

Overview Most dynamic theories of discourse include components that track the past of the discourse: the Common Ground (Stalnaker, 1978) tracks common beliefs established in the past, and Question Under Discussion (QUD) stack (Roberts, 1996/2012) tracks lines of inquiry that have been previously taken up. However, Roberts’s integrated model of discourse struggles with refusals to address to the QUD as in (1). It incorrectly predicts such moves to be irrelevant (Hyska, 2015), and gives an *ad hoc* treatment of how they operate on the QUD stack. I argue that the dynamics of stack-based model of discourse can be repaired and simplified by directly modeling possible future discourse states in the context. I adopt a framework which lifts the discourse context to a set of possible future information states of the discourse, and give a pragmatic analysis of refusals to address a QUD (1B) as well as a lexical semantics for the discourse particle *just* which rejects a QUD (1B’). The proposal adds to a growing body of work arguing for a discourse context that directly models the future of the discourse (Cohen and Krifka, 2014; Onea, 2016; Warstadt, 2020).

(1) A: Why did Jordan break up with you? B: I’d rather not say. B’: They just did./#They did.

The QUD Theory and Problems Roberts (1996/2012) introduces the notion of a **QUD stack** to formalize discourse structure and relevance in a dynamic theory. The stack is defined as follows: At a given point in the discourse, the stack *QUD* is a set of questions that have been previously asked (either explicitly or implicitly). Following Groenendijk and Stokhof (1984), I assume a question is a set of nonempty propositions that partitions the context set *C*. *QUD* is totally ordered by $<$ such that $Q < Q'$ iff Q was asked prior to Q' . Roberts defines relevance as in (2) relative to a question Q such that a relevant assertion eliminates at least one alternative to Q . An assertion is considered relevant *to the discourse* iff it is relevant to the **current question** CQ , defined as $\iota Q \in QUD \forall Q' \in QUD. Q' < Q$. Finally, for all $Q \in QUD$, the conditions in (3) must hold, and CQ is popped from the stack if either is not met.

(2) **Relevance (Roberts)** An assertion that p is relevant to question Q iff $\exists q \in Q. C \cap p \subseteq \neg q$

(3) a. An answer to Q is not entailed by the context set, and
b. Q has not been determined to be practically unanswerable.

There are two problems with Roberts’s (1996/2012) theory that the present proposal addresses. First, as Hyska (2015) notes, the theory undergenerates by predicting refusals to address the current question (1B’) and other **metadiscursive moves** about the discourse to be irrelevant. This is problematic if, following Grice’s (1975) Maxim of Relation, we assume that irrelevant moves are uncooperative and therefore infelicitous, and is inconsistent with other views of relevance (e.g., Ginzburg, 2010). The other problem is one of explanatory power. Namely, (3) specifies disjunctive conditions under which the current question is popped from QUD stack. Therefore, the theory fails to draw any connection between these two conditions and between the account of relevance, and so it fails to explain why we have these conditions and not others.

However, such connections do exist, and should be leveraged to simplify the theory. The connection I propose begins with recognizing that an assertion is relevant iff it eliminates any future possibility learning the truth of an alternative to the current question. This simplifies (3): the current question must be removed iff no relevant assertion exists.

Commitment Space Semantics The proposal makes crucial reference to the idea of future discourse possibilities, and Cohen and Krifka’s (2014) **commitment space** framework is especially well suited to formalizing this notion. In their dynamic model, the context includes a set of sets of illocutionary acts K called the **commitment space**. Each member of K represents a possible future illocutionary state, or **I-state**, of the discourse. K has a distinguished element, $\sqrt{K}$, corresponding to the current I-state of the discourse, akin to the common ground. Every other $I \in K$ is a possible future I-state reachable by monotonically adding further illocutionary acts to $\sqrt{K}$. The updates for K are defined in (4), and illustrated in Figure 1. Updating K with an act A eliminates all $I \in K$ that do not contain A . Updating with $\sim A$, the **denegation** of A , is simply the complement: all $I \in K$ that *do* contain A are eliminated.

(4) **Updates:** $K + A =_{def} \{I \in K \mid (\sqrt{K} \cup \{A\}) \subseteq I\}$ $K + \sim A =_{def} K \setminus (K + A)$

Just and Other Refusals I propose that the denegation update be adapted to model metadiscursive moves that reject a QUD. Cohen and Krifka’s (2014) use the denegation operator to model refusals to perform a speech act. For instance, if John says “I don’t promise to do the homework” with an initial commitment space K , the resulting commitment space is $K + \sim\text{PROMISE}(\text{John does the homework})$, i.e. a commitment space in which no I-state contains a promising act by John to do the homework. This idea generalizes to refusals like (1B’) through straightforward pragmatic reasoning about the preconditions of speech acts: Assuming that participant B will only assert p if they are *willing* to assert p , then upon learning that B would rather not answer Q , the addressee reasons that any I-state that includes an assertion by B that answers Q is not a possible future I-state. More precisely, for each alternative $q \in Q$, the addressee can perform the denegation update $K + \sim\text{ASSERT}(q)$, and the resulting commitment state is modeled by the intersection: $\bigcap \{K + \sim\text{ASSERT}(q) \mid q \in Q\}$.

Arguably, the semantic contribution of *just* in (1B) is a refusal to address a question. I use denegation to model the lexical semantics of *just* in (5). This proposal follows Wiegand (2016) in extending alternative-based theories of exclusives (e.g. Coppock and Beaver, 2013) into the speech act domain, and it follows Beltrama (2018) and Warstadt (2020) in the claim that *just* expresses the unassertability of alternatives. As in Coppock and Beaver, *just* derives its alternatives from the CQ . The lexical entry selects for the prejacent proposition p and updates the commitment space K with the prejacent and the denegation of all the alternatives to the CQ . This removes from K any I-state where an alternative of CQ has been asserted.

$$(5) \quad \llbracket \text{just} \rrbracket^K = \lambda p [K + \text{ASSERT}(p) \cap \bigcap \{K + \sim\text{ASSERT}(p') \mid p' \in CQ\}]$$

Re-organizing the QUD Stack The proposal for revising the QUD theory proceeds by redefining relevance for assertions to be more inclusive, as in (6). I follow Farkas and Bruce (2010) in supposing that the goal of the conversational participants at all times is to move towards emptying the QUD stack. Adopting Roberts’s (1996/2012) view that relevance is defined relative to the participants’ goals, it follows that any move that brings the stack closer to being empty is relevant. Thus, rather than requiring a relevant assertion to entail the falsity of at least one alternative, it makes more sense for an assertion to be considered relevant to a question Q iff it eliminates, for some alternative in Q , any possibility of that alternative entering into common belief. As before, an assertion must be relevant to CQ to be considered relevant in the discourse.

$$(6) \quad \textbf{Relevance (Revised)} \text{ An assertion that } p \text{ is relevant to } Q \text{ iff } \exists q \in Q \forall I \in K + \text{ASSERT}(p) \cdot \text{ASSERT}(q) \notin I$$

Redefining relevance in this way addresses one problem noted above by predicting refusals to answer the CQ to be relevant, and therefore felicitous. This follows under the proposal in which a refusal to answer CQ updates K by removing all I-states in which the alternatives have been asserted. This also explains the contrast in (1B): when *just* is present the response is relevant by virtue of eliminating from K any I-state that contains an assertion of an answer to CQ , but when it is absent the response is irrelevant because the assertion makes a trivial update.

Finally, it is possible to revise the conditions under which a question is popped from the stack. I propose that for all $Q \in QUD$, the condition in (7) holds. All this condition requires is that there is some possible future I-state of the discourse where some new assertion relevant to the question has been made. This proposal unifies the disjunctive conditions in (3). If a question has been exhaustively answered, there is no hope of learning any new relevant information, and likewise if it has been refused.

$$(7) \quad \text{There is a } p \text{ such that } \text{ASSERT}(p) \text{ is relevant to } Q \text{ in the sense of (6) and } \exists I \in K \cdot \text{ASSERT}(p) \in I$$

Conclusion The proposal gives evidence that the discourse context makes direct reference to the future of the discourse. This view can simplify analyses of relevance and the dynamics of refusal, as well as provide new insight into puzzling discourse particles like *just*. Furthermore, the analysis need not be tied to Cohen and Krifka’s (2014) framework: It can be translated to Inquisitive Semantics (Ciardelli et al., 2018), given an interpretation like Onea’s (2016) in which the inquisitive context is the set of possible future information states (Onea, 2016). Future work will explore this generalization of the proposal in greater detail.

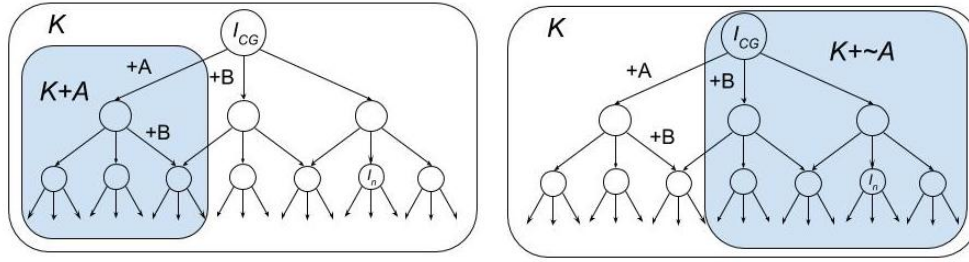


Figure 1: Updating $K + A$ (left), and updating $K + \sim A$ (right). $\sqrt{K} = I_{CG}$ and can be thought of as corresponding to the common ground.

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