the same time, then, this paper constitutes to my knowledge the first direct empirical argument that the semantics of English assertions must comprise not just their truth-conditions, but also their alternative-evoking or issue-raising capacity². In particular, we hold that an assertion like (1) with an indefinite, *something* has a semantic representation which reflects not only its truth-conditions but also the fact that it makes salient different alternatives (e.g. for (1), ‘that John ate tacos’, ‘that John ate soup’, etc.). Formally, this shift is captured by modeling the meanings of assertions as sets of proposed alternative propositions, rather than as simple propositions with no further structure. This approach, we show, allows for a deep understanding of the special role played by indefinites and disjunctions as inner antecedents, as well as allowing for satisfying accounts for more problematic cases.

1.1 Problematic merger data

For merger, the data which are problematic for a purely truth-conditional semantic condition come from cases where the truth-conditional equivalence of the A and E clauses is apparent, yet sluicing is infelicitous. The first such case we discuss are sentences where an otherwise suitable inner antecedent, such as an overt indefinite, occurs within the scope of double negation, as in (3). Given the truth-conditional vacuity of double negation, such A clauses are predicted to license sluicing, just like minimally different sentences with no negation.

- (3) #It’s not the case that Bill didn’t bring a dish, but I don’t know which (one).

The second problematic case for Merger are sentences where an otherwise licit inner antecedent occurs inside of an appositive relative clause. As in the case of double negation, the appositive preserves truth-conditions, yet sluicing is quite degraded.

- (4) #The valiant knight, who defeated a masked enemy, still wonders who.

Given the truth-conditional vacuity of double negation and apposition, the question becomes the following: what distinguishes the illicit A clauses in (3-4) from licit ones like (1)? Our answer builds on recent semantic insights from inquisitive semantics (Groenendijk (2007)), Groenendijk & Roelofsen (2009), and AnderBois (2012a) *inter alia*), which holds that ordinary indefinites like *something* in (1)_A introduce a set of alternatives into the composition and make two distinct semantic contributions related to this set.

The first is the truth-conditional *information* that there exists some true alternative or other in this alternative set. For example, the indefinite in (1)_A (given appropriate

²As we will discuss in §2, previous work in ‘Hamblin’ or ‘Alternative’ semantics has argued that indefinites (and disjunctions) evoke alternatives *within* the semantics of a sentence (e.g. Kratzer & Shimoyama (2002)). What is new here, however, is the idea such alternatives are truly part of the sentence’s top-level meaning.

compositional principles to be discussed in §2) will produce a set of propositional alternatives of the form ‘John ate x ’. The informative component of the meaning of $(1)_A$ is that there is at least one true alternative in this set. The second meaning component – the *inquisitive* component – is to make salient the issue of which alternative(s) in this set hold. In other words, a sentence with a (widest-scope) ordinary indefinite like *something* in $(1)_A$, has the effect of introducing a *potential* Question Under Discussion (QUD) in the sense of Roberts (1996) (i.e. a question whose resolution represents a ‘safe’ next step in conversation, but whose resolution is not obliged). While the importance of QUDs to the analysis of sluicing is already well established, most notably by Ginzburg & Sag (2001), we leverage the core idea of inquisitive semantics – the inquisitive nature of indefinites and disjunctions – to explain why it is these elements which play a privileged role in sluicing.

The central claim of this paper is that the semantic condition on sluicing is crucially sensitive to this alternative-rich notion of semantic content. Since E clauses in sluicing are always interrogative, their meanings will necessarily be inquisitive ones (indeed, this is their only *new* contribution). Given the inquisitive contribution of the E clause, it follows that the only A clauses which can symmetrically entail an E clause are ones which are themselves inquisitive. The emergent generalization is stated in (5):

- (5) **Inner antecedent generalization:** An expression α can serve as an inner antecedent for sluicing only if α makes an inquisitive contribution.

Since an ordinary indefinite like *something* in $(1)_A$ is, on this view, inquisitive, it is correctly predicted to be a possible inner antecedent. Similarly, since disjunctions have been argued to make an inquisitive contribution, we make the welcome prediction that disjunctions will also be licit inner antecedents, as in (6). As we will see in §3.3, this is so even in cases where the disjunction is of entire clauses, cases which are problematic for accounts based on syntactic isomorphy (as noted by Chung et al. (1995)). The inner antecedenthood of these two elements, then, is due to a particular semantic property they share with questions: their inquisitive potential.

- (6) [(Either) John or Mary left the door open]_A, and I want to find out [which (one) ~~left the door open~~]_E.

In contrast, we will argue that the A clauses in (3-4) have a different semantics. While they each make the same informative contribution to the discourse as corresponding examples with a simple indefinite would, they lack the inquisitive potential which the indefinite contributes. For double negation as in (3), this follows straightforwardly from the way in which negation is naturally defined in inquisitive semantics. Since sentence meanings in inquisitive semantics are sets of alternatives, to negate a sentence is to reject each of these alternatives (i.e. to universally quantify over them). As Groenendijk & Roelofsen (2009) point out, this means that *double* negation eliminates the inquisitive content of the sentence to which it applies. In §4, we will argue that independently observable properties of appositive relative clauses motivate a semantics where they too make a contribution to discourse which is inherently non-inquisitive.

1.2 Problematic sprouting data

For merger, the problematic cases we have introduced are ones where the sluicing fails despite the presence of the appropriate truth-conditional information in the semantics of the A clause. For sprouting, essentially the opposite problem arises: cases where sluicing succeeds despite the absence of even the existential information (let alone the relevant inquisitive content). That is to say, the A clause –“Fred baked a cake” – entails the existence of a time at which the cake was baked, but not the existence of a helper. In contrast to well-behaved cases of sprouting like (7), examples like (8) – first discussed in depth by Chung (2006) – are therefore problematic for an account based on symmetric entailment.

- (7) [Fred baked a cake]_A, but I don't know [when ~~Fred baked a cake~~]_E.
(8) [Fred baked a cake]_A, but I don't know [with whose help ~~Fred baked a cake~~]_E.

There is a clear intuition that such examples rely on inference or accommodation of some sort. However, an approach which relies on ‘direct’ accommodation at the level of the discourse will struggle to capture the fine-grained ways in which the linguistic form of the A clause itself still does impact the (in)felicity of such sluices. For example, Chung et al. (1995) (who in turn attribute the generalization to Chris Albert) observe that cases like (9), where there is an island present, do not allow sprouting. Furthermore, Romero (1998) observes that sprouting also is not possible in examples like (10a), where the non-elliptical counterpart – (10b)– is grammatical.³

- (9) *That Tom will win is likely, but it's not clear which race. Chung et al. (2010)
(10) a. *Ramon is glad that Sally ate, but I don't remember which dish.
b. I don't remember which dish he is glad that Sally ate. Romero (1998)

As in the problematic instances of merger from §1.1, we propose a solution which makes crucial use of inquisitive content in the A clause. We propose that like indefinites, the existential quantification over the Neo-Davidsonian event(uality) argument is inquisitive. For an example like (7), then, the proposal is that (7)_A contributes both the *information* that there exists an event of Fred baking a cake and makes salient the *issue* of which event it is. Sprouting, then, is the result of an inferential process we dub ‘issue-bridging’ (the term is intended to highlight the notional parallel with bridging definite descriptions). Sprouts like (7-8) are felicitous because the issue contributed by the E clause (e.g. What time was there an event of the appropriate type?) is sufficiently similar to that contributed by the A clause (e.g. Which event(s) are of the appropriate type?).

The felicity of (7-8), therefore, is crucially dependent on the issue contributed by the A clause. In the infelicitous sprouts in (9) and (10), on the other hand, the A clauses are not inquisitive since another operator takes scope over the existential event quantification. Without an inquisitive A clause, there is no issue to compare with that of the E clause and sluicing will not be possible.

³Lisa Matthewson (p.c.) suggests that the judgments in (9) and (10a) may exhibit more gradience than the judgments reported in previous literature (and repeated here) suggest. We leave this question for future exploration since islands-sensitivity is not central to the present paper.

The outline of the remainder of the paper is as follows. §2 reviews the inquisitive semantics for both assertions and questions proposed by AnderBois (2012a) (who in turn builds on work by Groenendijk & Roelofsen (2009) and others). §3 proposes a novel semantic condition which builds on Merchant (2001)’s symmetric entailment condition, but makes use of the inquisitive semantics proposed in §2. Having done this, we show that the account captures examples with disjunctive inner antecedents, (6), and the interaction with double negation, (3), in addition to more basic instances of merger. §4 shows that an independently motivated semantics for appositives correctly predicts the infelicity of (4) and a range of other facts regarding the interaction of appositives and ellipsis. §5 shows that cases of sprouting with indefinite or existential implicit arguments – which we call *direct* sprouting – follow straightforwardly given their independently observable semantics. §6 tackles cases of *indirect sprouting*, where no indefinite/existential argument is present (e.g. (8)) as cases of issue-bridging. Finally, §7 concludes.

2 Inquisitiveness in questions and assertions

In the introduction, we presented the core intuition of this paper: that sluicing makes crucial reference not just to truth-conditional information, but to a sentence’s inquisitive contribution. To do this, we of course need a semantics which comprise both of these meaning components, i.e. an *inquisitive* semantics in the sense of Groenendijk & Roelofsen (2009) and others. Inquisitive semantics builds on the core insight of Hamblin (1973), who proposed that the denotation of a question is a set of alternative propositions, namely its possible answers.

For a wh-question, this alternative set is contributed by the wh-word – which denotes a set of individuals – and “expands” by combining with other elements of the clause. The result, then, is that a wh-question has as its top-level meaning a set of alternative propositions. For example, a simple question like (11a) would denote the set of alternatives of the form ‘Bill talked to x ’, where x is some person or other. More concretely, then, the meaning of a (11a) would be as in (11b), with the number of alternative propositions being determined by the contextual restriction on the wh-word (and in a technical sense, the model relative to which the sentence is evaluated).

- (11) a. Who did Bill talk to?
 b. { ‘that Bill talked to Mary’, ‘that Bill talked to Al’, ‘that Bill talked to Jo’, ... }

In contrast to a question, Hamblin treats an assertion like (12a) as differing fundamentally in that it denotes not a singleton set containing a single proposition: ‘that Bill talked to someone or other.’ as in (12b). While for Hamblin, both assertions and questions are of the same type (sets of propositions, type *stt*) many subsequent works in this tradition, such as Lahiri (2002), have taken assertions to be of a different semantic type (a set of possible worlds, type *st*). This latter view, then assigns to (12a) a semantics like (12c), and therefore makes the meanings of questions and assertions look ever more different.

- (12) a. Bill talked to someone.
 b. { ‘that Bill talked to someone or other’ }

- c. ‘that Bill talked to someone or other’

While questions and assertions clearly are different in many ways, a number of recent works have pursued the intuition that these differences are not quite so stark as the traditional view above. In particular, it has been proposed that indefinites (Kratzer & Shimoyama (2002)) and disjunctions (Alonso-Ovalle (2006)) make the same alternative-rich contribution as Hamblin ascribes to *wh*-words. In this view, an indefinite like *someone* contributes the same set of individual alternatives as the corresponding *wh*-word, *who*. A disjunction similarly introduces a set of alternatives, with each disjunct spelling out a member of this set.

Although these authors extend do hold that indefinites and disjunctions themselves are more similar to *wh*-words, the view of the formal relationship between questions and assertions is remains the same as in Hamblin (1973). The top-level semantics of an assertion like (12a) still differs fundamentally from that of a question like (11a), differing either in the cardinality of the alternative set, (12b), or in the semantics type itself. (12c). In essence, then, these authors use question-like sets of alternatives as meanings for subparts of sentences, but arrives at the classical picture in (11-12) through the insertion of an existential closure operator (unpronounced in English) which quantifies over these alternatives.

The result, then is that pairs like (13a) and (13b) have identical meanings, even though the composition of the latter involves an alternative-evoking element, while the former presumably does not. In light of the asymmetry between these two sentences with respect to sluicing, seen in (14), this equivalence is an undesirable result.

- (13) a. It’s not the case that Bill talked to no one.
b. Bill talked to someone.
- (14) a. #It’s not the case that Bill talked to no one, but I don’t know who.
b. Bill talked to someone, but I don’t know who.

Inquisitive semantics builds on the Kratzer & Shimoyama (2002)-style alternative semantics by holding that not only do indefinites and disjunctions have an alternative-evoking semantics with sentential composition, but that evoking question-like alternatives is an aspect of the sentence’s top-level meaning and therefore its contribution to discourse. That is, while (??) has the same truth-conditions as (13a), the former additionally evokes the set of alternatives as the corresponding question did in (11).

In §2.1, we flesh out this picture for assertions by presenting AnderBois (2012a)’s inquisitive semantics for first order logic. §2.2 extends this semantics to questions, which have the same inquisitive content as corresponding sentences with indefinites, but are nonetheless distinguished by their being (necessarily) truth-conditionally uninformative.

2.1 Inquisitive semantics for first-order logic

In this section, we briefly review AnderBois (2012a)’s inquisitive semantics for first-order logic, which itself builds on the inquisitive semantics for propositional logic of Groenendijk &

Roelofsen (2009).⁴ As the preceding informal discussion suggests, the primary formal shift in inquisitive semantics is to treat the denotation of either an assertion or a question as a set of classical propositions, i.e. a set of sets of possible worlds. For many formulas, including all atomic formulas, this set will simply be the singleton set containing the classical denotation.

Atomic formulas:

$$\mathbf{S1:} \llbracket \mathbb{R}^n(\gamma_1, \dots, \gamma_n) \rrbracket^{\mathcal{M},g,w} = \text{ALT}\{\alpha \subseteq W \mid \text{for all } w' \in \alpha : \langle \llbracket \gamma_1 \rrbracket^{\mathcal{M},g,w'}, \dots, \llbracket \gamma_n \rrbracket^{\mathcal{M},g,w'} \rangle \in \llbracket \mathbb{R}^n \rrbracket^{\mathcal{M},g,w'}\}$$

Setting aside the contribution of ALT for a moment, the interpretive rule collects all of the sets of worlds where each world in that set is one where a given ordered tuple is a member of the given relation. For example, if we consider a toy model where “John left” is true only in worlds w_1 and w_2 , the definition will produce the set $\{\{w_1\}, \{w_2\}, \{w_1, w_2\}\}$ – the power set of classical denotation. The ALT operator, defined in (15), takes this set and eliminates any sets which are non-maximal, creating true *alternatives*, rather than mere *possibilities* (e.g. John and Bill leaving is not intuitively an *alternative* to John leaving). While this method is a bit cumbersome for atomic formulas, it will be crucial in a moment when we turn to inquisitive expressions (i.e. disjunctions and indefinites).

$$(15) \quad \text{ALT}\mathcal{P} = \{\alpha \in \mathcal{P} \mid \text{for no } \beta \in \mathcal{P} : \alpha \subset \beta\}$$

For basic cases (when all subformulas are not inquisitive), conjunctions similarly produce the set containing the classical denotation, as in **S2**. Universal quantifiers, then, are defined in **S3** essentially as conjunctions whose length is specified only by contextual restriction (and the domain of the model in a technical sense).

Conjunction:

$$\mathbf{S2:} \llbracket \varphi \wedge \psi \rrbracket^{\mathcal{M},g,w} = \text{ALT}\{\alpha \subseteq W \mid \text{there is some } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M},g,w} : \alpha \subseteq \beta \text{ and there is some } \gamma \in \llbracket \psi \rrbracket^{\mathcal{M},g,w} : \alpha \subseteq \gamma\}$$

Universal Quantifier:

$$\mathbf{S3:} \llbracket \forall u \varphi \rrbracket^{\mathcal{M},g,w} = \text{ALT}\{\alpha \subseteq W \mid \text{for all } d \in \mathcal{D}_e : \text{there is some } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M},g[u/d],w} : \alpha \subseteq \beta\}$$

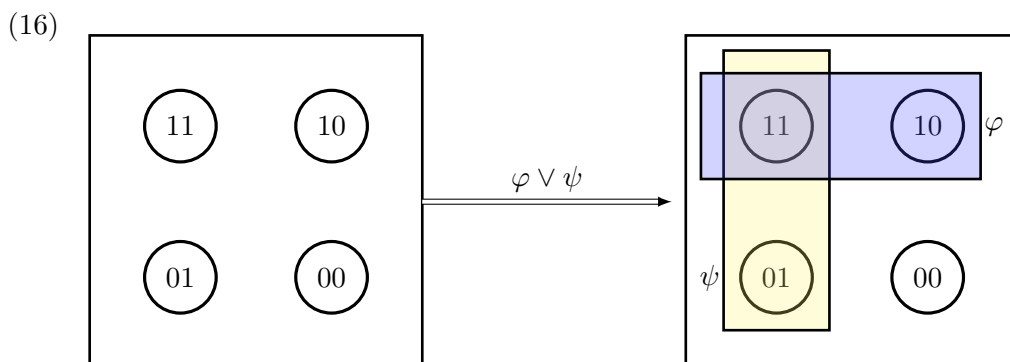
Thus far, we have yet to see the impact of inquisitive semantics since the elements we have considered thus far produce denotations which are singleton sets. Where we see its impact is when we turn to consider disjunction and the existential quantifier. A disjunction introduces a non-singleton set of alternatives into the computation, one per disjunct.

Disjunction:

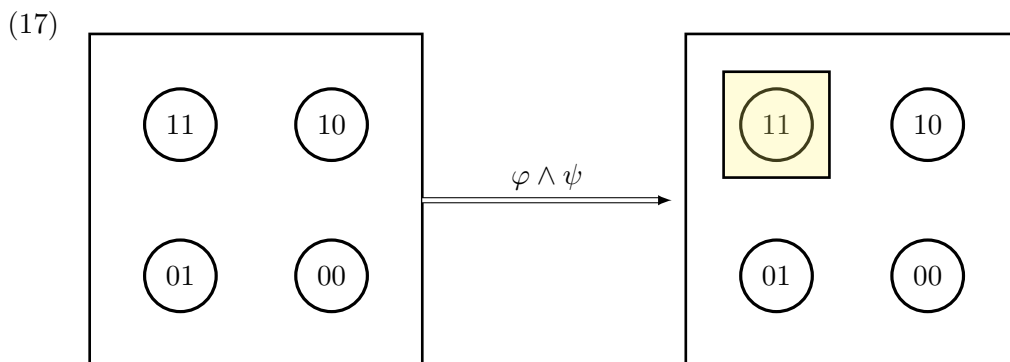
$$\mathbf{S4:} \llbracket \varphi \vee \psi \rrbracket^{\mathcal{M},g,w} = \text{ALT}\{\alpha \subseteq W \mid \text{there is some } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M},g,w} : \alpha \subseteq \beta \text{ or there is some } \gamma \in \llbracket \psi \rrbracket^{\mathcal{M},g,w} : \alpha \subseteq \gamma\}$$

⁴For simplicity’s sake, we limit ourselves here to models with finite domains. See Ciardelli (2009) for a somewhat more complicated inquisitive semantics for first-order logic which allows for models with infinite domains.

Since these alternatives are located in the semantic interpretation of the metalanguage, rather than the metalanguage *translation*, the formulas themselves appear unchanged. For this reason, it is helpful to have a pictorial representation of our inquisitive denotations, as in (16). Here, we consider a toy model with four possible worlds (w_{00} , w_{01} , w_{10} , w_{11}), each represented by a circle, with the numbers inside the circle indicating the truth value of two propositions, p and q , in that world. A disjunction $\varphi \vee \psi$, then, denotes a set of two alternatives: the maximal set of worlds where φ is true and the the maximal set of worlds where ψ is true.



Note that even though the definitions for conjunction/universal quantifier are entirely parallel to those for disjunction/existential quantifier, the former produces a singleton set of alternatives, as in (17). That is, the sets of worlds where all of the atomic formulas in the conjunction are true will necessarily be in a subset-superset relationship. The ALT operator, then, will eliminate all of the non-maximal ones, leaving only a single alternative (see Roelofsen (t.a.) for a far more detailed discussion of this asymmetry).



Just as we have done for the universal quantifier, the existential quantifier is defined as a disjunction with the number of disjuncts being specified contextually rather than linguistically. For a model with only two individuals, then, the denotation of the existential quantifier will be identical to that of a corresponding disjunction with two disjuncts.

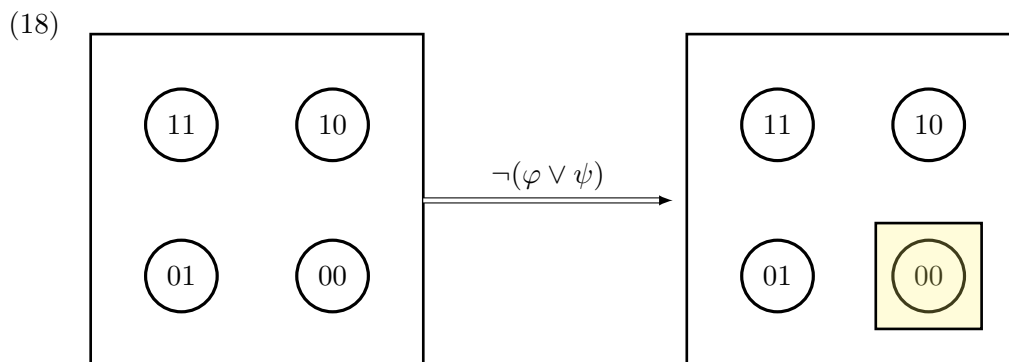
Existential Quantifier:

S5: $\llbracket \exists u \varphi \rrbracket^{\mathcal{M}, g, w} = \text{ALT} \{ \alpha \subseteq W \mid \text{there is some } d \in \mathcal{D}_e: \text{there is some } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M}, g[u/d], w} : \alpha \subseteq \beta \}$

We have seen that formulas containing disjunctions and existential quantifiers introduce non-singleton sets of alternatives into the semantics composition. Negation, then, is naturally seen as rejecting each of these alternatives. The interpretive rule in **S6** accomplishes this by universally quantifying over the alternatives in the denotation to which it applies. As we can see in (18), the result of this is that the negation of any formula consists of a single alternative, whether the formula to which it applies contains a single alternative (e.g. atomic formulas, conjunction) or is inquisitive (e.g. disjunction). Note that collecting all of the alternatives which reject *some* alternative in φ would yield quite different truth-conditions in cases where φ is inquisitive.

Negation:

S6: $\llbracket \neg\varphi \rrbracket^{\mathcal{M},g,w} = \text{ALT}\{\alpha \subseteq W \mid \text{for all } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M},g,w}: \alpha \cap \beta = \emptyset\}$



2.2 Questions in inquisitive semantics

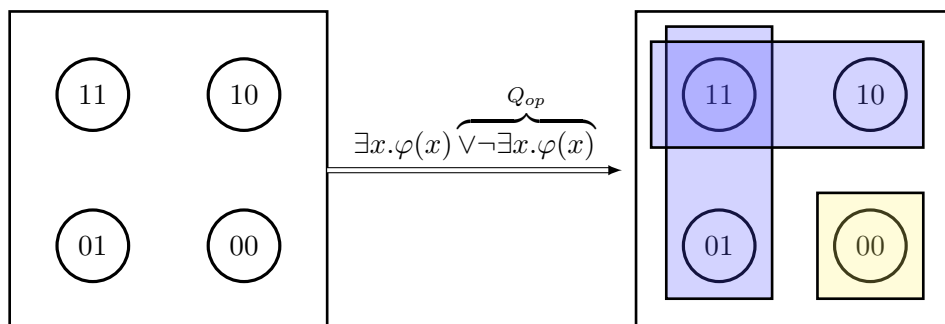
Thus far, we have assigned disjunctions and existential quantifiers a semantics which is far more question-like than is traditionally assumed. In §3, we will see that it is this inquisitive contribution which is central to the inner antecedenthood of disjunctions and indefinites. First, however, we review two different question semantics which have been proposed in previous literature in inquisitive semantics. Common to both is the idea that questions differ from assertions in whether or not they provide truth-conditional *information*, rather than differing in their inquisitiveness itself.⁵

Where previous work in inquisitive semantics has differed is in what sort of uninformativity questions require: *absolute* or *relative* to the sentence's presuppositions. The first option has been pursued by Groenendijk & Roelofsen (2009), who propose a question operator, Q_{op} , which takes the set of alternatives introduced by an inquisitive disjunction (or wh-word given our first-order extension) and adds in the elsewhere alternative: its negation. While it is not a partition (since the inquisitive alternatives introduced by the wh-word can

⁵It is important to point out here that we are here concerned only with defining the two classes of formulas – questions and assertions – rather than providing a complete characterization of how questions behave in discourse, which we take to be the domain of speech act theory. For example, in the semantics of Hamblin (1973), questions are sentences whose denotations are non-singleton sets, while assertions have singleton sets as their denotations. For Groenendijk & Stokhof (1984), the difference is one of semantic types, with questions being of type *sst* and assertions of type *st*.

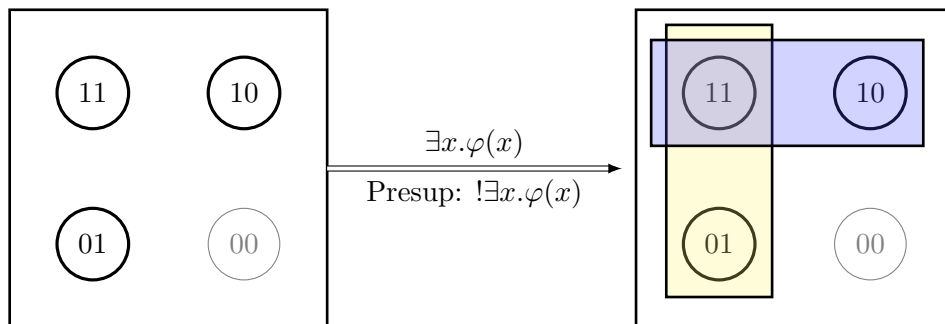
overlap), this semantics is reminiscent of Groenendijk & Stokhof (1984)’s in taking the question’s alternatives to cover the entire logical space, with no presupposition present.

(19) **Groenendijk & Roelofsen (2009)’s semantics for a wh-question:**



The second option, due to AnderBois (2012a), is to claim that questions have an existential presupposition and that the alternative set of the question is uninformative only relative to this presupposition. Returning to the inquisitive diagrams, we see in (20) that this means that the presupposed input state is one where the negative alternative has already been eliminated. The result, then, is a top-level semantics for questions which is identical to that of Hamblin (1973).

(20) **AnderBois (2012a)’s semantics for a wh-question:**



In what follows, we will adopt this second option, since it allows us to define entailment in independently motivated ways, by making use of so-called ‘Strawson entailment’ (von Stechow (1999) et seq.). Ultimately, there are, of course, empirical concerns beyond the scope of this paper which will decide between a question semantics in the mold of Hamblin (1973) semantics and one in the mold Groenendijk & Stokhof (1984). Perhaps most notably, the long unresolved question of whether or not wh-questions in general contribute existential presuppositions bears on this decision. For our purposes, however, the decision is one of convenience and we leave it to future work to determine the viability of a similar account using a question semantics along the lines of (19), though nothing obvious prevents such an account.

One technical aspect of the formula in the presupposition is the presence of the Groenendijk & Roelofsen (2009)’s ‘non-inquisitive closure’ operator, indicated by the exclamation point. This operator, to be discussed further and formally defined in (42) takes a potentially

inquisitive formula φ and returns only the informational component (i.e. a set containing the single alternative where any of the alternatives in φ are true). Since the purpose of a question is to introduce a new issue in discourse, it seems clear that the existential presupposition of a question ought not to include a prior QUD or anything of the sort, hence its inclusion in the presupposition.

3 Sluicing and inquisitive entailment

With this semantic background in place, we turn now to formulate our semantic condition on sluicing: that the inquisitive semantic interpretations of the A and E clauses symmetrically entail one another. In order to do this, we first briefly review previous accounts of sluicing in order to properly situate the proposed account with respect to prior literature. Of particular interest is Merchant (2001), whose account is in many respects the most immediate predecessor to the current account. Having laid out the inquisitive entailment condition, we return to two of the empirical observations with which we started: (i) the ability of disjunctions to serve as inner antecedents, and (ii) the inability of doubly negated indefinites to do so.

3.1 Previous approaches to sluicing

One of the central reasons why sluicing (and ellipsis more generally) has been a topic of such great interest to researchers is the apparent mismatch between what is pronounced and what is interpreted. There are two central questions about this mismatch which an account of sluicing must address: **(i)** How does this mismatch arise? and **(ii)** What condition(s) is this mismatch subject to? The arguments in this paper are principally about the latter question, but a few brief words are in order about the former.

With respect to the first question, three kinds of approaches have been proposed in prior literature. The first approach claims that the perceived mismatch is not actually a mismatch after all (e.g. Culicover & Jackendoff (2005)). That is, the bare *wh*-word or phrase simply has an anaphoric interpretation, much like a pronoun. Just as most theories no longer think of pronouns as resulting from a pronominalization transformation replacing a fully fleshed out definite description, these authors argue that sluicing should be seen as the base generation of an anaphor (albeit of a special type) with no covert structure present in the syntax at any level.

In the absence of evidence to the contrary, such an account would seem to be preferable to one which posits covert syntax since it relies only on independently motivated mechanisms of anaphora resolution. Much research in previous decades, however, has provided several potential kinds of counterevidence. As the issue is largely orthogonal to our present concerns, we refer the reader to Merchant (2001) for detailed arguments, as well as Chung (2006) and Chung et al. (2010) for more recent discussions of this issue.

The other two approaches both assume covert syntactic structure at some level of representation, differing in what this level is and where this structure comes from. One view, originally proposed by Ross (1969), and espoused more recently by Merchant (2001), holds that the E clause has a full clausal structure constructed in the normal way. That is, the

surface syntax of the E clause is essentially the same as that of its non-elliptical counterpart. While this structure is present in the surface structure, it is deleted at PF under the appropriate conditions. This approach has therefore come to be known as *PF-Deletion*. The other view, developed by Chung et al. (1995) (and more recently defended by Fortin (2007) and Chung et al. (2010)), holds that the surface syntax of the E clause matches what is pronounced, consisting of a wh-word (or phrase) and an empty TP. This empty TP is filled-in at logical form via the ‘re-use’ or ‘copying’ of a TP from prior discourse, and is therefore termed *LF-copying*.

The central argument we present in this paper is that the retrieval conditions on sluicing make crucial reference to inquisitive content in the A clause in the sense developed in §2. While we implement this idea in a way that makes use of covert structure, the main idea would seem to be equally implementable under a suitable structure-free approach.⁶ For the sake of concreteness, we formulate the analysis under a PF-deletion theory of ellipsis, leaving open the question of its compatibility with an LF-copying approach. The primary reason for this choice, however, is that it allows for a more direct comparison with Merchant (2001).

Here, we focus on the isomorphy question: what conditions are imposed on the mismatch between what is pronounced and what is interpreted.⁷ Since we couch our account in terms of PF-deletion, then, these are the conditions that this deletion process is subject to. The isomorphy conditions which are commonly posited fall into two major categories: (a) conditions on the syntactic/morphological/lexical *form* of the A and E clauses and (b) conditions on their *meanings*.

For example, in Ross (1969)’s seminal work, he argues that sluicing is subject to a single isomorphy condition between the A and E clauses: syntactic identity. In contrast to Ross (1969), Merchant (2001) argues that sluicing is subject to only a semantic identity condition: that the focus closures of the A and E clauses symmetrically entail one another. Since Merchant (2001), the view that the isomorphy conditions on sluicing are at least partially semantic has come to be widely accepted (though not universally so). At the same time, however, there is mounting evidence that a purely semantic account might be too permissive, leading many recent authors (e.g. Chung (2006), van Craenenbroeck (2008), and Chung et al. (2010)) to conclude that the conditions must include both a semantic isomorphy condition *and* some sort of form-based condition.⁸ Under a ‘hybrid’ approach of this sort, the possibility arises that the form-based condition can be far less stringent than full-blown syntactic isomorphy. For example, Chung (2006) argues that sluicing is subject to both a semantic condition and a lexical condition (all unpronounced words must have a pronounced counterpart in the A clause). When we turn to consider sprouting in §§5-6, we will adopt an approach of exactly this sort.

In order to capture the data mentioned in the introduction, however, we argue for a

⁶Though see §4.2 for further discussion of the relationship between sluicing and other anaphoric processes such as pronominal reference.

⁷In addition to the conditions on sluicing itself, there are conditions on deaccenting which must be met by focus parallelism domains which are (possibly) larger than the A and E clauses themselves. See Rooth (1992) and Fiengo & May (1994) for discussion of this condition in general and Romero (1998) for detailed discussion of its implications for sluicing.

⁸Ginzburg & Sag (2001) may be considered a forerunner to this sort of hybrid approach, since a certain amount of syntax is in some sense built into the semantics.

symmetric entailment condition which references a richer semantics than the purely truth-conditional semantics assumed in Merchant (2001)’s account. Since the semantic isomorphy condition we propose builds on Merchant (2001)’s in its basic form, it is worth considering his condition in more detail before proceeding. Building on Schwarzschild (1999)’s account of deaccenting, Merchant argues that sluicing is subject to the condition in (21). That is, the A clause must entail the focus-closure of the E clause and vice versa.⁹

- (21) **Merchant (2001)’s e-Givenness condition:** An IP α can be deleted only if α is e-GIVEN.
- (22) **e-Givenness** An expression E counts as e-GIVEN iff E has a salient antecedent A and, modulo existential type-shifting,
- a. A entails F-clo(E), and
 - b. E entails F-clo(A).

While Merchant’s condition is a semantic one, one key point to make about it is that the reason indefinites are good inner antecedents in this account is nonetheless syntactic. Consider an example like (23). The condition in (21) holds that the crossed out material in the E clause can be elided only if it symmetrically entails the A clause. Merchant would (uncontroversially) assign the A-clause a denotation with existential truth-conditions. Where a decision has to be made is with respect to the trace of the wh-phrase. What semantics should the trace be given for the purposes of computing e-GIVENNESS? Merchant’s answer, not surprisingly, is to give the trace an existentially quantified interpretation (the ‘existential type-shifting’ in (22)), so that IP_E and IP_A have the same interpretation, and ellipsis is correctly predicted to be possible.

- (23) [[Marta lent something to Joe] $_{IP}$] $_A$,
and I want to find out [what $_i$ [~~she lent t_i to Joe~~] $_{IP}$] $_E$.

While this correctly captures the fact that indefinites are licit inner antecedents, it doesn’t provide a deep semantic explanation for *why*. It is not the semantics of interrogative E clauses itself which makes them sufficiently similar to A clauses with indefinites. Rather, it is the existential closure built into the symmetric entailment condition coupled with the free variable contributed by the wh-trace. In the account to be developed below, the ability of indefinites to serve as inner antecedents arises because of the tight semantic connection between indefinites and wh-words themselves.

Although we focus on English data in the present paper, it is important to note that this connection between indefinite/existential semantics and sluicing is cross-linguistically

⁹The focus-closure (F-clo) part of the definition is needed to handle two kinds of sluices which we will not discuss here: ones where the wh-phrase contains *else*, as in (1), and so-called ‘contrast’ sluices like (2), both examples from Merchant (2001). For exposition’s sake, we ignore this in what follows, though something like it is surely needed to account for examples of this sort.

- (1) Abby called BEN_F an idiot, but I don’t know who else.
- (2) She has five $CATS_F$, but I don’t know how many $DOGS_F$.

widespread or perhaps universal (Merchant (2006), Merchant & Simpson (2012)). For example, Potsdam (2007) applies this theory to Malagasy, a language where questions are argued to be formed from pseudoclefts. Beyond these differences in the forms of questions, we see that a variety of constructions in Malagasy – an existentially-interpreted bare noun in (24a) and an existential cleft in (24b) – can provide the inner antecedent as long as they produce an existential semantics.

- (24) a. Nandoko zavatra i Bao fa manadino aho hoe inona
 paint thing Bao but forget I COMP what
 ‘Bao painted something but I forget what.’ Potsdam (2007)
- b. Nisy olona nihomeny ka nanotany ianao hoe iza
 exist person laugh and ask you COMP who
 ‘Someone laughed and you asked who.’ Potsdam (2007)

One further consequence of this aspect of Merchant’s account worth noting is the ramifications it has for *wh*-in-situ languages. One of the great benefits of a semantic account of sluicing is that it can readily account for sluicing in languages where questions have quite different syntactic structures than in English. Since Merchant (2001)’s approach for English relies on an existentially closed trace, this has meant that in order to analyze sluicing in *wh*-languages¹⁰, covert movement of some sort must be appealed to (e.g. covert *wh*-movement). While the account we offer here is consistent with such covert movement account of the syntax of such questions, it imposes no such restriction as we will see.

3.2 An inquisitive entailment condition on sluicing

As we saw in §2, given a Hamblin semantics for questions, the denotation of a question like “Who left?” and a corresponding assertion “Someone left.” differ only in whether or not they impose a presupposition on the input state. They both propose the same output state consisting of a set of alternative propositions of the form ‘*x* left’ and with the worlds where no one left no longer candidates for the real world. That is, they not only contain the same truth-conditional *information*, but also make the same *inquisitive* contribution (i.e. raise the same *issue*). Sluicing, we claim, requires symmetric entailment over both kinds of semantic content, not just truth-conditions. That is, for an interrogative E clause to be elided, its proposed output must have identical truth conditions *and* inquisitive content as an A clause in prior discourse.

Formally, we achieve this by imposing a symmetric entailment condition similar to Merchant (2001)’s, but defining entailment over our inquisitive semantic denotations, as in (25), from Groenendijk & Roelofsen (2009). A formula φ entails another formula ψ iff every alternative in φ is a subset of some alternative in ψ . For formulas which denote singleton sets (e.g. those which are free of disjunctions and indefinites), this definition reduces to the standard notion of entailment. For elements which are inquisitive, the definition mirrors Groenendijk & Stokhof (1984)’s entailment for questions, the difference being that the alternatives are allowed to overlap, therefore not necessarily forming a *partition*. It should be

¹⁰This is, of course, assuming that the constructions in question are in fact truly sluicing, rather than, say, clefts of some sort (as Gribanova (t.a.) argues for Uzbek).

noted that while the condition is stated in terms of symmetric entailment, the interesting cases where this condition is not met are almost exclusively ones where the A clause fails to entail the E clause.

(25) **Entailment:** $\varphi \vDash \psi$ iff $\forall \alpha \in \llbracket \varphi \rrbracket$, α is such that $\exists \beta \in \llbracket \psi \rrbracket$ such that $\alpha \subseteq \beta$

Crucially for our present purpose, this definition for entailment operates only over the proposed output states, ignoring the presupposed input or (equivalently) assuming that they are met. The notion of entailment we require, then, is what von Stechow (1999), in his account of NPI licensing, has dubbed ‘Stawson entailment’. The result, then, is that we essentially compute entailment over the entire clause, including the wh-phrase, but ignoring the existential presupposition (which we attribute to a covert interrogative complementizer C_{+Q}).

Given this definition for entailment, we can state the semantic condition on sluicing as in (26)¹¹:

(26) **Symmetric Entailment Condition on sluicing:** Given a structure $\begin{array}{c} \text{CP}_E \\ \swarrow \quad \searrow \\ \text{C}_{+Q} \quad \text{IP}_E \end{array}$,
 IP_E can be elided only if there is some salient antecedent CP_A such that:
 a. $\text{CP}_E \vDash \text{CP}_A$, and
 b. $\text{CP}_A \vDash \text{CP}_E$

In addition to defining entailment over richer semantic objects as discussed above, there are two further differences between this condition and Merchant (2001)’s from (21). First, this definition makes explicit that the prospective E clause is a question, something which Merchant (2001) states, but does not explicitly include in his definition. The more substantial difference (facilitated by the richer semantics we adopt) is that symmetric entailment can be defined over the entire clause *including* the wh-phrase. Since wh-words always make an inquisitive contribution, the symmetric entailment condition therefore dictates that the A clause must also have a denotation which is inquisitive. The empirical generalization which follows from (26), therefore, is stated in (27).

(27) **Inner antecedent generalization:** An expression α can serve as an inner antecedent for sluicing only if α makes an inquisitive contribution.

In contrast to this, Merchant (2001)’s entailment condition is computed over the IP_E to be elided, and therefore disregards the wh-phrase itself. What matters for Merchant (2001)’s account, then, is the relationship between the inner antecedent and the existentially-closed trace, rather than the inner antecedent and the wh-phrase itself. The wh-phrase and the trace of course, must also be related, since they form a single chain of ordinary A' -movement. Under the present approach, the intermediate step of existentially closing the trace becomes unnecessary; the wh-phrase itself already has suitably similar semantics to the inner antecedent, as we will see in detail shortly.

¹¹As discussed above, this definition would have to be complicated with focus closure or something similar in order to account for contrast sluices and sluices with *else*. We ignore this complication in what follows, as it is orthogonal to our present concerns.

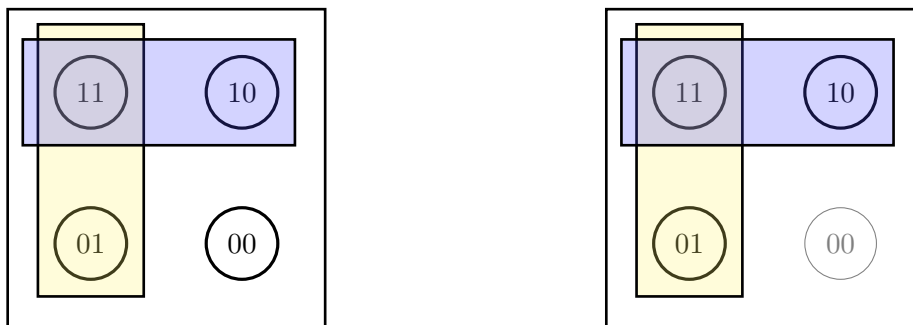
Applying this semantic condition to the data, we can first consider the most straightforward case, an example where there is a widest-scope overt indefinite in the A clause serving as inner antecedent, as in (28). The A clause ‘Someone left’ will be assigned the metalanguage translation in (29a), whose inquisitive semantic interpretation is pictured in the left-hand side of (30). That is, the denotation of the A clause here consists of a set of alternative propositions of the form ‘ x left’. The E clause will be assigned the metalanguage translation in (29b) whose output state is pictured in the right-hand side of (30). The interrogative E clause’s denotation, then, differs from that of the A clause only in the input condition it presupposes (indicated by the grayed out circle).

(28) [Someone left]_A, but I don’t know [who left]_E

(29) a. (28)_A $\rightsquigarrow \exists x.\text{leave}'(x)$

b. (28)_E $\rightsquigarrow \exists x.\text{leave}'(x)$ (Presupposes: $!\exists x.\text{leave}'(x)$)

(30) $\llbracket(28)_A\rrbracket \quad \Leftrightarrow \quad \llbracket(28)_E\rrbracket$



Given these denotations, the symmetric entailment condition in (26) will be met and the sluice is predicted to be well-formed. Each alternative in CP_E is contained by one in CP_A (since they are the same alternatives), and the same holds in the opposite direction. The definition we have given for entailment ignores the presupposition of the E clause, which is precisely what distinguishes the two clauses. We also straightforwardly predict that proper names and strong quantifiers cannot similarly serve as inner antecedents, as in Chung et al. (1995)’s examples in (31). The prospective A clauses in these examples have denotations which are not inquisitive in the way that indefinites are.

(31) a. ?* I know that Meg’s attracted to Harry, but they don’t know who.

b. *She said she had spoken to {everybody/most students}, but he wasn’t sure who.

The analysis here also straightforwardly handles cases of what Chung et al. (1995) call ‘inheritance of content’ such as Ross (1969)’s example in (32). Here, Chung et al. (1995) observe that the wh-word in the E clause, *who*, is restricted to individuals from Kankakee. Whereas accounts based on syntactic identity must posit some additional sluicing-specific mechanism to capture such data (Chung et al. (1995)’s ‘Merger’ operation being the most well-known such mechanism), a semantic account like the present one can treat such data as more or less ordinary cases of contextual domain restriction of quantifiers. Since this approach is already discussed at some length in previous semantic/pragmatic accounts such

as Romero (1998) and Merchant (2001), we will refrain from a more detailed discussion here (see AnderBois (2011), pp. 73-76 for a more extended discussion within the current framework).

- (32) [Ralph is going to invite someone from Kankakee to the party]_A, but they don't know [who_j ~~he's going to invite t_j to the party~~]_E

3.3 Disjunctions and the nature of inner antecedents

Thus far, the fact that indefinites are licit inner antecedents for sluicing is derived from a symmetric entailment condition on sluicing in combination with an inquisitive semantics for indefinites. Since questions are always inquisitive (indeed, this is their sole contribution), symmetric entailment dictates that the antecedent clause must not only have the same informational content, but must also be inquisitive. In this section, we show that the account straightforwardly extends to capture the fact, first observed by Chung et al. (1995), that another inquisitive element — disjunction — can also readily serve as an inner antecedent for sluicing. Some basic examples are in (33):

- (33) a. [(Either) Ryan or Dexter will play center field]_A, but they haven't announced [which (one) ~~will play center field~~]_E.
 b. [Carlos (either) likes tofu or chicken]_A, and I'm going to find out [which (one) ~~he likes~~]_E.
 c. [Troy gave the ball to (either) Todd or Ian]_A, but I don't know [which (one) ~~he gave the ball to~~]_E.

In each of the examples in (33), we can readily replace the disjunction with a suitable indefinite and the resulting sentence is felicitous with roughly the same meaning. This parallelism is, in a sense, unsurprising, given the long noted semantic parallels between disjunctions and indefinites (e.g. Rooth & Partee (1982), Schlenker (2006)).¹² Indeed, Chung et al. (1995) suggest an approach in passing (pp. 268-9) which would treat such disjunctions as indefinites whose values are restricted to one of two individuals. It is not clear how literally this syntactic suggestion is intended, but regardless, it will struggle with examples like those in (34), where the disjunction is not of arguments, but of clauses or other constituents larger than DPs.

- (34) a. (Either) Freddie is baking a cake again or something is on fire, but I can't tell which (one).
 b. Russ is in the back or Ali is working alone, but I can't tell which (one).
 c. Estelle (either) walked in the park or took out the trash. If you wait, you'll find out which (one).

¹²The only thing distinguishing these examples is the obligatory presence of the D-linked wh-word, *which*, which we take to be independently motivated by the presence of overt descriptive material in the A clause. See Dayal & Schwarzschild (2010) for a detailed discussion of the connections between the material in the A clause and the use of 'which' in general.

The examples in (34) demonstrate that the potential for disjunctions to serve as inner antecedents is not a peculiarity of argument disjunctions, but is a fact about disjunctions in general. Chung et al. (1995)'s suggested tactic of assimilating disjunctions like (33) to indefinites does not seem readily generalizable to the data in (34). While clausal disjunctions are quite different than indefinites in their syntax, there is ample reason to think that there are deep semantic parallels, including their shared *inquisitivity*.

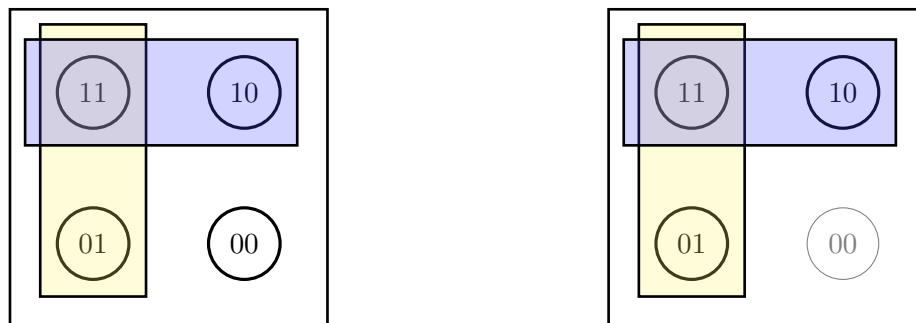
Before going through an example in detail, we should mention one open question raised by the examples in (34): the internal syntax of the E clause. In argument disjunctions, it seems clear what the internal syntactic structure should be, by analogy with corresponding examples where an indefinite serves as inner antecedent. For (34), however, it is less clear what the internal structure of the E clause is. A number of different paraphrases would seem to yield (roughly) the appropriate meaning. For example, the E clause in (34a) could be *which (one) is happening*, *which (one) is true*, *which (one) it is*, among other possibilities. (34c) has an additional paraphrase which is of particular note: *which (one) she did*. While this paraphrase does not immediately suggest a solution, it suggests that the problem posed by (34) is closely related to another well-known phenomenon from the literature on VP-ellipsis: that of so-called *split antecedents* (Elbourne (2008), Fiengo & May (1994) among others), as in (35).

- (35) a. Bob wants to sail round the world and Alice wants to climb Kilimanjaro, but neither of them can, because money is too tight. (Webber (1978))
 b. Whenever Max uses the fax or Oscar uses the Xerox, I can't. (Fiengo & May (1994))

We leave this larger issue for future work, as the choice between the different possible E clauses is largely orthogonal to our present concerns. As long as the *wh*-phrase plus the elided material has the same semantics as the A clause, our account predicts ellipsis to be possible. The central difference between clausal disjunctive antecedents to sluicing and split antecedents for VPE — the fact that they arise only with disjunctions — follows straightforwardly from our account since only disjunctions have denotations which are inquisitive.

This caveat aside, the account developed above correctly predicts the felicity of sluicing with a disjunctive inner antecedent, as seen in (36). The interpretation of the A clause puts forth a set of two alternatives, as pictured in the left-hand side of (36c). The E clause, right, is also inquisitive, due to the *wh*-word. The contextual restriction of *which* limits the alternative set of the E clause to the same two alternatives made salient by the disjunctive inner antecedent. Since the A clause and E clause denote the same set of alternatives, the symmetric entailment condition in (26) is met, and the sluice is predicted to be acceptable.

- (36) a. [(Either) John or Fred left]_A. Tell me [which (one) left]_E.
 b. i. (36)_A \rightsquigarrow leave'(j) \vee leave'(f)
 ii. (36)_E \rightsquigarrow $\exists x.x \in \{j,f\} \wedge \text{leave}'(x)$ (Presupposes: $!\exists x.x \in \{j,f\} \wedge \text{leave}'(x)$)
 c. $\llbracket(36)_A\rrbracket \quad \Leftrightarrow \quad \llbracket(36)_E\rrbracket$



One thing which this example makes quite clear is that it is the interpretation of the two clauses, in (36c), which is crucial to the example’s felicity. The metalanguage translations of the two clauses in (36b) are quite different, yet sluicing succeeds due to the semantic parallels between the interpretations of disjunctions and indefinites. The clausal disjunctions in (34) illustrate this mismatch even more starkly. While this account is ultimately quite distinct from that suggested by Chung et al. (1995), there is nonetheless a shared intuition that the reason why disjunctions are licit inner antecedents stems from the parallelism between them and indefinites. Chung et al. (1995) suggest that this parallel might be cashed out syntactically, which is plausible for argument disjunctions, but less so for clausal disjunctions. By cashing out this parallel in the semantic interpretation itself, we capture the relevant data, but avoid having to posit an indefinite-like syntax for disjunctions.

3.4 Double negation

The symmetric entailment condition we have developed holds that A clauses for sluicing must have not only the same truth conditions as their corresponding E clauses, but also the same inquisitive potential. This richer semantic condition predicts that there should be potential A clauses which have existential truth conditions, yet fail to license sluicing. The first case of this sort which we examine is that of doubly negated indefinites, which do not license sluicing, as seen in (37).

- (37) a. *[It’s not the case that no one left]_A, but I don’t know [who left]_E.
 b. *[It’s not the case that John didn’t meet with a student]_A, but Fred still wonders [who ~~John met with~~]_E.

While the A clauses in such sentences are clearly pragmatically marked, it seems equally clear that they have the same truth conditions as their negation-less counterparts. Furthermore, in examples where the indefinite is provided by an ordinary indefinite, rather than *no one* or *anyone*, the sentence has the same potential for licensing cross-sentential anaphora as

corresponding sentence with no negation, as seen in Krahmer & Muskens (1995)’s example in (38).¹³

- (38) It is not true that John didn’t bring an umbrella. It was purple, and it stood in the hallway.

Given these facts, then, it seems that double negation preserves truth-conditions, but nonetheless has a semantic effect, namely eliminating the fine-grained inquisitive structure that the indefinite ordinarily possesses. This result follows quite directly from the way we have defined negation in §2 repeated in (39). Negation closes off alternatives by quantifying over them universally. That is, while narrow scope indefinites contribute alternatives in local composition, these alternatives are ‘used up’ by the higher operator, the result being that the whole sentence is not inquisitive.

$$(39) \llbracket \neg\varphi \rrbracket^{\mathcal{M},g,w} = \text{ALT}\{\alpha \subseteq W \mid \text{every } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M},g,w} \text{ is such that } \alpha \cap \beta = \emptyset\}$$

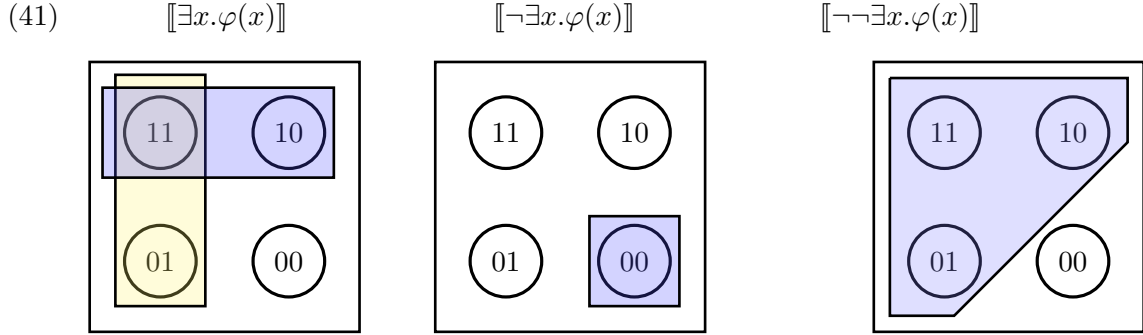
This definition is empirically supported by the fact that an indefinite within the scope of negation, as in Chung et al. (1995)’s (40), does not license sluicing. The continuation with sluicing is possible, but indicates that the indefinite in the A clause takes wide-scope over negation.

- (40) She didn’t talk to one student; I wonder who.

It follows directly from this definition that double negation is no longer semantically vacuous. While it preserves truth conditions, it nonetheless has a semantic effect: eliminating the inquisitive component of the formula to which it applies. We can see this visually in (41). The first negation (middle) looks at all of the alternatives of the indefinite (left) and returns the maximal alternative which does not overlap with any of them. The second negation looks at this necessarily singleton set and returns the maximal set with no overlap with that single alternative. The resulting set contains a single alternative comprising all of the worlds which were members of some alternative or other in $\llbracket \exists x.\varphi(x) \rrbracket$. That is, double negation preserves the truth-conditions of the formulas to which it applies, but eliminates its inquisitive potential. Indeed, Groenendijk & Roelofsen (2009) define a ‘non-inquisitive’ closure operator, ‘!’ in terms of double negation, as in (42).

¹³It is, of course, not impossible that the anaphora in such examples is somehow exceptional, not arising from ordinary means (e.g. via something more pragmatic). It is not at all clear, however, how to formulate such an account in a way which correctly predicts the asymmetry between (38) and other pragmatically similar examples such as Partee’s famous marble example, in (i), and examples of negated negative quantifiers like (ii).

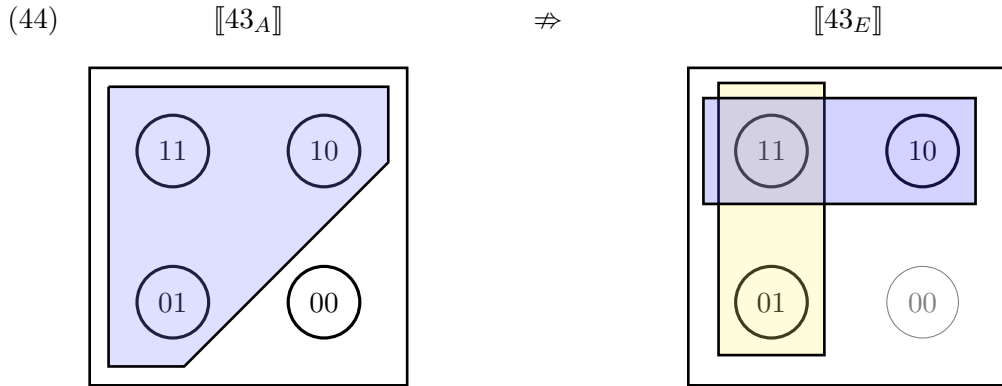
- (i) I lost ten marbles and found only nine of them. # It is probably under the sofa.
(ii) It’s not the case that no student came to office hours. #He just left early.



(42) $\llbracket !\varphi \rrbracket = \llbracket \neg\neg\varphi \rrbracket = \{ \{w' : \text{there is some } \alpha \in \llbracket \varphi \rrbracket \text{ s.t. } w' \in \alpha \} \}$

Returning to our sluicing example, we now understand why indefinites under double negation cannot serve as inner antecedents, as in (43), repeated from above. The A clause receives the interpretation schematized in the left-hand picture below, while the question is still, of course, inquisitive and has the proposed output state seen in the right picture. Since we are operating under a PF-deletion theory of ellipsis, we only need to consider an E clause with no negation since the doubly-negated clause does not allow wh-extraction (the predictions of the LF-copying approach will be discussed shortly).

(43) * $[\text{It's not the case that no one left}]_A$, but I don't know $[\text{who left}]_E$.



Applying our symmetric entailment condition, then, we see that the E clause does entail the A clause. Each alternative in the E clause finds some alternative (the single alternative) in the denotation of the A clause which is a superset of it. In the other direction, however, we find that the single alternative in the doubly negated A clause does not find any alternative in the E clause which contains it. Since symmetric entailment fails, we correctly predict that double negation should block sluicing.

The account, then, correctly predicts the unacceptability of such examples because of the semantic (but non-truth-conditional) effect of double negation. At this point, we can compare the present account with previous accounts, many of which struggle with such examples. While we have already seen several problems for such accounts above (and Merchant (2001) points out several more), accounts based on full-blown syntactic isomorphy get these examples right since the A clause with its double negation quite obviously has a different internal structure than the corresponding question with no negation.

An account based on symmetric entailment over a solely truth-conditional semantics, such as Merchant (2001), incorrectly predicts sluicing to be possible in such cases.¹⁴ The A clause has the same informational content as the existentially closed E clause and should therefore license sluicing in exactly the same way as the corresponding example with no negation. The more general conditions on deaccenting discussed by Romero (1998) will similarly predict that double negation will have no effect. For deaccenting, this prediction seems to be borne out: it seems that the underlined material in (45) can be destressed felicitously, as predicted by either the Roothian approach or Schwarzschildian givenness.

- (45) It's not the case that Bill didn't donate a book to the library, but I don't know which book he donated.

Despite this, the corresponding sluice is ill-formed, which shows us a rift between deaccenting and sluicing (possibly ellipsis more generally, see §4.2, esp. (62)). Deaccenting really is concerned with whether or not truth-conditional *information* is given, as both Rooth (1992) and Schwarzschild (1999) argue. Sluicing, on the other hand, is concerned primarily with *inquisitive* content, i.e. with retrieving an issue which the prior linguistic context has made salient. Ordinary indefinites are hybrid expressions, in that they make both an informational contribution and an inquisitive one. Double negation removes this latter contribution, and it is this richer notion of meaning to which sluicing is sensitive.

It is a bit more tricky to assess the predictions made by Chung et al. (1995) with regards to double negation. Their account relies on the copied IP containing a free variable which the question operator can bind, yielding the desired interpretation. On the one hand, since Heim (1982)'s semantics for negation does not predict there to be a free variable, Chung et al. (1995)'s account would appear to correctly rule out examples like (43). On the other hand, however, Heim (1982)'s account itself is aimed at capturing the anaphoric potential of such expressions, and therefore makes the wrong prediction with regards to doubly negated indefinites (as do nearly all other dynamic accounts, see Krahmer & Muskens (1995) for discussion). The potential for sluicing in Chung et al. (1995)'s account is closely tied to the potential for cross-sentential anaphora, and double negation represents a case where the two diverge (in §4, we will see that appositives provide another such case).

Focusing on the 'merger' subtype of sluicing, this section has proposed that sluicing is subject to a semantic condition: that the inquisitive semantic denotations of the A and E clauses symmetrically entail one another. Since E clauses in sluicing are always matrix or embedded questions, it follows from this that the A clause must not only have the same truth-conditions (modulo the question's existential presupposition), it must have the same issue-evoking capacity. The so-called 'inner antecedent' is the element which provides this in the cases we have considered in this section. The semantics we have argued for, then, derives several observations about the nature of inner antecedents including the felicity of

¹⁴An anonymous reviewer suggests that Merchant (2001) might account for such cases by claiming that only the embedded negated clause would count as a 'salient antecedent', with the unacceptability of the sluicing being due to the resulting negative island. Such an explanation, however, would rely crucially on an independently motivated notion of salience on which the singly negated clause counts as salient, but the innermost positive clause and the entire doubly negated clause do not. Beyond being unlikely from a theoretical perspective in my opinion, this appears to be in direct conflict with the observation that singly negated indefinites do not license cross-sentential anaphora, assuming that the same notion of salience is relevant in ellipsis as in pronominal anaphora.

disjunctions as inner antecedents and the infelicity of doubly-negated indefinites. Examples of this sort have proven problematic for prior syntactic and truth-conditional semantic accounts respectively. Moreover, we will see in the next section that this account can be minimally extended to capture a novel body of facts which will prove problematic to both syntactic and truth-conditional semantic accounts: the interaction between sluicing and appositives.

4 Ellipsis and Apposition

The semantics we have developed for ordinary assertions above is more like that traditionally assumed for questions. So far, we have claimed that it is this alternative-rich structure which allows sentences with indefinites and disjunctions to be sufficiently similar to questions to license sluicing. In this section, we examine an environment which, we claim, lacks this alternative-rich structure — appositive relative clauses — and show that a number of novel observations about sluicing follow from this idea. Central among these observations is that even overt indefinites inside relative appositive clauses are not licit inner antecedents for sluicing, as in (46).¹⁵

- (46) #Joe, who once killed a man in cold blood, doesn't even remember who.

The section proceeds as follows: §4.1 provides independent motivation for treating appositives as having a semantics which is more like that of classical assertions than questions, devoid of the rich structure we attribute to at-issue assertions; §4.2 demonstrates that this semantics correctly predicts the attested interactions between sluicing and apposition.

4.1 Appositives as classical updates

In recent literature, it has been widely agreed upon that the semantics of appositives is, in some way, different from that of at-issue assertions. That is, the semantics — broadly construed — of a sentence like (47a) is not reducible to that of (47b) plus some additional piece of semantics or pragmatics.

- (47) a. Mary, who is originally from Los Angeles, has a really good recipe for salsa.
b. Mary is from Los Angeles and she has a really good recipe for salsa.

Following Potts (2005), it has become common to think of the content of the appositive relative clause as being in some way *separate* from the rest of the sentence. While this result seems right at the level of propositional content, several recent works have shown that this separation does not extend to anaphora in general (Nouwen (2007), Amaral et al. (2007)) or to ellipsis more specifically (AnderBois et al. (2011)). For example, VP-ellipsis can operate

¹⁵An anonymous reviewer suggests, in line with Vlachos (2011), that the observations in this section have parallels in the realm of restrictive relative clauses. Note, however, that such facts are already expected for restrictive relative clauses under any account that captures the more general observation that inner-antecedents must take wide scope relative to other operators (e.g. negation in (40)). Appositives, however, quite famously exhibit obligatory wide-scope/scopelessness and therefore require some other explanation.

more or less freely¹⁶ across the at-issue/appositive boundary, as in (48). While ellipsis in general can freely cross the at-issue/appositive boundary, sluicing proves a surprising exception, as seen in (49).

(48) Mary, who doesn't help her sister, told Jane to ~~help her sister~~ instead.

(49) *Joe, who once killed a man in cold blood, doesn't even remember who.

Since other anaphoric processes including VPE are possible, the infelicity of (49) cannot simply be attributed to the separation or extradimensionality of appositive content. Rather, it must be that the semantic contribution of appositive content is itself different from that of at-issue content in a way which derives this difference. To see how, we must first flesh out the conception of ordinary at-issue assertions assumed above.

Inquisitive semantics treats assertions as being more question-like than is traditionally assumed. One of the central motivations for this is the idea that assertions, like questions, are *proposals* to update the common ground (see Groenendijk & Roelofsen (2009) for further discussion of this motivation). This conception is developed most explicitly by Farkas & Bruce (2010) in their account of particle responses to questions and assertions. Empirically, they argue for this view of at-issue content based in part on the fact that across languages, assertions often *allow* for the responses that polar questions *expect*, as seen for English in (50).

- (50) a. Anne: Sam is home.
b. Ben: Yes. // Yeah, he's home. // No, he isn't home.

Appositives, however, do not intuitively *propose* updates to the common ground, they *impose*¹⁷ them. That is, while they also aim to enrich the common ground (i.e. provide new information), they are not readily subject to the same 'discourse negotiation' tactics as at-issue assertions (see AnderBois et al. (2011) for a more detailed discussion, and Murray (2010) for a similar approach to evidentials). For example, the response particles *yeah* and *no* do not seem to target the appositive content (whether or not she is a bad housemate), but rather the main clause. Speaker B is most readily seen as confirming or rejecting A's claim that Sonia is a bad housemate, rather than the claim about the jar.

(51a-51b).

- (51) A: Sonia, who left a jar open on the counter, is a terrible housemate.
a. B: Yeah.
b. B: No.

The observation that at-issue assertions, like questions, *propose* ways of updating the common ground fits naturally in inquisitive semantics, since both are modeled as being of the same semantic type, *stt*. To capture the idea that appositives *impose* rather *propose*, then, they ought to be of the same type as classical assertions — *st* — rather than questions. As we have seen, however, being of type *stt* is also the exact feature of the logic that allows

¹⁶While this is true in general, we will argue at the end of §4 that appositives do produce analogous effects within a particular subclass of VP-ellipsis cases.

¹⁷Thanks to Floris Roelofsen for suggesting this term.

for *inquisitiveness*. This is because inquisitiveness is due to the fact that a formula denotes a set consisting of multiple alternative sets of possible worlds. Since appositives are not proposals, it follows then, that they cannot be inquisitive; the two properties are inextricably linked.

In terms of compositional semantics, one way to capture this behavior is by making appositive content subject to a COMMA operator, as in (52). This operator takes an inquisitive proposition φ (i.e. a set of alternative sets of possible worlds) and returns a simple set of worlds where some alternative or other in $\llbracket\varphi\rrbracket$ holds. Equivalently, COMMA takes a set of alternatives and returns the single, unique maximal set of worlds in $\llbracket!\varphi\rrbracket$. For example, in (51), $\llbracket\varphi\rrbracket$ is a set of alternatives ‘Sonia left the jar of mayo open on the counter’, ‘...orange marmalade ...’, etc. and $\llbracket\text{COMMA}(\varphi)\rrbracket$ would be the set of worlds – not the set of alternatives – where there is some jar or other which she left open on the counter.

$$(52) \quad \llbracket\text{COMMA}(\varphi)\rrbracket = \{w \mid \text{there is some } \alpha \in \llbracket\varphi\rrbracket \text{ s.t. } w \in \alpha \}$$

A full account of appositives is beyond the scope of the present work, as it requires a semantic account of *how* these two kinds of content update the common ground (though see AnderBois et al. (2011)). What matters for our present purposes, however, is what structures these updates consist of; the operator in (52) accomplishes exactly this.

4.2 Sluicing and appositives

Returning to sluicing, we see that unlike other ellipsis processes, it cannot freely cross the appositive/at-issue boundary. More specifically, sluicing is fairly unacceptable whenever the would-be A clause occurs in an appositive relative clause, as in (53-55). As the (b) examples show, this restriction does not seem to be due to some independent source; it is the ellipsis itself which is ill-formed. Furthermore, since we have already seen in (48) that VPE can find its antecedent VP inside an appositive, this sluicing data cannot be due to discourse parallelism constraints on ellipsis of the sort discussed by Hardt & Romero (2004), Frazier & Clifton (2006), and others which affect both VPE and sluicing. Similarly, it cannot be due to more general conditions on deaccenting discussed by Romero (1998) and others since VPE is generally taken to be subject to these conditions as well.

- (53) a. #?Joe, who once killed a man in cold blood, doesn’t even remember who.
 b. Joe, who once killed a man in cold blood, doesn’t even remember who he killed.
- (54) a. #?The valiant knight, who defeated a masked enemy, still wonders who.
 b. The valiant knight, who defeated a masked enemy, still wonders who he killed.
- (55) a. #?Amy, who coined a new word last night, forgot what/which.
 b. Amy, who coined a new word last night, forgot what/which word she coined.

At this point, a word of caution is in order about the acceptability of sluicing with appositives. The paper in this paper were collected using the traditional methodology of introspection by a native-speaker linguist and informal corroboration of the data with fellow native-speaker linguists of various dialects of English, audiences in various public forums, and to a lesser extent naive native speakers. Using this method, there is a clear consensus that the (a) examples in (53-55) (as well as (62) below) are at least somewhat degraded.

While such examples sound at least somewhat odd, it is important to note that it is relatively easy to figure out what the sentences were intended to have meant after the fact (especially when encountered in written form). While these sentences may or may not as categorically bad as the semantics here would predict, all speakers I have consulted agree that they are significantly worse than corresponding non-elliptical controls or truncated clefts (e.g. ‘...still wonders who it was’). This asymmetry is all the more striking since outside of appositives, there is a strong preference in the opposite direction, that is, the full clausal or truncated cleft versions are frequently dispreferred. We leave it to future work to determine the processing and other factors which produce such variability and how to extend the present analysis to account for the fine-grained variations in judgments.

Finally, we see the same contrast present in examples where the clause containing the indefinite is embedded within the appositive, as in (56). Such examples are important because the prospective A and E clauses in them are identical in every respect: lexically, syntactically, and truth-conditionally. They differ only in that the A clause occurs inside an appositive relative clause, yet sluicing is not possible. Such examples highlight that the infelicity of the above examples cannot be straightforwardly attributed to some aspect of the connection between the relative pronoun and the matrix subject¹⁸.

- (56) Elizabeth, who thinks that Joe murdered a man in cold blood, wants to find out who ~~#(it was)~~.

In §4.1, we motivated a semantics of appositives as purely informational updates imposed on the common ground. We achieved this in the logic by positing a semantics for comma intonation which collapses all the alternatives in the formula to which it applies into a single classical proposition (i.e. a single piece of information). Since the antecedent clause, as it has entered the common ground, doesn’t possess inquisitive alternatives, it cannot entail the inquisitive E clause.¹⁹ Since symmetric entailment fails, sluicing is correctly predicted to be infelicitous as demonstrated for (57) in (58-59).

- (57) *Joe [_A who once killed a man in cold blood,]_A, doesn’t even remember [_E who he ~~killed in cold blood~~]_E.
- (58) a. $\llbracket 57_A \rrbracket = \text{COMMA}(\exists x. \text{kill}'(\text{Joe}, x))$
 b. $\llbracket 57_E \rrbracket = \text{At-issue: } \exists x. \text{kill}'(\text{Joe}, x)$ Presupposes: $!\exists x. \text{kill}'(\text{Joe}, x)$
- (59) $\text{COMMA}(\exists x. \text{kill}'(\text{Joe}, x)) \not\Rightarrow \exists x. \text{kill}'(\text{Joe}, x)$

One thing that these examples make clear is that the proposed semantic condition on sluicing is truly a condition on the anaphoric *retrieval* of the issue introduced by the inner antecedent. To determine whether the E clause can be elided, we must examine the representation of prior conversation and try to find a suitable antecedent which entails it symmetrically in the discourse record. In the case of appositives, the appositive provides a prior clause with the same lexical items, syntax, and truth-conditional semantics, yet sluicing is not possible since that clause – as it has entered into the discourse record – has

¹⁸Thanks to an anonymous reviewer for discussion relating to this point.

¹⁹In a technical sense, entailment as defined in (25) is not even defined for appositive contents since they are of different types ($\langle s, t \rangle$ instead of $\langle st, t \rangle$). We can fix this by defining entailment for elements of type $\langle s, t \rangle$ in terms of the entailment properties of the singleton sets containing them.

been subjected to the comma operator. That is, the symmetric entailment condition we propose is not an calculation which operates over abstract formal objects such as logical forms, but is a way of formalizing the conditions on the anaphoric retrieval of the issue from the A clause²⁰.

Since it is a condition on the anaphoric retrieval of the A clause, we predict the restriction on sluicing across the appositive/at-issue boundary to be an asymmetric one. Since issues *within* the scope of a COMMA operator do not exhibit any special behavior (e.g. there are embedded questions within appositives), we expect that sluicing with an at-issue A clause and an appositive E clause should be equally well-formed as when no appositive is involved. This is exactly what we find in examples like (60):

- (60) [Someone left the door open]_A. Jamie, who wants to find out who [~~left the door open~~]_E, is interrogating the likely culprits.

Given this, it is perhaps tempting therefore to simply attribute these observations to a more general condition already present in Merchant (2001)'s semantic condition in (21): that the A clause be *salient* in prior discourse. That is, one might think that being inside an appositive is simply a particular way that a clause can fail to be sufficiently *salient*. This, however, cannot be since Merchant (2001)'s condition is explicitly stated to hold of both sluicing and VPE, which we have seen can indeed find its antecedent material inside an appositive.

However, while antecedents for VPE can occur inside appositives, there is reason to believe that the material retrieved in these cases is not in fact inquisitive²¹. That is, the elided VP in a sentence like (61a) is interpreted as (61b) rather than (61c), as the inquisitive entailment condition would predict. While we leave a more detailed investigation to future work (see also AnderBois (2011), pp. 90-92), one observation supporting this conclusion is the inability of indefinites *inside* elided VPs of this sort to serve as inner antecedents or further sluicing, as in (62)

- (61) a. John, who met with a student yesterday, convinced Jane to ___ too
 b. $\llbracket 61a_E \rrbracket = \lambda y. !\exists x. \text{meet-with}'(y, x) \quad \Leftarrow$ Predicted
 c. $\llbracket 61a_E \rrbracket = \lambda y. \exists x. \text{meet-with}'(y, x) \quad \Leftarrow$ Not predicted
- (62) #? John, who met with a student yesterday, convinced Jane to ___ too, but she can't remember who [~~she met with yesterday~~].

Summing up, we see that the appositive data highlights the sense in which ellipsis is truly an *anaphoric process*. An account which simply compares the logical form of the antecedent and elided clauses abstractly, whether syntactically or semantically, would be unable to account for such facts. The content of the A clause itself is not what determines the infelicity of these examples. Rather, it is the fact that their material entered the conversational record via an appositive (i.e. subject to the COMMA operator) which derives their infelicity. Furthermore, these facts demonstrate an asymmetry between issues and pronominal anaphora in indefinites. Whereas indefinites inside appositives still serve as

²⁰Admittedly, this aspect of the theory would be more clearly seen if the present account were embedded in an update semantics for appositive and at-issue content (e.g. AnderBois et al. (2011)).

²¹Thanks to Jeroen van Craenenbroeck for insightful discussion on this point

antecedents for subsequent anaphoric reference, they cannot serve as inner antecedents for sluicing. Given this, even an account referring to symmetric entailment over dynamic semantic representations will not be able to account for these facts.

5 Direct Sprouting

Thus far, we have proposed that sluicing is subject to a symmetric entailment condition over inquisitive semantic representations. Since the elided clause in sluicing is always a question, this condition predicts that the antecedent clause in sluicing will always have an inquisitive interpretation. In the previous sections, we have considered the class of sluices where the inquisitiveness of the A clause is provided by an overt indefinite or disjunction, what Chung et al. (1995) dub ‘merger’. In the following two sections, we turn to cases where there is no such inquisitive element overtly present (i.e. pronounced) in the A-clause, what Chung et al. (1995) term ‘sprouting.’²² As seen in the examples in (63), the *wh*-phrases in sprouting can correspond to either an argument of the main predicate (63a-63b) or to an adjunct (63c-63d).

- (63) a. [Alexis was reading]_A, but [what ~~Alexis was reading~~]_E isn’t clear.
 b. [Craig is jealous]_A, but I don’t know [who of ~~Craig is jealous~~]_E.
 c. [Francisco finished the book]_A, but I’m not sure [when ~~Francisco finished the book~~]_E.
 d. [Seth arrived]_A, but I don’t know [who with ~~Seth arrived~~]_E.

At first blush, such examples appear to be counterexamples to the inquisitive entailment condition we have proposed. What we will argue in what follows is that such cases are not counterexamples at all, but rather are instances where the semantic representation of the A clause contains covert existential quantification over individuals, neo-Davidsonian events, or other suitable semantic objects. Just as we have claimed that overt indefinites are inquisitive, so too with these cases of covert existential quantification.

One of the challenges posed by sprouting is the fact that prepositional material such as *of* in (63b) cannot be elided even though English in general allows preposition stranding (i.e. there is a non-elliptical form “I don’t know who Craig is jealous of.” where only the *wh*-word is fronted). To account for this observation, we follow Chung (2006) in taking the semantic condition on sluicing to be supplemented by the lexical requirement in (64).²³ The condition in (64) ensures that no morpheme can be elided which was not present in the A clause. There are various other ways to formulate this generalization, see Merchant (2007).

- (64) **No New Morphemes:** Every lexical item in the numeration of the sluice that ends up (only) in the elided IP must be identical to an item in the numeration of the antecedent CP.

²²For Chung et al. (1995), these two terms do double duty, referring not only to the two descriptive classes defined in the main text, but also to a particular analysis of these. For Chung et al. (1995), examples of sprouting arise from a specific LF-augmentation procedure of the same name. In general, my use of these two terms is intended as a descriptive one, not presupposing any particular analysis. Indeed, I will argue below that some instances of sprouting are best analyzed in a way more akin to merger than sprouting.

²³The moniker ‘No New Morphemes’ is due to Merchant (2007).

Within this basic framework, our goal is to argue that examples like those in (63) can be successfully accounted for by a modified version of the symmetric entailment condition from (26). Central to the analysis is the idea that once we take seriously the claim that existentially interpreted implicit arguments are present in the semantics, many cases of sprouting follow quite naturally. For example, if we assign an example like (63a) a translation as in (65), we predict sluicing to be possible just as it is with an overt indefinite.

(65) ‘Alexis was reading.’ $\rightsquigarrow \exists x.\text{read}'(A, x)$

For certain adjuncts, however, it is clearly untenable to claim that the interpretation of the A clause contains an existential quantifier *directly* corresponding to the wh-phrase of the E clause. For example, assigning the A clause in (63d) a translation such as (66) clearly produces truth-conditions which are too strong; $(63d)_A$ does not entail that Seth had a companion. There is no implicit companion argument of any sort in the meaning of a sentence like ‘Seth arrived.’. The sentence’s meaning does not preclude this possibility, of course, but this has no bearing on the semantic representation of the sentence.

(66) ‘Seth arrived.’ $\rightsquigarrow \exists x.\text{arrive-with}'(S, x)$

Instead, we will argue that the inquisitive element in $(63d)_A$ is something more general: existential quantification of a neo-Davidsonian event argument. The felicity of examples like (63d) (and possibly (63c)) is the result of an accommodation procedure which we term ‘issue-bridging’. The idea is that the existence of the issue corresponding to a specific argument of the event introduced by the E clause can be accommodated based on the more general issue previously raised by the inquisitive existential quantification in the A clause. The proposed accommodation process is similar to what we find in bridging definite descriptions, where a discourse referent can be accommodated by ‘bridging’ from one previously present in the discourse (e.g. ‘A bus went by and *the driver* waved.’).

Following this discussion, we can divide sprouting into two different subclasses, depending on whether there is an inner antecedent which corresponds *directly* with the wh-phrase. We term cases of sprouting where there is such an inner antecedent present semantically *direct* sprouting and cases with no such element *indirect* sprouting.²⁴

(67) **Two kinds of sprouting:**

- a. **Direct:** The A clause contains a semantically represented inner antecedent equivalent to the wh-phrase.
- b. **Indirect:** The A clause does not contain a semantically represented inner antecedent equivalent to the wh-phrase.

The remainder of §5 extends the account of merger to direct sprouting and §6 presents the analysis of indirect sprouting.

²⁴While I will use the terms ‘direct’ and ‘indirect’ here to refer to instances of sprouting, the terms could equally be applied to all instances of sluicing, including merger cases. Since merger involves an overt indefinite or disjunction in the A clause, such cases will necessarily be classified as ‘direct’ sluicing. The direct/indirect distinction is therefore the semantic analog of Chung et al. (1995)’s syntactically/phonologically defined merger/sprouting distinction.

5.1 The typology of implicit arguments

Before proceeding to direct sprouting, we first make clear some assumptions about the semantics of implicit arguments. While it is universally agreed upon that implicit arguments are understood at some level of interpretation, the details of how this happens is the subject of widespread disagreement in the semantic literature.

On the one extreme, Recanati (2007) argues that the implicit arguments like those in (68) arise pragmatically, not being represented either semantically or syntactically. On the other extreme, Landau (2010) has recently argued that many sorts of implicit arguments are always present in the syntax, differing from their overt counterparts only in being featurally deficient and unpronounced. While they express uncertainty about exactly what this would mean, Bhatt & Pancheva (2006)’s survey article reaches a similar conclusion, claiming that (many) implicit arguments are ‘syntactically active but not syntactically projected’.²⁵ In between these extremes are accounts such as Condoravdi & Gawron (1996), which take implicit arguments to be present in the semantics, but make no commitments about their status in the syntax.

- | | | |
|------|-----------------------------|-------------------------|
| (68) | a. Jacques finally noticed. | State of Affairs |
| | b. Alexis was reading. | Theme |
| | c. Bill is jealous. | Stimulus |

In contrast to the lack of consensus in the literature on implicit arguments, the literature on sluicing has (often tacitly) taken the position that implicit arguments are absent from the syntax. For example, Merchant (2001) simply treats (68b) as involving an intransitive verb without any sort of syntactic argument (though as far as I can tell, this syntax is in no way crucial to the account). I take no particular position on the issues of whether and how such arguments are represented in the syntax in what follows, since it is their semantics which matters in the present account.

The clearest piece of evidence that implicit arguments must be present in semantic representations is the need to distinguish between different semantic subtypes of implicit arguments. The most longstanding distinction in this vein is one first proposed by Fillmore (1969) between *indefinite* and *definite* implicit arguments (alternately termed “existential” and “anaphoric”). Here, we see that implicit arguments of these two sorts exhibit the same behavior as their overt counterparts with respect to two diagnostics: (i) ability to license sluicing, and (ii) whether they establish a novel discourse referent or are coreferential with some prior discourse referent. See Fillmore (1969) et seq. for further indications regarding the (in)definiteness of these implicit arguments (e.g. uniqueness, felicity in out-of-the-blue contexts, bound variable readings for definites).

- | | | |
|------|--|---|
| (69) | Sluicing: | |
| | a. Fido was eating, but I don’t know what. | ⇐ Indefinite does license sluicing |
| | b. #Alexis noticed, but I don’t know what. | ⇐ Definite does not |

²⁵There is a wider range of other syntactic approaches than the present discussion would suggest (see Bhatt & Pancheva (2006) for a recent survey). The differences between them are not important for our purposes, however, since our account of sluicing relies mainly on semantic identity.

(70) **Novelty condition:**

- a. A: What happened to my sandwich?
B: #Fido ate. \Leftarrow **Indefinite cannot refer to prior dref**
- b. A: John is really tall.
B: I noticed. \Leftarrow **Definite must refer to prior dref**

However, AnderBois (2012b) shows that these same diagnostics reveal a third class of apparent implicit arguments which are *flexible* with respect to these two properties. For example, the implicit stimulus of the predicative adjective *jealous* can serve as the inner antecedent for sluicing, as in Chung (2006)'s (71). At the same time, however, it can receive an interpretation in other cases which is apparently anaphoric to a prior dref, as in (72). Note, however, that in any individual use of *jealous*, the IA either behaves as a definite or as an indefinite, i.e. a continuation like (72) is not possible where the implicit argument is anaphoric yet still licenses sluicing.

(71) **Sluicing:**

- a. They're jealous, but its unclear of who. \Leftarrow **Flexible does license sluicing**

(72) **Novelty condition:**

- a. A: Fred just won the lottery.
B: I am so jealous. \Leftarrow **Flexible can refer to prior dref**

(73) **Familiar inner antecedent impossible:**

- a. A: Fred just won the lottery.
B: I am so jealous, but I won't say what of.
 \Leftarrow **Flexible cannot both license sluicing and refer to a prior dref at once**

In what follows, we follow AnderBois (2012b)'s proposal that unlike definite and indefinite implicit arguments, flexible ones are indeed absent from the semantic representation.²⁶ That is to say that they aren't truly *arguments* at all, but lexical or metaphysical entailments. Recanati (2007) makes a related proposal, but intends it to apply to all implicit arguments. Since it is absent from the A clause's semantic representation, then, sprouting with flexible arguments is another instance of indirect sprouting – similar to adjunct examples like (63d) – and will therefore be discussed in §6 when we address indirect sprouting more generally.

Turning to definite IAs, it might seem that an account based on syntactic isomorphy would struggle to predict their inability to license sluicing in (74). The verb *notice* can take an overt internal argument, and if sprouting is an operation which augments LFs within the bounds of argument structure (e.g. as argued by Chung et al. (1995)), we might expect (74) to be felicitous. This concern, however, largely goes away once we observe that the non-elliptical control, (75), is also infelicitous, as Fillmore (1986) observes. Given this, any account which makes the felicity of the sluice parasitic on that of the overt clausal

²⁶While this is a natural way to approach such data, the present account would be consistent with other approaches as well. For example, if flexible implicit arguments were given an indefinite-like semantics in the uses like (71), such cases could be treated in the same way as true indefinite implicit arguments like that of *eat* are in §5.2.

counterpart will correctly rule out (74). Since structure-free accounts lean more heavily on the semantics/pragmatics in the first place, such facts will also be unproblematic for them as well.

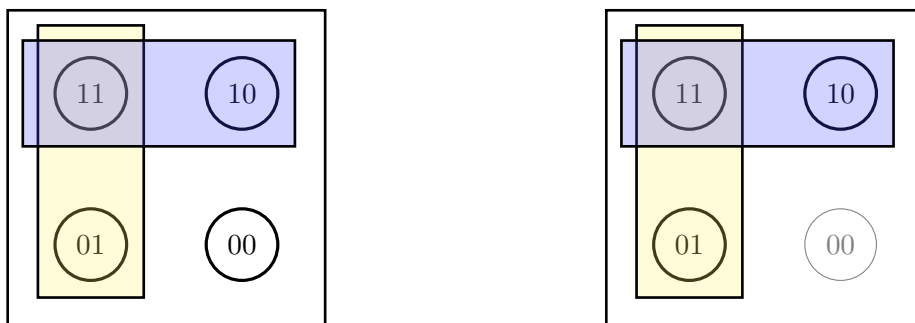
- (74) #Alexis noticed, but I don't know what.
 (75) #Alexis noticed, but I don't know what she noticed.

5.2 Direct sprouting and operator intervention

We turn now to examine in more detail the behavior of indefinite implicit arguments in more detail. Like their overt counterparts, we take indefinite implicit arguments to be present in the semantic representation. As with overt indefinites, we take them to introduce inquisitive existential quantification into the semantics. Given this, indefinite implicit arguments can serve as the inner antecedents for sluicing for the same reason as their overt counterparts: the semantics of the A clause introduces the same issue as the E clause. We see this sketched out in (77) for the example in (76).

- (76) [John ate_A, but I don't know [what ~~John ate~~]_E.
 (77) a. (76)_A $\rightsquigarrow \exists x.\text{eat}'(J, x)$
 b. (76)_E $\rightsquigarrow \exists x.\text{eat}'(J, x)$ (Presupposes: $!\exists x.\text{eat}'(J, x)$)

(78) $\llbracket(76)_A\rrbracket \quad \Leftrightarrow \quad \llbracket(76)_E\rrbracket$



Another indefinite implicit argument which is handled straightforwardly under this approach is the implicit agent of English passives, as in (79). Unlike the corresponding inchoative in the would-be A clause of (80), the passive entails the existence of a causer/agent. As such, the A and E clauses receive translations as in (81) including an (inquisitive) existential quantifier. Given these translations, the symmetric entailment condition in (26) is met, and sluicing is predicted to be possible. The non-omissibility of the preposition *by* in (79) is again attributed to the ‘No New Morphemes’ constraint, as confirmed by the contrast with the long passive in (82), since *by* is present in the A clause in this example as well.

- (79) [The boat was sunk]_A, but Fred wasn't sure [who by ~~the boat was sunk~~]_E.
 (80) *The boat sunk, but Fred wasn't sure who by.
 (81) a. (79)_A $\rightsquigarrow \exists x.\text{sink}'(x, \text{the boat})$
 b. (79)_E $\rightsquigarrow \exists x.\text{sink}'(x, \text{the boat})$ (Presupposes: $!\exists x.\text{sink}'(x, \text{the boat})$)

- (82) [The boat was sunk by someone]_A, but Fred wasn't sure [~~who the boat was sunk by~~]_E.

While the account we propose assimilates direct sprouting to merger cases, the account also readily provides an explanation for the central asymmetry between the two: sensitivity to islands (and other intervening operators). One of the properties of the merger subtype of sluicing that has attracted the most attention in previous literature (dating back to Ross (1969)) is its lack of sensitivity to syntactic islands. For example, sluicing is possible in an example like (83), even though the non-elliptical version of the E clause, (84), is not possible (see Merchant (2001) for examples from a variety of islands and detailed discussion).

- (83) That Tom will win a (certain) race is likely, but it's not clear which race.

- (84) *It's not clear [which race]_i that Tom will win *t_i* is likely.

While this 'island-amnestying' effect holds in cases of merger, it has been observed by Chung et al. (1995) (who in turn attribute the observation to unpublished work by Chris Albert) that no such effect arises in corresponding examples of sprouting, as seen by the ungrammaticality of their example in (85).

- (85) *That Tom will win is likely, but it's not clear which race.

Chung et al. (1995) and many subsequent authors have pursued the intuition that the source of the ungrammaticality of (85) is the same as that of (84). In particular, the idea is that relationship between the *wh*-phrase and the trace in sprouting is similar (or perhaps identical) to the *A'*-movement which takes place in overt *wh*-movement. In contrast, merger cases are argued to involve unselective binding rather than movement and therefore are expected to be island-insensitive. This approach, then, makes the prediction that sprouting should be subject to exactly the same constraints as overt *A'*-movement. While it is true that sprouting is subject to all of the constraints that overt *A'*-movement is, Romero (1998) and later Merchant (2001) show that it is in fact subject to a more stringent condition than *A'*-movement. Evidence for this comes from minimal pairs like those in (86-87) where there is some intervening element which blocks sprouting, as in the (a) examples, but allows overt *A'*-movement, as in the (b) examples.

- (86) a. *Ramon is glad that Sally ate, but I don't remember which dish.
 b. I don't remember which dish he is glad that Sally ate. Romero (1998)

- (87) a. *A nurse is rarely on duty — guess when!
 b. When is a nurse rarely on duty? Merchant (2001)

Looking at the whole body of data from (83-87), Romero (1998) identifies the unifying pattern: sluicing is possible if and only if the existential in the A clause — whether overt or not — takes widest scope, as the *wh*-phrase does in the E clause. That is, the island-escaping example in (83) is possible only under a wide scope reading for the indefinite *a race*. She argues that the asymmetry between (83) and (85) can therefore be attributed to independently observed scopal properties of overt and implicit arguments (Merchant (2001) makes essentially the same case). In particular, it has been independently observed that

implicit existential arguments always take narrow scope relative to all other operators (e.g. Fodor & Fodor (1980), Lasnik (1997)). In contrast, overt indefinites have been known since at least Farkas (1981) to have the property of being able to take wide-scope outside of syntactic islands, i.e. ‘exceptional wide scope’.

In terms of the present account, then, this means that A clauses containing overt indefinites will have a reading (the wide-scope reading) which will be assigned an inquisitive denotation, even when the indefinite occurs inside an island. The fact that sluicing with overt indefinites as inner antecedents is island-insensitive is directly tied to the exceptional wide scope of overt indefinites more generally. Implicit existential arguments do not exhibit exceptional wide scope (in fact, quite the opposite) and, correspondingly, sluicing with implicit inner antecedents is only possible when no such operator intervenes.

Since overt disjunctions show the same sort of exceptional wide scope (Schlenker (2006) and references therein), we predict straightforwardly that sluicing with an overt disjunction as inner antecedent should also be island-insensitive. We see this prediction borne out in (88), parallel to (83).

- (88) That Tom will win (either) the downhill or the slalom is likely, but it’s not clear which.

Beyond islands, this account captures one further parallel between merger cases and direct sprouting: so-called ‘inheritance of content’. In §3.2, we saw examples like (32), repeated in (89), where overt material in A clause contextually restricts the interpretation of the E clause despite not being present (or absent via some independently attested process). While implicit arguments do not have overt restrictor material, their interpretation is nonetheless more restricted than their overt counterparts, as has been known since Fillmore (1969). For example, Allerton (1975) claims that the indefinite implicit argument of the verb drink “normally suggests an object beverage that is [+ALCOHOLIC]”, whereas the range of possible overt arguments is not restricted in this way. When an indefinite implicit argument provides the inner antecedent for sluicing, we similarly find that this content restricts the interpretation of the E clause in (90), i.e. Alejandro’s mom wants to find out what kind of alcohol he drank.

- (89) [Ralph is going to invite someone from Kankakee to the party]_A, but they don’t know [who_j ~~he’s going to invite t_j to the party~~]_E
- (90) Alejandro drank at the party, and his mom wants to find out what.

In this section, we have seen that once we take the independently motivated position that implicit arguments should be represented (at least) in the semantics, some instances of sprouting (which we dub ‘direct’ sprouting) can be given essentially the same analysis as corresponding examples with overt indefinites. In the following section, we turn to the remaining cases of sprouting, what we have dubbed ‘indirect’ sprouting.

6 Indirect Sprouting

In §5, we argued that A clauses with existentially interpreted implicit arguments — ‘direct’ sprouting — are possible inner antecedents for the same reason as their overt counterparts. While this strategy is possible for some cases of sprouting, it falls short for other cases such as (91), where there is no existential directly corresponding to the wh-phrase. In addition to these cases where there the existential information is not entailed at all, there are the instances of flexible implicit arguments discussed in §5.1, where the existential information is a lexical or metaphysical entailment, as in (92).

- (91) a. [Seth arrived]_A, but I don’t know [who with ~~Seth arrived~~]_E.
b. [John baked a cake]_A, but we’re all wondering [with whose help ~~John baked a cake~~]_E.
c. [Mary learned French]_A, but I don’t know [who for ~~she learned French~~]_E.
- (92) a. [They’re jealous]_A, but it’s unclear [of who]_E. Chung (2006)
b. [They were firing]_A, but [at what]_E was unclear. Chung et al. (2010)
c. [John has been nominated]_A, but he still hasn’t found out [for which award.]_E

In both sorts of cases, we claim, there is no inquisitive element such as an existential quantifier²⁷ which directly corresponds to the wh-phrase. While it is true that no inquisitive element *directly* corresponds to the wh-phrase in these examples, we will argue in this section, however, that the A clause in indirect sprouting nonetheless does contain an inquisitive element: the existential quantification of a neo-Davidsonian event argument. The sluices in (91-92), then, are the result of an accommodation process of sorts, which we term *issue-bridging*. The term is intended to highlight the analogy with bridging in the realm of definite descriptions, as exemplified by the definite *the driver* in (93).

- (93) A bus went by. The driver had on sunglasses.

Issue-bridging must be constrained in order to correctly rule out the accommodation of the various illicit sluices we have seen in previous sections. In §6.1, we spell out and motivate the extension of inquisitive existential quantification beyond the domain of individuals. In §6.2, we examine three ways in which the analysis from previous sections constrains *issue-bridging*. First, the ‘sprouted’ wh-phrases must be ‘licensed’ by the material in the A clause since the E clause is, by hypothesis, a fully articulated clause underlyingly. Second, the entire wh-phrase including prepositions must be present overtly due to the ‘No New Morphemes’ constraint. Third, just as bridging requires a prior discourse referent, issue-bridging still requires a prior issue, in the form of the *inquisitive* A clause. Collectively, these constraints ensure that issue-bridging: **(i)** only occurs with wh-phrases which do not have counterparts in the A clause (adjuncts and flexible implicit arguments), and **(ii)** is subject to the same operator/island intervention effects as sprouting with implicit arguments.

²⁷It should be noted that there are a number of cases for which either an indefinite implicit argument (with a contextual domain restriction) or a flexible implicit argument seems *prima facie* plausible. Many of these cases arise in domains which can be subdivided with varying degrees of granularity (e.g. times and places). Under the former analysis, such cases would be treated as direct sprouting, and under the latter as indirect sprouting. We set aside such cases here, though see AnderBois (2011) for further discussion.

6.1 Inquisitive existential quantification beyond individuals

In §2, we presented a compositional semantics where indefinites not only include the truth-conditional information that there is some entity satisfying a given predicate, but also raise the issue of which entity or entities do so. Therefore, a sentence containing a wide-scope indefinite (or disjunction) makes a hybrid contribution to discourse: it provides information (ideally) aimed at resolving old issues and simultaneously pushes the discourse forward by highlighting new issues for elaboration. In this subsection, we extend this idea to other kinds of existential quantification, particularly that of an event/state argument, proposing that they too make a similar hybrid contribution.

Before tackling existential event quantification, recall how the interpretation of indefinites came about for a basic example like (94). First, we translated this formula into our metalanguage with the formula in (95). Second, the metalanguage interpretation of this formula consists of a set of alternative possibilities schematized in (96). In terms of information, the sentence is considered true iff there is at least one alternative in (96) which contains the world of evaluation. In addition to this truth-conditional information, (94) also introduces the issue of which alternative(s) in (96) hold as a potential future issue for discussion.

(94) Someone left.

(95) $\exists x.\text{leave}'(x)$

(96) $\left\{ \begin{array}{l} \text{John left} \\ \text{Maribel left} \\ \text{Alexis left} \\ \text{Ignacio left} \\ \dots \end{array} \right\}$

For events, we repeat the same procedure, differing only in the ontological domain we are operating over. Ignoring tense, a simple sentence like (97) is assigned a metalanguage translation as in (98). Interpreting the existential event quantification in the same way gives us the semantic interpretation in (99).

(97) John won.

(98) $\exists e.\text{win}'(e) \wedge \text{AGENT}(J, e)$

(99) $\left\{ \begin{array}{l} e_1 \text{ is an event of John winning} \\ e_2 \text{ is an event of John winning} \\ e_3 \text{ is an event of John winning} \\ e_4 \text{ is an event of John winning} \\ \dots \end{array} \right\}$

In terms of information, the sentence is therefore true iff at least one of the alternative possibilities is true in the world of evaluation. If we add in a suitable semantics for tense, this gives us exactly the truth conditions we expect for the sentence. However, it also makes an inquisitive contribution, putting forth the issue of which events are in fact events that consist of John winning.

On the face of it, this is a somewhat strange issue to imagine, in part because there is no overt corresponding question of the form ‘Which event(s) is one of John winning?’ in the way that the issue raised by (94) can be straightforwardly paraphrased as ‘Who left?’. This strangeness, however, merely points to what we already knew: that while we take events to be, in some sense, objects in the real world, they are a quite different sort of “object” than individuals. It is not natural to individuate events in the same way as we do physical entities such as people and things (much as it is not natural to do in the case of possible worlds). While it is not so natural to individuate events, it is quite natural to *sort* them along a given dimension. That is, while it is somewhat odd to imagine asking a question about ‘which event’, it is quite easy to imagine asking questions which target particular classes of events, whether by time, location, or other properties which are salient in context.

Issue bridging, then, involves making just such a leap: from the general issue of ‘which event’ introduced by the inquisitive existential quantification in the A clause to the adjunct wh-question which sorts the space of events along a particular argument of the event and asks the question ‘which class of events?’. Consider, for example, the case of sprouting from a flexible implicit argument as in (100).

(100) [John won]_A, but I don’t know [which contest]_E

Here, the A clause will have the semantic contribution sketched in (98-99), raising the issue of which event(s) in fact are events of John winning. We can visualize this in terms of a table as in (101) where each row represents a different event and the columns describe properties of those events. For the purposes of illustration, we assume a model with only 8 events differing only in two parameters: time and the contest won. The existential quantification of the (100)_A-clause puts on the table the issue of which row(s) contain events of John leaving.

(101)

Event	Time	Contest
e ₁	t ₁	c ₁
e ₂	t ₂	c ₁
e ₃	t ₁	c ₂
e ₄	t ₂	c ₂
e ₅	t ₁	c ₃
e ₆	t ₂	c ₃
e ₇	t ₁	c ₄
e ₈	t ₂	c ₄

The E clause in (100), on the other hand, presents a closely related issue, but one which is slightly more coarse-grained. Instead of asking the question of which row contains an event of John winning, it sorts the space of events along a particular dimension (the contest) and asks which box contains one of John winning (e.g. is there an event of John winning c₁, a c₂ event, etc). We can see this visually in terms of the bolded boxes in (102).

(102)

Event	Time	Context
e ₁	t ₁	c ₁
e ₂	t ₂	c ₁
e ₃	t ₁	c ₂
e ₄	t ₂	c ₂
e ₅	t ₁	c ₃
e ₆	t ₂	c ₃
e ₇	t ₁	c ₄
e ₈	t ₂	c ₄

Indirect sprouting, then, consists of an A clause which presents a general issue (‘Which event?’), thereby facilitating further discussion of the details of the event described. The E clause presents a more coarse-grained issue corresponding to this larger issue and can therefore be accommodated as being sufficiently similar to the A issue. That is, indirect sprouting is expected to be licit to the extent that world knowledge and context support the inference that the alternatives in A (which differ in which event serves as witness for the existential in (101) differ along the dimension specified by the wh-phrase in the E clause, as specified in (103). While we leave a more detailed exploration of the parallels with bridging definites to future work, we regard this principle as a specific instance of these more general inferential processes.

- (103) **Covariation condition:** Indirect sprouting is felicitous to the extent that the context allows for the inference that the alternatives in the A clause covary with the alternatives in the E clause.

This principle predicts that indirect sprouting is context-sensitive in a way that merger is not. And indeed, this seems to be the case. The clearest indication of this are cases where the discourse context provides a prior discourse referent for a flexible implicit argument, as in (104). Here, the context is such that events in question are only ones where my having won the lottery is clearly indicated as the stimulus of John’s jealousy. Therefore, the covariation condition is not met, and (104) is predicted to be infelicitous.

- (104) #I just won the lottery. John is jealous, but I don’t know who of.

For adjuncts like (105), this condition means that the existential presupposition of the question in the E clause must be met or accommodated in order for sluicing to be felicitous. If the information that John rode on a bike at all is not present, say if John generally takes the bus, then clearly the events of John getting to the party will not covary with bikes. Beyond this, the prediction is that the sentence’s felicity will be tied to the plausibility in context of a variety of different bikes John may have taken. For example, (105) is expected to be better in a context where John’s bike is known to be broken than if it is known to be working (since presumably he would use his own bike in most such events then).

- (105) John got to the party, but we don’t know on whose bike.

While we leave more extensive empirical investigation to future work, the covariation condition seems reasonable and captures the data we have seen here. One aspect of the

account of indirect sprouting which is worth emphasizing here is that while the account relies on accommodation, it is the covariation of the A and E issues which must be accommodated, not simply the E issue itself. As we will see in the remainder of this section, this approach avoids the pitfalls faced by unconstrained accommodation.

6.2 Constraints on issue bridging

That sprouting would involve accommodation, especially in some of the cases of adjuncts, is not a new idea. However, as Chung (2006) discusses, unconstrained accommodation runs the risk of being too permissive, allowing any arbitrary issue to be accommodated. Chung points out examples like (106) as being problematic for an account making use of free or unconstrained accommodation. The examples in (107-109) present further cases which would seem to be problematic for free accommodation.

- (106) #He finished the project, but we don't know whose help. Chung (2006)
- (107) #The ship sunk. Guess who (by).
- (108) #Tony sent Mo a picture that he painted, but it's not clear with what.
Chung et al. (1995)
- (109) #No nurse was on duty, but we don't know when. Merchant (2001)

The account developed in previous sections for sluicing with overt and implicit inner antecedents, however, naturally constrains issue-bridging in ways that rule out such examples. There are three independently motivated aspects of the analysis that serve to constrain issue-bridging:

- (110) **3 constraints on issue-bridging:**
1. No New Morphemes
 2. Overt E clause must be grammatical.
 3. The A clause is inquisitive.

First, in order to account for the obligatory presence of prepositions introducing implicit arguments, we have, following Chung (2006), assumed that the elided material cannot contain any morphemes which are not previously present in the A clause. This correctly predicts that any prepositional material is obligatorily present in cases like (111-112), just as it was for semantically-represented implicit arguments.

- (111) a. #He finished the project, but we don't know whose help.
b. He finished the project, but we don't know with whose help.
- (112) a. #John got to the party, but we don't know whose bike.
b. John got to the party, but we don't know on whose bike.

Second, the account we have proposed is based on the PF-deletion of a fully articulated E clause. One consequence of this is that the fully formed E clause itself must be possible in the first place (island amelioration being the notable exception, as discussed in detail by Merchant (2001)). Given this, examples like (113) are expected to be ill-formed since

the E clause is itself not possible. Not only must the E clause itself be well-formed, but the combination of the A clause and the fully formed E clause must be well-formed. This constraint rules out examples like (114) where the E clause is itself well-formed, but is infelicitous following the A clause (for reasons which are poorly understood).

- (113) a. #She knew French, but I don't know for whom.
b. #John was tall, but I don't know on what occasions.
c. #They noticed the painting, but I don't know for how long.
d. #The ship sunk. Guess who (by).
- (114) a. #John noticed, but I don't know what.
b. #The cake was tasty, but I don't know for who.

Finally, the accommodation process we have proposed is a *bridging* process, not the direct accommodation of a question or issue under discussion. Accommodation in indirect sprouting is located in the *similarity relation* between the adjunct question and the issue introduced by the A clause. As such, the A clause still must be inquisitive in order for this to be possible. Like the existential quantification found in implicit arguments, existential quantification over events is also known to have narrow-scope relative to other operators (e.g. Landman (2000)) including negation. Given this, we predict that sprouting of this sort will pattern with sprouting with implicit arguments in being sensitive to strong islands, as in (115), as well other intervening operators such as negation, as in (116). This also correctly predicts the impossibility of adjunct sprouting in cases of double negation, as in (117).

- (115) #Tony sent Mo a picture that he painted, but it's not clear with what.
Chung et al. (1995)
- (116) #No nurse was on duty, but we don't know when. Merchant (2001)
- (117) #It's not the case that John didn't leave. Guess when!

In this section, we have proposed an analysis of *indirect* sprouting, i.e. sprouting where there is no inner antecedent directly corresponding to the wh-phrase. In particular, the analysis holds that such cases involve anaphoric retrieval of an issue introduced by the inquisitive existential quantification of the event argument plus an accommodation process, issue bridging.

At this point, then, it is worth considering the relationship between issue-bridging and ordinary bridging and therefore the place of sluicing within the typology of anaphoric processes more generally. While they do not consider ellipsis, one distinction which has been made by Beaver & Zeevat (2007) is between anaphoric processes which readily allow for accommodation (albeit with certain restrictions) and those which do not. Some examples of the first category, seen in (118), are the presuppositions of change of state verbs like *stop* and of factive verbs such as *realize*. The second category, according to Beaver & Zeevat (2007), includes pronouns, short definite descriptions, as well as certain lexical presuppositions such those contributed by *too* and *another*.

- (118) a. It will *stop* raining.
b. Mary *realizes* it is raining.

- (119) a. *He* is very cute.
 b. *The* driver waved at me.
 c. John is having dinner in New York *too*.
 d. *Another* man came in.

This distinction, Beaver & Zeevat (2007) argue, can be boiled down to the precise nature of the material to be accommodated. Specifically, they claim that the anaphoric material sought in (118) is limited to propositions or facts about the world, while those in (119) are “intrinsically concerned with the discourse record itself”. While they leave many of the details for future work, they attribute the asymmetry in accommodation between the two cases to a general principle such as (120).

- (120) **The Discourse Record Principle:** Presuppositions about what is in the discourse record may not be accommodated.

Sluicing, therefore, belongs to the second category; sluicing in general is clearly about the discourse record. Like pronouns and the presuppositions of *too* and *another*, sluicing requires a linguistic antecedent and does not allow for the relevant material to be accommodated if no such material is found, as in Hankamer & Sag (1976)’s example in (121). In essence, this claim is not particularly new, being more or less a restatement of Hankamer & Sag (1976)’s claim that sluicing requires an overt linguistic antecedent (i.e. is a type of ‘surface anaphora’ in their terms).

- (121) **Scenario:** Hankamer produces a gun, points it offstage and fires, whereupon a scream is heard.
 Sag: #Jesus, I wonder who.

The present account offers two insights regarding the status of sluicing within this broader picture. First, the account gives us a clear indication of why sluicing must be intrinsically concerned with the discourse record. The material to be retrieved is not a mere proposition or fact, but rather is itself an intrinsically discourse-related entity, an *issue* (much the same can be said for pronouns vis-à-vis discourse referents). Second, the account of sprouting in this section has provided an explanation of a class of apparent counterexamples: indirect sprouting. Consider again an instance of sprouting such as (111b), repeated in (122).

- (122) He finished the project, but we don’t know with whose help.

Since the issue in the E clause has no direct inner antecedent in the A clause, indirect sprouting appears to involve the accommodation of an issue with no antecedent in the prior discourse record. In this section, however, we have argued that such examples do indeed involve the retrieval of an issue from the previous discourse record: the issue introduced by existential event quantification. To arrive at the specific issue in the E clause requires some inference in the form of issue-bridging, but it also requires the existence of the issue in the previous discourse record from which to bridge. In this way, the account allows us to maintain the idea that sluicing is a type of surface anaphora, intrinsically concerned with the discourse record, yet still capture examples like (122).

7 Conclusion

In this paper, we have proposed that the semantic condition on sluicing in English must be sensitive not just to the truth-conditional information of the two clauses, but also to their inquisitive content. Since the E clause to be elided in sluicing is always a question, it then follows that the antecedent A clause must have a denotation which is inquisitive. On the empirical side, this theory allowed us to account for two kinds of otherwise recalcitrant examples. First, we saw certain cases of merger where truth-conditional equivalence is met, yet sluicing is not felicitous. Second, we were able to account for cases of sprouting where truth-conditional equivalence was not met, yet sluicing was possible. On the theoretical side, the account offers a *semantic* insight into what aspects of indefinites and disjunctions makes them good inner antecedents for sluicing. Indefinites and disjunctions evoke the same kind of alternatives as questions do and it is this deep connection which explains their role in sluicing.

In addition to improving our understanding of sluicing and ellipsis, the paper has significant ramifications for inquisitive semantics itself. The data and analysis presented here constitute the first direct empirical argument that an inquisitive semantics is needed for assertions themselves, at least in English. Previous work has made the empirical case for an inquisitive semantics based principally on the compositional role of disjunctions and indefinites in questions across languages (e.g. AnderBois (2012a), Pruitt & Roelofsen (2012)). Under the account of sluicing we have proposed, then, sluicing emerges as a way of diagnosing inquisitive content in assertions and providing empirical support for richer notion of semantic content central to inquisitive semantics. Finally, given the apparent ubiquity of sluicing cross-linguistically discussed in §3.1 and the role of disjunctions and indefinites as inner antecedents, there is every reason to believe that similar arguments can be made for other languages and therefore that an issue-rich semantics is warranted for natural language more generally.

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