

Conditional Questions as Matrix Questions with Syntactic Reconstruction

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Abstract

Conditional Questions (CQs), structures such as *If it's raining, will Joanna leave?* pose a compositional puzzle: they look globally like conditionals, but are interpreted like questions. Existing accounts in the literature all take the surface form of CQs at face value and treat them as matrix conditionals scoping over a question (Isaacs and Rawlins 2008; Ciardelli et al. 2019). We develop and argue for an alternative theory on which CQs are, despite surface appearance, underlyingly matrix questions scoping over a conditional. The input to semantic interpretation is obtained as a result of syntactic reconstruction of the *if*-clause under the question. We show that this perspective makes correct predictions with respect to diagnostics for reconstruction that surface-syntax accounts of CQs don't make. Overall, the arguments point to the conclusion that grammar does not make available a mechanism for interpreting questions as consequents of conditionals, in contrast to previous accounts.

Keywords: conditionals, questions, syntactic reconstruction

1 Introduction

Linguists who are faced with the task of working out the compositional semantics of some puzzling syntactic structure often find that their starting assumptions must be modified. In such cases a familiar dilemma sometimes emerges: should we complicate the underlying syntax or the underlying semantics (or both)? This paper deals with this dilemma in the empirical domain of so-called ‘Conditional Questions’ (henceforth CQs). CQs are illustrated in (1).

- (1) a. If it’s raining, will Joanna leave?
 b. If it’s raining, who will show up?

Impressionistically, what is going on in (1) is that a question in the consequent of the conditional is raised against the information specified by the antecedent of the conditional. In interpreting (1a), for instance, we raise the issue of whether Joanna will leave on the supposition that it is raining.

But how exactly do CQs compose to derive this meaning? The classical analysis of the conditional operator *if* is that it connects two declarative sentences, i.e., composes two propositions; therefore it is puzzling that here *if* is apparently able to connect a declarative sentence with an interrogative one.

Existing analyses in the literature (Velissaratou, 2000; Isaacs and Rawlins, 2008; Krifka, 2019; Bledin and Rawlins, 2019; Ciardelli et al., 2019), while varying sometimes radically from one another, all have one thing in common: they take the surface form at face value and presuppose a What-You-See-Is-What-You-Get syntax. Thus, they all employ (and must justify) some semantic machinery that allows the conditional operator to compose a proposition with a question meaning. We group those accounts under the heading ‘*if*>? approach’, and we state its gist in (2).

- (2) *if*>? approach:

CQs are structures in which a question is embedded in the consequent of a

conditional (*if* > ?). ‘*if*’ (or whichever is the operator that builds conditional constructions) can compose a proposition with a question meaning.

A prominent variant of an *if*>? account is offered by Isaacs and Rawlins (2008). On their view, the interpretation of CQs proceeds in a two-step, dynamic process of context update for conditionals. Specifically, Isaacs and Rawlins (2008) propose, CQs are interpreted as follows: first, the global context of utterance is temporarily updated with the proposition in the conditional antecedent; then, the question in the consequent takes the newly created context as input, and outputs a partition of it (as is suitable for a question meaning; Hamblin 1958; Groenendijk and Stokhof 1984). (1a), for instance, is semantically interpreted first by intersecting the global context with the set of worlds in which it’s raining, and then the question partitions the new context to one cell in which Joanna leaves and one cell in which she doesn’t.

A different *if*>? analysis is offered by Ciardelli (2016) and Ciardelli et al. (2019). They take the existence of CQs as support for the framework of Inquisitive Semantics, whose core is the hypothesis that declarative sentences and interrogative sentences have a like status in terms of both semantic content and semantic type (roughly, both describe a set of propositions). Glossing over the details, Ciardelli et al. (2019, §7.2.2) essentially stipulate that the conditional operator can be semantically lifted from its basic meaning as connecting two propositions to one that can operate on sets of propositions. With such lifting, the conditional operator can compose with a set of propositions—a question meaning—in the consequent.

The purpose of this paper is to develop and argue for a theory of CQs that rejects the *if*>? approach altogether. While we share the basic intuition described in the beginning of this section about the overall meaning of CQs and how they function in discourse, we will defend an analysis that cashes out that intuition with different assumptions about the syntax and compositional semantics. In short, we claim that CQs are matrix questions scoping over a conditional at Logical Form (LF).

4 *Conditional Questions*

Our alternative account can be appropriately called ‘*?>if*’ **approach**, and its gist is summarized in the points in (3), which contrast with (2).

(3) *?>if Approach* (this paper)

- (i) CQs are structures in which, despite surface appearance, a conditional is embedded under a question (*? > if*); they are ordinary matrix questions.
- (ii) ‘if’ cannot connect a proposition with a question; it only ever connects a proposition with a proposition.

Our proposal which makes the claims in (3) possible is that the conditional antecedent syntactically reconstructs into the question nucleus before semantic interpretation takes place, i.e. at Logical Form (LF). The underlying structure we propose for the CQs in (1) is virtually the same as in cases in which the *if*-clause appears in final position, and is schematically represented in (4).

(4) *Proposal: the LFs of (1), schematically*

- a. Will [Joanna leave [if it’s raining]]?
- b. Who₁ will [_t₁ show up [if it’s raining]]?

As we discuss later, the hypothesis that (some) sentence-initial *if*-clauses originate in a lower position, to which they can optionally reconstruct, has been argued for on independent grounds (Iatridou 1991, Bhatt and Pancheva 2006), and is not a novelty designed specifically for our account of CQs, although it is one which we make crucial use of. Other than that, our analysis incorporates fairly standard assumptions about the interpretation of questions and conditionals, and does not require any special machinery to deal with conditional questions—that is, nothing beyond whatever is needed to account for conditional assertions.¹

¹Kai von Stechow (unpublished class handout) also argues that CQs should receive a *?>if* account—what he calls a ‘questioned conditionals’ account—and he shows how all the semantic-pragmatic properties of CQs discussed by Isaacs and Rawlins 2008 still fall in place if the question is analyzed as taking scope over a conditional. Von Stechow points out that “under the questioned conditional account, it[=a question like (1a), THE AUTHORS] must involve some kind of

We provide empirical arguments to favor our $?>if$ theory. For one, we will present evidence that the process of *if*-clause reconstruction is a possible route for interpreting CQs, based on the interaction of CQs with independent processes that require reconstruction such as scope and variable binding. Second, we will show that some of the evidence point to the stronger conclusion that not only is reconstruction a possible route for interpreting CQs, but that it is a necessary step for interpreting CQs. The relevant data come from observed syntactic constraints on the distribution of CQs, in particular syntactic islands and Binding Principle C, and differences between conditionals and disjunction in their potential to license questions. The picture that will emerge is that approaches that rely on an *if* $>?$ syntax to interpret CQs are not only rendered unnecessary by the reconstruction mechanism but in fact better be unavailable, for otherwise the observed restrictions would not be derived and our grammar would overgenerate certain CQ structures.

The paper is organized as follows. In section 2 we present the formal details of our $?>if$ theory, and we show how it delivers all the basic desiderata from a theory of CQs. Section 3 discusses some differences between our $?>if$ approach and the competing *if* $>?$ approach, and will offer a conceptual argument for $?>if$. In section 4 we present and review arguments for the existence of *if*-clause reconstruction independently of CQs, based on scope and binding facts, and we crucially show that the relevant generalizations extend to CQs, supporting the view that reconstruction is a possible strategy for composing CQs. Section makes the case that the semantic mechanisms postulated by *if* $>?$ analyses should be rendered unavailable in a theory of CQs since they overgenerate certain grammatical configurations.

topicalization of the *if*-clause.” He however stops short of developing this idea formally and doesn’t provide empirical reasons to favor it over the Context Update approach. This paper fills this gap.

2 An *?>if* analysis of Conditional Questions

2.1 Syntax

To repeat, in our view CQs like those in (1) are matrix questions scoping over an ordinary, propositional conditional, despite surface appearance. A syntactic derivation for the polar question in (1a) is given schematically in (5), and for the constituent question in (1b) is given schematically in (6). The *if*-clause, an adverbial, starts out somewhere inside TP and then moves up to adjoin to CP.² The base position of fronted elements is represented as a co-indexed t_i .

(5) *Derivation of (1a)* ‘if it rains, will Joanna leave?’

- a. Base structure: [_{TP} Joanna will leave [_{ADVP} if it rains]]
- b. Head-movement: [_{CP} will [_{TP} Joanna leave [_{ADVP} if it rains]]]
- c. *if*-clause fronting: [[_{ADVP} if it rains]₂ [_{CP} will [_{TP} Joanna leave t_2]]]

(6) *Derivation of (1b)* ‘if it rains, who will show up?’

- a. Base structure: [_{TP} who will show up [_{ADVP} if it rains]]
- b. WH(+head)-movement: [_{CP} who₁ will [_{TP} t_1 show up [_{ADVP} if it rains]]]
- c. *if*-clause fronting: [[_{ADVP} if it rains]₂ [_{CP} who₁ will [_{TP} t_1 show up t_2]]]

The structure after fronting feeds phonological form (PF). At LF, however, the *if*-clause reconstructs so the input to semantic interpretation is (5b)/(6b).

We consider the hypothesized movement of the *if*-clause a topicalization.³ If so, we expect other adverbs to undergo a similar process of topicalization. This is corroborated for instance by the question in (7).

²We are being deliberately vague about where exactly the *if*-clause adverbial sits in the TP, because the choices don’t matter for current purposes. While the *if*-clause is represented here sentence-finally, we cannot rule out a parse where it originates TP-initially, higher than the subject. See more on this in footnote 12.

³This meshes well with Haiman (1978)’s thesis that *if*-clauses are in fact topics, supported by the observation that in many languages *if*-clauses and topics are marked identically.

(7) Tomorrow, [_{CP} who did you say will [_{VP} join us]]?

The temporal adverb *tomorrow* is understood to be modifying the event denoted by the VP, and this can be captured if the adverb has originated syntactically in the VP and then moved to the CP region.

In section 4 we will rehearse arguments for the existence of syntactic reconstruction of *if*-clauses for the purpose of scope and binding, and show that they extend to CQ structures. Before that, in the following sections we provide our formal assumptions about how the structures in (5b)/(6b) are semantically interpreted.

2.2 Semantics

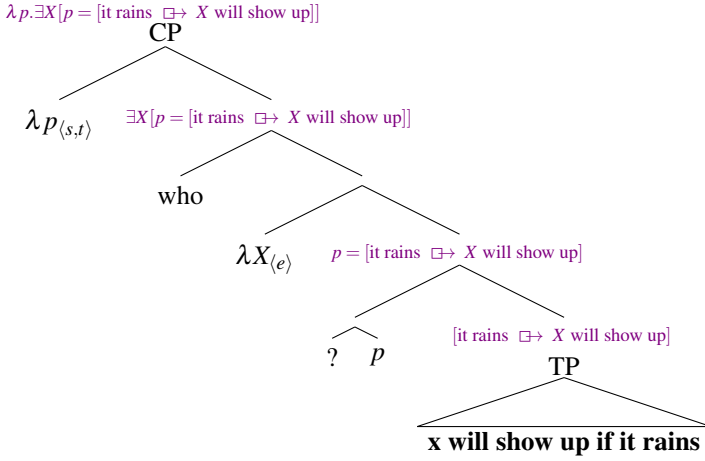
To illustrate how the LF and semantic interpretation of CQs work on our proposal, we will focus on the constituent question case in (6b) (the analysis of the polar question case in (5b) is not substantially different).

We follow the Hamblin-Karttunen-Heim tradition, according to which the denotation of questions is a set of propositions which correspond to the set of its (possible) answers, together with a general recipe for using that set to induce a partition of the context (see a.o. Hamblin 1973; Karttunen 1977; Heim 1994; Guerzoni and Sharvit 2007; Klinedinst and Rothschild 2011; Cremers and Chemla 2016; Fox 2019). For our example (6b), the question denotation is the set of conditional propositions of the form *x will show up if it rains*—one proposition per (relevant) individual *x*.

We use standard technology to derive this compositionally, essentially a syntacticized version of Karttunen 1977, by adding some operators at LF and by treating *wh*-elements as existential quantifiers. Our LF is in (8), which enriches (6b) with λ -operators and with Karttunen's proto-question operator ' $?$ ' (syntactically an interrogative head). The denotation of ' $?$ ' and of *who* are given in (9). ' $\Box \rightarrow$ ' stands for the meaning of the conditional operator (see below). We ignore the contribution of tense.

(8) *LF of the CQ-structure in (6b)*

8 Conditional Questions



- (9) a. $\llbracket ? \rrbracket = \lambda p. \lambda q. p = q$
- b. $\llbracket who \rrbracket = \lambda P_{\langle e, t \rangle}. \exists X[X \text{ is human} \wedge P(X) = 1]$

The resulting denotation of (8) (shown in (10a) in set notation) is equivalent to the set in (10b) of conditional propositions, as desired.⁴

- (10) a. $\{p : \exists X[p = [\text{it rains} \sqsupset X \text{ will show up}]]\}$
- b. $\{\text{it rains} \sqsupset \text{Ann will show up},$
 $\text{it rains} \sqsupset \text{Ed will show up},$
 $\text{it rains} \sqsupset \text{Ann and Ed will show up}, \dots \}$

What about the meaning of $\sqsupset$? We think that many, if not all, of the prominent theories of the semantics of (propositional) conditionals are compatible with our core proposal (see more on this point in section 3). For concreteness, we assume one of the most popular ones: the selection-function analysis of Stalnaker (1968) in (11), according to which *if*-clauses refer to the most similar antecedent-worlds to our own. Thus, *if*-clauses are like singular definite descriptions of sorts.⁵

⁴We assume that *who* ranges over both atomic and plural individuals.

⁵A variant of the selection-function analysis is the Lewis-Schlenker analysis according to which *if*-clauses refer to not one but a *plurality* of most similar antecedent-worlds (Lewis 1973; Schlenker 2004). That variant is also compatible with our proposal.

(11) *Stalnaker's semantics*:

$\llbracket p \Box \rightarrow q \rrbracket = \lambda w. \llbracket q \rrbracket(w_p) = 1$, where w_p is the world most similar to w among those that make $\llbracket p \rrbracket$ true.⁶

Adopting Stalnaker's analysis, (10b) can be re-written as in (12), where 'rain' stands for 'it is raining'.

(12) $\{ \lambda w. \text{Ann shows up in } w_{\text{rain}},$
 $\lambda w. \text{Ed shows up in } w_{\text{rain}},$
 $\lambda w. \text{Ann and Ed show up in } w_{\text{rain}}, \dots \}$

2.3 Pragmatics: partitions and felicitous answers

Questions are often modeled as inducing a partition of the context (Hamblin 1958, Groenendijk and Stokhof 1984 et seq.). A partition of a space of contextual possibilities C (a context set, in the sense of Stalnaker 1978) is a set of mutually-exclusive, non-empty subsets ('cells') of C whose union equals C . Our CQ denotation in (12) is a set of propositions which aren't mutually-exclusive, so it doesn't constitute a partition by itself—which is generally the case in Karttunen-Heim framework for question semantics. But the partition can be retrieved from the denotation in familiar ways. This is done by dividing the context into non-overlapping compartments each of which contains worlds that agree on the truth value of all the propositions in the question denotation. We now show how this standard algorithm produces a suitable partition for our CQ denotation.

The partitioning operation will be carried out here by the PART function defined in (14), which takes the question denotation as input and outputs a partition.⁷

⁶ We adopt the so-called 'limit assumption', which stipulates that there is always exactly one most similar antecedent-world to any w . We take it to be an added presupposition of $\Box \rightarrow$. As for the similarity relation that underlies (11), we leave out a precise formulation of it as the details do not matter for our purposes.

⁷ See Fox (2019) for a slightly different idea that links the contextual partition induced by Q to a process of pointwise-exhaustifying the contextual answers to Q.

10 *Conditional Questions*

(14) Let Q be a set of propositions (a question denotation) and C a set of worlds (a context set).

a. $\text{PART}(Q, C)$, the partition of C based on Q , :=

$$\{p \mid \exists w \in C[p = \{w' : w \sim_{Q,C} w'\}]\}$$

b. $w \sim_{Q,C} w'$ iff $w, w' \in C$ and $\forall p \in Q[p(w) = p(w')]$

Assume that Ann and Ed are the only relevant individuals in C . Then applying PART to (12) and C yields a set containing the mutually exclusive propositions in (15).⁸

- (15) a. $\lambda w \in C$. Only Ann shows up in w_{rain}
 b. $\lambda w \in C$. Only Ed shows up in w_{rain}
 c. $\lambda w \in C$. Both Ann and Ed show up in w_{rain}
 d. $\lambda w \in C$. Neither Ann nor Ed shows up in w_{rain}

Each proposition in (15) is a cell in the partition of C . Partitions help us define answerhood conditions on questions (Groenendijk and Stokhof 1984). A direct answer to a question Q is appropriate only if it denotes a cell or a union of cells in the partition induced by Q . Each proposition in (15) corresponds, intuitively, to an exhaustive answer to our conditional question. For our example, the good answer in (16a) denotes the union of (15a) and (15c).⁹ We assume that a fragment answer like (16b) is really just a shorthand for the conditional answer in (16a).

(16) Q: If it's raining, who will show up?

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- (13) $\text{PART}(Q, C) = \{[\text{EXH}(A, Q)]_C \mid A \in Q\}$, where ' ϕ_C ' is the intersection of ϕ with the context set C , and $\text{EXH}(A, Q) = \lambda w. A(w) \wedge \forall A' \in Q[A'(w) \rightarrow A \subseteq A']$ (Fox 2019)

⁸This set is the Boolean closure of the three propositions in (12). It is sometimes suggested that the 'negative' cell, i.e. one in which all (Hamblin) answers to the question are false, should not strictly speaking be part of the contextual partition induced by the question. If that's the case then (15d) should be dropped. This can be derived if we assume following Dayal (1996) that questions impose a Maximality presupposition on the context, to the effect that one member of the question denotation must be true (and entail all other true ones). It would also follow from Fox's 2019 constraint that every proposition in Q must identify through exhaustification some cell in the contextual partition induced by Q (cf. fn. 7). We can remain agnostic about the proper treatment of the negative cell.

⁹Or, if (16a) is appended with an exhaustivity operator (Fox 2007), it denotes (15a).

- a. A: If it's raining, Ann will show up.
- b. A: Ann (will show up).

This concludes the basics of our analysis of constituent conditional questions. As for the polar question case in (5), the analysis is the same except for a choice-point largely irrelevant to our main concern. Depending on one's favorite theory of polar questions, their basic denotation could either be thought of as a doubleton set containing both the positive and the negative proposition in the question nucleus, giving us (17a); or it can be thought of as a singleton as in (17b), with the negative proposition being supplied indirectly through the partition function in (14).

- (17) a. {If it rains Joanna will leave, $\neg$ if it rains Joanna will leave} (doubleton)
 b. {If it rains Joanna will leave} (singleton)

2.4 Denial of the antecedent

Velissaratou (2000) and Isaacs and Rawlins (2008) discuss the fact that denying the conditional antecedent seems to be a felicitous response to a CQ:

- (18) Q: If it's raining, who will show up?
 A: It won't rain.

The felicity of the response in (18) is a challenge given the answerhood condition mentioned above, since the negation of the antecedent is provably neither a cell nor a union of cells in the partition induced by the question.

We adopt Isaacs and Rawlins (2008)'s own solution to the challenge: the denial of the antecedent amounts to a denial of a presupposition that the question carries. Indicative conditionals presuppose that the context set contain some antecedent worlds ($p \Box \rightarrow q$ evaluated in C presupposes that there are p -worlds in C); this presupposition projects to the question in (18) so that the utterance as a whole presupposes

that it might rain. The response by A objects to this presupposition, denying that the antecedent is contextually possible. From this perspective, denying the antecedent is no different from parallel cases in which some presupposition that a question carries is denied as a response. For instance in (19), the existence presupposition of the definite description is denied and the discourse sounds felicitous.

(19) Q: Did you go on the escalator here?

A: There is no escalator here.

3 Intermediate summary and a conceptual argument

So far we developed an account of conditional questions which relies on reconstruction of the *if*-clause into the question nucleus at LF. This idea allows us to employ run-of-the-mill assumptions about interpretation: a Karttunen-style semantics with partition pragmatics for questions, and a Stalnaker semantics for conditional assertions, in order to capture the basic phenomenology. Our $?>if$ system thus renders unnecessary a mechanism that can manipulate question meanings in the consequent of conditionals.

Where does this put us with respect to the comparison between our $?>if$ analysis and competing $if>?$ approaches, which do rely on a mechanism that can manipulate question meanings in the consequent of conditionals? Let us recall the $if>?$ theory of CQs proposed by Isaacs and Rawlins (2008). Very briefly, on their view, the interpretation of CQs proceeds in a two-step, dynamic process of context update for conditionals: first the global context of utterance is temporarily updated with the proposition in the conditional antecedent; then, the question in the consequent takes the newly created context as input, and outputs a partition of it. Subsequent utterances—typically the answers to the CQ—are evaluated against the partitioned context.

It should be emphasized what we are **not** arguing against. We do not take a stand in this paper on the viability of dynamic context-update accounts of conditional interpretation *per se*. We are in agreement with Isaacs and Rawlins (2008) that many of the theoretical tools and concepts they employ are, when taken separately, well-motivated and have become fairly standard. Our main (and virtually only) point of disagreement concerns the scopal relation between the conditional and the question involved in the underlying syntax of CQs. In fact, as long as the logical form that the semantics reads off of is a $?>if$ one, our proposal could be implemented using much of the same compositional ingredients that Isaacs & Rawlins employ—including in particular context update for conditionals, where the content of the consequent is evaluated relative to a context updated with the content of the antecedent.¹⁰ It is only for the sake of simplicity that we didn't do so in the previous section, but we trust that context update machinery is easy to implement into a suitably enriched $?>if$ theory.

Comparing the different approaches will then have to involve other considerations. One question that immediately rises is whether one can motivate *if*-clause reconstruction on independent grounds, since only our approach is committed to its existence. In section 4, we review old arguments and present new ones for *if*-clause reconstruction based on facts from scope, binding, and presupposition satisfaction facts. While some of these arguments have been made in the domain of conditional assertions, we will show that the relevant generalizations extend to CQ structures. This will provide independent support for the claim that *if*-clause reconstruction is at least available as a strategy for composing CQs.

Given the arguments for *if*-clause reconstruction, a proponent of $if>?$ could still maintain that $if>?$ strategies to interpret CQs exist side by side *if*-clause reconstruction. This leads to the next question: do we have empirical reasons that reconstruction

¹⁰One empirical advantage of adopting a context update mechanism of this sort is that it would make it possible to capture the modal subordination potential of conditionals, as discussed in Isaacs and Rawlins (2008):289-290.

is the **only** available mechanism to interpret CQs, namely that the various *if*>? strategies proposed in the literature are not only unnecessary but also unavailable? The answer we will propose in section 5 to this question will be yes. We will identify divergent predictions that the approaches make with respect to syntactic constraints on CQs. We will show that assuming the availability of *if*>? routes makes wrong predictions, which are avoided if the ?>*if* strategy is the only way to interpret CQs.

Before we continue, we would like already at this point to offer a conceptual argument from theoretical parsimony in favor of the current approach and against the *if*>? proposal of Isaacs and Rawlins (2008). The conceptual argument is based on considering what assumptions must be made about the encoded meaning of the conditional operator *if* on the two approaches.

On the theory presented here, there is one single *if* that operates in the same way in both conditional assertions (CAs, such as ‘*if John comes, Mary will come*’) and CQs (‘*if John comes, will Mary come?*’). The lexical semantics of *if* doesn’t vary between these two constructions. Can we say the same about the competing approach? not quite. As far as we see, the *if*>? apparatus that Isaacs and Rawlins (2008) concoct must come with an implicit claim about **lexical ambiguity of *if***. There is a *if*_{CA} in charge of composing CAs—say with the bland context update process for CAs, where the whole conditional eventually outputs a (non-partitioned) context; and there is a homophonous *if*_{CQ} in charge of composing CQs in the way described above, where the conditional eventually outputs a partition. The two *ifs* do very similar things, except that the first manipulates assertions and the second questions in its consequent. The fundamental reason for the necessity of the posited ambiguity is that, given the reliance on a *if*>? syntax, for Isaacs and Rawlins 2008 the difference between CAs and CQs is located **inside the conditional construction** (specifically in the consequent). On the present ?>*if* analysis, by contrast, the source

of the difference between CAs and CQs is located **outside** of the conditional construction. One *if* handles both CAs and CQs. The argument from parsimony is then that one approach requires a stipulation of lexical ambiguity that doesn't need to be assumed on the other approach.

Of course, theoretical parsimony arguments only go so far. In the next sections we turn to the empirical arguments.

4 Arguments for the existence of *if*-clause reconstruction

4.1 Scope relative to attitude predicates

Iatridou (1991) and Bhatt and Pancheva (2006) discuss evidence in the declarative domain that some sentence-initial *if*-clauses can originate lower than their surface position. The primary evidence is based on scope interaction between sentence-initial *if*-clauses and matrix attitude verbs, as exemplified in (20).

- (20) a. If it rains, Mary believes that Bill will come. (Iatridou 1991:26)
 ≈ 'Mary believes that Bill will come if it rains'
- b. If Ed comes to the party, Mary is convinced that Joanna will leave early.
 ≈ 'Mary's convinced that Joanna will leave early if Ed comes to the party'
- c. If Alfonso comes to the party, Mary knows that Joanna will leave.
 ≈ 'Mary knows that Joanna will leave if Alfonso comes to the party'

Sentence (20a) on its most salient reading describes the existence of Mary's thought about a conditional, and not that the existence of her thought is conditioned on rain. This indicates that the *if*-clause can be interpreted in the scope of *believe*.¹¹ The same

¹¹The scope difference is truth conditional, and we can easily set up contexts in which these sentences are intuitively true only on the inverse-scope reading. For (20a), focus on normal contexts in which (the conversational participants presuppose that) whether Mary's belief state entails that Bill will come doesn't depend on whether there is rain. In many such contexts the closest world(s) *w* where it rains are such that Mary does not have the belief in *w* that Bill will come.

16 *Conditional Questions*

goes for (20b)-(20c). We can account for these readings if the *if*-clause is represented at LF in the embedded clause, and moved to its pronounced position in the surface syntax. On this hypothesis, the structure of e.g. (20a) before movement looks like (21).¹²

(21) Mary believes [that Bill will come if it rains].

If this is correct, we have initial evidence for reconstruction of *if*-clauses to lower positions. On our proposal, it is this operation that underlies both the the scope interaction with attitude verbs and our *?>if* LF for CQs. The question in (23) is an example that combines both: it is a CQ in which the *if*-clause reconstructs under an attitude predicate.

(23) If it rains, does Mary think that Bill will come? (*think* > *if*)

One may try to argue that the relevant reading of (20) and (23) is read off the surface structure of these sentences, without syntactic reconstruction, using (yet-to-be-specified) semantic means.¹³ However, this alternative would run into serious

This makes the *if* > *think* reading of (20a) false in these contexts. But the sentence can intuitively still be true on the *think*>*if* reading.

¹²As Iatridou (1991) and Bhatt and Pancheva (2006) emphasize, examples like in (20) are only evidence that the fronted *if*-clause has a source in the embedded clause, but they are silent on where exactly in the clause. In particular, these examples don't decide on the question of whether the base position of the *if*-clause is clause-final as we represent in (21) or rather clause-initial in the embedded clause. For reasons of convenience only, we will always represent the pre-moved site of *if*-clauses as clause-final. This decision should not be taken to be of theoretical importance. In fact, we cannot assume that reconstruction all the way to clause-final position is always the only available option, because of data like (22) below. (22a) is acceptable but (22b) is not due to a Principle C violation, suggesting that (22a) should not have (22a) as its only LF analysis. For more on Principle C effects in the context of our arguments see section 5.2.

(22) a. If John_i is home, he_i is not alone.
b. *He_i is not alone if John_i is at home.

¹³Blumberg and Holguín (2019) present and set out to account for interesting semantic puzzles that arise when attitude predicates are embedded under conditionals. As Blumberg and Holguín point out (correctly, to our assessment), the main phenomenon they are concerned with, which they dub 'Verb Restrictions', has no account in terms of non-surface scope relations. Space considerations prevent us from going into a serious review of that work; suffice it to say, however, that the issues there seem to us to be separate and not directly relevant to our discussion. Empirically, Verb Restrictions is quite restricted in ways that the scope facts in (20) are not. For instance, as Blumberg and Holguín 2019 themselves acknowledge (pp.392-393), Verb Restrictions is limited to attitudes with 1st-person subjects, whereas our facts are not thus constrained: there are no 1st-person subjects in (20). It seems that the phenomenology in (20) requires a description in terms of genuine scope.

problems. For one, it cannot explain some other facts we discuss later from pronoun binding (section 4.3) and from syntactic constraints on CQ structures (section 5), which the reconstruction analysis immediately accounts for. Second, it makes a wrong prediction regarding presupposition satisfaction, which we now turn to (section 4.2).

4.2 Argument from presupposition filtering

As mentioned earlier, indicative conditionals presuppose that the proposition expressed by the *if*-clause is contextually possible, i.e. that the context set contain antecedent worlds. This explains why both versions of (24) are odd, as this presupposition of the *if*-clause clashes with contextual knowledge:

- (24) (Context: We know that Johanna is out of town so there is no way she will come to the party tonight.)
- a. #Alfonso will leave if Johanna comes to the party tonight.
 - b. #If Johanna comes to the party tonight, Alfonso will leave.

In the scope of attitude predicates (*think*, *hope*, *want* etc.), presuppositional information is ‘filtered’ (Karttunen 1974; Heim 1992): it only poses constraints on the belief state of the attitude holder, not on the (global) context. This is why the presuppositions triggered by the definite description *her cello* in the second sentence in (25) do not cause a clash with the information specified in the first sentence.

- (25) Bill is mistaken to think that Mary owns a cello. He furthermore thinks that she wants to sell her cello. (after Heim 1992)

Our reconstruction analysis then predicts that fronted *if*-clauses that are interpreted in the scope of lower attitude predicates will similarly not impose constraints on the

18 *Conditional Questions*

global context, but only on the belief state of the attitude holder. This is borne out, as (26a) and crucially (26b) both sound coherent.

(26) (Context same as (24))

- a. Bill mistakenly thinks that Johanna might come to the party tonight.
Furthermore, he thinks that Alfonso will leave if she comes.
- b. Bill mistakenly thinks that Johanna might come to the party tonight.
Furthermore, if she comes he thinks that Alfonso will leave.¹⁴

The fact that the existence presupposition triggered by the *if*-clause in (26b) is filtered under the attitude indicates that the *if*-clause must be allowed to fully take scope under the attitude verb, as predicted by the reconstruction analysis. But if the *if*-clause in (26b) was interpreted where it surfaces (and the relevant reading of (20) and (23) read off by the surface syntax of these sentences), we would wrongly predict presupposition failure. This indicates that the inverse scope of a sentence like (20a) is not a scope illusion.

Finally, we can take the filtering test from (26b) and apply it to the case of CQs.

- (27) a. A- Bill is mistaken to think that Johanna might come to the party tonight.
B- Yeah I know. But does he think that Alfonso will leave if she comes?
- b. A- Bill wrongly thinks that Johanna might come to the party tonight.
B- Yeah I know. But if she comes does he think that Alfonso will leave?

As the felicity of (27b) shows, the *if*-clause in B's utterance must be allowed to take scope under the attitude predicate, hence under the question, lest a presupposition would be triggered that would contradict the context.

¹⁴We note that texts in (26) become odd or at least very degraded if the second sentence in each example is uttered in isolation. E.g., the sentence *if Johanna comes Bill thinks that Alfonso will leave* in isolation sounds like a presupposition failure against the context in (24). But since this fact holds of both (26a) and (26b), it is not about the surface position *per se* of the *if*-clause, so it does not speak against reconstruction. Rather, it could be attributed to the idea, going back to Karttunen and to Heim (1992), that presuppositions in the scope of attitude verbs generally tend to be globally accommodated as a default unless the speaker explicitly signals that the attitude holder's presuppositions do not coincide with theirs. That tendency is apparently so strong that it can cause a clash with contextual knowledge, a clash which is prevented by the explicit addition of the first sentence in (26a)-(26b).

4.3 Argument from pronoun binding

Bhatt and Pancheva (2006) observe that a pronoun in a sentence-initial *if*-clause can be bound by a quantifier in the main clause:

(28) If her_1 child is late from school, every mother $_1$ is upset.

(28) can be paraphrased as ‘every mother $_1$ is upset if her_1 child is late from school’.

That her_1 can be bound in (28) then suggests that the *if*-clauses reconstructs under every mother at LF.¹⁵

Unsurprisingly, in the case of CQs too, a pronoun in a fronted *if*-clause can be bound by a lower operator. In (29), her_1 is bound by the wh-phrase:

- (29) a. If her_1 child is late from school, which mother $_1$ gets upset?
 ≈ ‘Which mother $_1$ gets upset if her_1 child is late from school?’
 b. If a relative of $hers_1$ dies, which actress $_1$ will inherit a fortune?
 ≈ ‘Which actress $_1$ will inherit a fortune if a relative of $hers_1$ dies?’

The $?>if$ theory immediately accounts for this binding possibility, given its reliance on reconstruction.¹⁶

¹⁵It would be problematic to claim that this binding option is a result of Quantifier-Raising every mother instead or reconstruction, because that would be a Weak Crossover violation.

¹⁶A reviewer asks about donkey anaphora configurations in conditional questions, such as the following:

- (30) If a farmer $_1$ buys a donkey $_2$, which of its $_2$ relatives does he $_1$ typically buy with it $_2$?

This example appears at first inconsistent with our official proposal, because if the *if*-clause reconstructs it’s not clear how the pronoun ‘its $_2$ ’ gets to be bound by ‘a donkey $_2$ ’. We believe however that this data is compatible with our general approach, once the proposal in section 2 is enriched with two additional (but independently needed) components: (i) the possibility of reconstruction the NP-part of wh-phrases back to their base position for interpretation (see e.g. Lebeaux 1984), and (ii) some mechanism or other to model donkey anaphora (i.e., binding without c-command). Once these two are in place, the analysis of (30) would involve the LF representation below, where the NP-restrictor reconstructs (the grey part marks its interpreted position) in addition to *if*-clause reconstruction into the question nucleus:

- (31) which $_x$ of its $_2$ relatives [if a farmer $_1$ buys a donkey $_2$] does he $_1$ buy [the $_x$ of its $_2$ relatives] with it $_2$]

5 Constraints on *if*-clause reconstruction

The arguments from the previous section showed that *if*-clause reconstruction exists for the purpose of scope, presupposition satisfaction, and pronoun binding, and that the relevant generalizations extend to CQs. Our $?>if$ theory which relies on reconstruction straightforwardly accounts for the observations. *if* $>?$ approaches, on the other hand, would have to devise extra mechanisms to achieve the same effects—unless they too assume that reconstruction is available. Still, this doesn't yet establish that surface-syntax *if* $>?$ mechanisms (such as the one proposed by Isaacs and Rawlings 2008) are generally unavailable; it could be that they exist as another route for CQ interpretation (when reconstruction isn't necessary). The present section presents syntactic restrictions on *if*-clause reconstruction, which provide reasons to conclude that surface mechanisms are indeed unavailable. In particular we will show that when syntactic principles block *if*-clause reconstruction, they also block (the relevant readings of) CQs. That will indicate that assuming the availability of *if* $>?$ strategy side by side the reconstruction strategy overgenerates CQ structures.

5.1 Syntactic islands

Bhatt and Pancheva (2006) show that island configurations seem to restrict the scope-reconstruction possibilities of *if*-clauses. One of the clearest cases of this involves the Complex NP constraint, as in (32).

(32) *Complex NP Island blocks if-clause reconstruction*

- a. #If it rains Mary_i heard the rumor that Bill_i will come.
(Bhatt and Pancheva 2006)
- b. #If Alfonso comes to the party, Mary expressed the concern that Joanna will cause trouble.

These sentences can't have the meaning expressed by the version in which the *if*-clause surfaces in the embedded clause:

- (33) a. Mary heard the rumor that Bill will come if it rains.
 b. Mary expressed the concern that Joanna will cause trouble if Alfonso comes to the party.

So, the possibility for a fronted *if*-clause to receive low scope relative to elements that surface lower is constrained by a complex NP-island boundary.

The same conclusion can be reached based on the so-called Coordinate Structure Constraint (CSC, Ross 1967), which bans movement from just one conjunct in a conjunction. As a baseline, consider first sentence (34a). It embeds a conjunction, and has a reading (perhaps its only reading) where the *if*-clause in the embedded clause modifies just the first conjunct. In other words, Ann believes there will be lots of booze regardless of John's coming). On this reading the structure is shown in (34b).

- (34) a. Ann believe that if John comes to the party Mary will come too and that there will be lots of booze there.
 b. Ann believe [_{CONJP} that [if John comes to the party Mary will come too] and that there will be lots of booze there].

Now consider (35), which involves a fronted *if*-clause.

- (35) If John comes to the party, Ann believes that Mary will come too and that there will be lots of booze there. (*with *if* modifying just the first conjunct)

We observe that (35) does not have the same reading as (34a), on which the *if*-clause modifies just the first conjunct. The *if*-clause can be understood in the scope of *believe*, but it must take scope above the whole conjunction, producing a reading which entails that whether there will be lots of booze, according to Ann's beliefs, depends on John's coming.

22 *Conditional Questions*

This too is explained if the low-scope possibility for the *if*-clause must involve movement, since in that case the unavailable reading would have to involve a movement that illegitimately violates the CSC:¹⁷

(36) *CSC-violating movement of if-clause*

*If John comes to the party,₁ Ann believe [_{CONJP} that [Mary will come too **t₁**] and that there will be lots of booze there].

In sum, syntactic islands can provide support for the hypothesis that inverse scope of a fronted *if*-clause relative to attitudes generally involves syntactic movement of the *if*-clause from a low position, to which it reconstructs (e.g. in (20))—but not when an island condition is violated.

Importantly, the facts are completely analogous in the case of CQs:

- (38) a. #If John comes to the party, did Mary express the concern that Ann will come too?
(* **with concern > if**)
- b. If John comes to the party, does Ann believes that Mary will come too and that there will be lots of booze there?
(***with if modifying just the first conjunct**)

This suggests that the derivation of CQs must involve syntactic reconstruction, in line with ?>*if*.¹⁸ If the surface mechanisms proposed by *if*>? analyses were also

¹⁷We assume that the reading that (35) does have, in which the *if*-clause modifies both conjuncts, is generated by Across-the-board movement(+reconstruction) of the *if*-clause:

- (37) If John comes to the party,₁ Ann believe [_{CONJP} that [Mary will come too **t₁**] and that there will be lots of booze there **t₁**].

¹⁸The attentive reader will notice a certain tension here, because on our account, CQs invariably involve a violation of an island: the so-called WH-island which bans movement that crosses a *wh*-element (we thank an anonymous reviewer for pointing this out). However, WH-islands are known to induce relatively weak judgments of unacceptability compared to the other islands mentioned here, especially in topicalization structures. The effect is even weaker or non-existent when it is an adverb that topicalizes, as shown in (39b) repeated from (7). Recall that we consider the fronting of *if*-clause a topicalization (fn. 3).

- (39) a. ?That book₁, I wonder who is reading **t₁** (weak wh-island effect)
b. Tomorrow₁, who (did you say) will join us **t₁**? (very weak or no wh-island effect)

available, it would be mysterious why the relevant readings of CQs are unavailable just when a syntactic island is present but not when one is absent (like in (20)).

5.2 Binding Principle C

Bhatt and Pancheva (2006) argue that inverse scope possibilities of *if*-clauses is sensitive to Binding Principle C effects. Consider first (40).

(40) *Normal Principle C effects*

- a. John_i thinks that Ann will come visit if he_i is sick.
- b. *He_i thinks that Ann will come visit if John_i is sick.

(40a) is a normal case of anaphora, and (40b) is ungrammatical due to a violation of Principle C: the name *John_i* is in the syntactic scope of *he_i*. This much is standard. Now consider (41).

(41) *Interaction between Principle C effects and scope of if-clauses*

(Bhatt and Pancheva 2006)

- a. (?)If he_i gets sick, John_i thinks that Ann will come visit. (with *think* > *if*)
- b. #If John_i gets sick, he_i thinks that Ann will come visit. (* **with *think* > *if***)

(41a), while sounding a bit artificial, is in no way unacceptable under the intended reading. This is because there is no violation of Principle C at no level of description (though there is backward anaphora, which might induce some processing difficulty). By contrast, (41b) strikingly does not have the indicated reading on which the *if*-clause scopes low under the attitude predicate. This is explained in light of arguments that the Principle C restriction applies at Logical Form after reconstruction (Heycock 1995, Fox 1999, a.o.), but crucially only if syntactic reconstruction of the *if*-clause to

24 *Conditional Questions*

its original position is obligatory in order to get the low scope. After reconstruction, the proper name is c-commanded by the co-indexed pronoun, exactly like in (40b).¹⁹

Importantly, here too we see that CQs induce the same Principle C effects, see (42).

- (42) *If John_i comes to the party, does he_i think that Alfonso will come too?
(with *think* > *if*)

This makes up another piece of evidence that CQ interpretation must involve syntactic reconstruction. It is not clear how to derive the interaction with Principle C if CQs can be represented with *if* > ? syntax.

5.3 No parallel ‘disjunctional questions’

Our final argument is also aimed at establishing that *if* > ? mechanisms overgenerate certain structures. It is based on the observation that there is no parallel to conditional questions when we shift our focus from conditionals to the semantically similar, but syntactically different, environment of disjunction. Consider the ungrammaticality of what we might call ‘disjunctional question’ in (43b) compared to the grammaticality of (43a):

- (43) a. If it’s raining, who will show up?
b. *It’s either not raining or who will show up?

Sentence (43b) point to the impossibility of *or* to compose a proposition with a question.²⁰ What could this follow from? There is an answer on the current ? > *if*

¹⁹It is crucial to judge these sentences on their *think* > *if* reading, since only on that scope relation is the *if*-clause and hence the name in it guaranteed to be in the c-command domain of the co-indexed pronoun. Using a mono-clausal structure without an attitude environment would not allow us to detect the principle C effect, because as mentioned in footnote 12, the diagnostics we have for *if*-clause reconstruction do not decide on the exact position of the *if*-clause relative to other elements in the clause where it is interpreted.

²⁰Sometimes *or* does seem to be able to connect a declarative proposition and a question, as in (44).

- (44) John is wrong, or is he not? (a reviewer, p.c.)

approach. The semantics of *or*, just like that of *if*, composes two propositions; so the surface structure of (43b) anyway cannot serve as input to semantic interpretation. But in contrast to conditionals, in the case of disjunction there is no syntactic derivation that produces a legitimate input either. The reason has to do with elementary syntactic differences between the two. *if*-clauses are adjuncts, and can topicalize, on our account, from inside the question nucleus to create the CQ in (43a). By contrast, no parallel derivation is available for (43b) because the string ‘*it’s either raining or*’ is simply not a constituent, hence *ipso facto* not an adjunct that can move to create the unattested CQ, as illustrated in (45).²¹

- (45) [who λ_x [_{DISJP} $\underbrace{\text{it’s either not raining or } x}_{\text{not a constituent}}$ will show up]]

On *if*>? accounts, however, and in particular on the context-update version by Isaacs and Rawlins 2008, the contrast in (43) is not so easy to explain, at least not without further stipulations whose nature is unclear to us. If the input to CQ interpretation can be the surface structure, why can’t there be a parallel *or*>? syntax, and why can’t *or*, just like *if*, compose a proposition with a question meaning? After all, in standard context-update semantics, *or* has an update semantics just like *if* (Heim 1983), so we would presumably expect *or* to be able to do what *if* does: update the context first with the negation of the first disjunct, then partitioning the resulting context with the question in the second disjunct.²²

But this examples could be analyzed as containing two separate root sentences (orthography could be misleading), where *or* is a sentence-initial, discourse-level particles in disguise. Sentence-initial uses *or* are quite common, though we are not aware of their mention in the formal literature, except for a short passage in Szabolcsi 2015:165. We control against understanding *or* this way in (43b) by the addition of *either*, which is known to mark the sentence-internal scope of disjunction (Larson 1985). Importantly, if we add *either* to (44b), the example becomes bad.

²¹From this perspective we can also explain why a version of (43b) in which the disjunctive marker *or* surfaces under *who* is also ungrammatical:

- (45) *It’s either not raining who or will show up?

In this case the movement of “*it’s either not raining*” from the underlying structure in (45) would be of a constituent, but it would illegitimately violate the Coordinate Structure Constraint.

²²To echo a point made in section 3, our argument is not against the viability of context-update mechanisms for the interpretation of disjunction *per se*. It is rather that however context-update for disjunction is represented, it should be read off an LF in which the connective *or* disjoins a proposition with a proposition rather than with a question meaning.

To be sure, this does not mean that *if*>? accounts cannot come up with some principle (of a lexical nature, perhaps) that can differentiate between (43a) and (43b). It only means that it is not obvious what such a principle would follow from. By contrast, the hypothesis that CQs must involve ?>*if* analysis reduces the difference to independent syntactic differences between conditionals and disjunction.

6 Conclusion

In studying a phenomenon at the syntax-semantics interface, sometimes it is unavoidable to enrich our initial assumptions about the semantic component. But in other times it is beneficial to take syntax more seriously than what appears on the surface. In this paper we made this case for Conditional Questions like (1). We claimed that syntactic reconstruction of the *if*-clause under the question, an independently motivated mechanism, is all we really need for an adequate analysis of the phenomenon. We furthermore argued that the hypothesis that the input to semantic interpretation is (or even can be) the surface syntax of such constructions leads to wrong predictions regarding various structural diagnostics and interactions with other grammatical processes.²³

²³One question that we leave for future research is whether the conclusions reached can or should be extended to the analysis of conditional imperatives (*'If you go to the store, get bread!'*).

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28 *Conditional Questions*

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