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# Discourse integration guided by the ‘Question under Discussion’

Charles Clifton Jr.<sup>a,\*</sup>, Lyn Frazier<sup>b</sup>

<sup>a</sup> Department of Psychology, University of Massachusetts Amherst, Amherst, MA 01003, USA

<sup>b</sup> Department of Linguistics, University of Massachusetts Amherst, Amherst, MA 01003, USA

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### ABSTRACT

What makes a discourse coherent? One potential factor has been discussed in the linguistic literature in terms of a Question under Discussion (QUD). This approach claims that discourse proceeds by continually raising explicit or implicit questions, viewed as sets of alternatives, or competing descriptions of the world. If the interlocutor accepts the question, it becomes the QUD, a narrowed set of alternatives to be addressed (Roberts, *in press*). Three eye movement recording studies are reported that investigated the effect of a preceding explicit QUD (Experiment 1) or implicit QUD (Experiments 2 and 3) on the processing of following text. Experiment 1 revealed an effect of whether the question queried alternative propositions or alternative entities. Reading times in the answer were faster when the answer it provided was of the same semantic type as was queried. Experiment 2 tested QUDs implied by the alternative description of reality introduced by a non-actuality implicature trigger such as *should X* or *want to X*. The results, when combined with the results of Experiment 3 (which ruled out a possible alternative interpretation) showed disrupted reading of a following verb phrase that failed to resolve the implicit QUD (*Did the discourse participant actually X?*), compared to reading the same material in the absence of a clear QUD. The findings support an online role for QUDs in guiding readers’ structuring and interpretation of discourse.

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## 1. Introduction

We argue that discourse coherence is enhanced when its content is relevant to a ‘Question under Discussion’ (QUD) that has been explicitly or implicitly introduced. We present evidence that compre-

\* Corresponding author.

E-mail address: [cec@psych.umass.edu](mailto:cec@psych.umass.edu) (C. Clifton Jr.).

hension of the discourse is facilitated when following material addresses a currently-likely QUD, and describe some factors that make a particular QUD likely. The notion of QUD comes from an analysis that views discourse structure as a series of questions, implicit or explicit, which if accepted by the interlocutor are ideally followed by comments or replies that partially or completely answer them (Beaver & Clark, 2008; Roberts, *in press*, 2004). An explicit question–answer pair, where the question is overt and the answer is a direct reply, is a straightforward example. But a QUD can be introduced implicitly or inferentially, or it could even be established after the fact, as by the client's second sentence in (1) (adapted from Cooper, Engdahl, Larsson, & Ericsson, 2000), which relies on cultural knowledge of travel agents.

- (1) Travel agent: Where will you be traveling?  
 Client: Madrid. There will be two of us.

Many factors, to be sure, contribute to discourse coherence. Some factors, including topichood, focus, order of mention, and various aspects of information status including the given vs. new contrast, affect the coherence of referring to particular entities or events (Gernsbacher, 1997; O'Brien & Myers, 1999; Sanford & Garrod, 1990, among others). Other factors, including causal coherence and temporal and spatial contiguity affect the ease of relating distinct propositions in a text to one another (McCruden, Magliano, & Schraw, 2011; Trabasso & van den Broek, 1985). Useful overviews of this work appear in Garrod and Sanford (1994) and Zwaan and Rapp (2006). A QUD has a different status from these factors. It can be defined in largely formal terms, as a set of alternatives introduced by independently required syntactic and semantic processing of an utterance. As we will attempt to explain, a likely QUD can be identified in advance and can guide a reader or listener's expectations for upcoming semantic content. Meeting these expectations leads to increased discourse coherence.

Much of the development of the QUD notion (Beaver & Clark, 2008; Roberts, *in press*, 2004) analyzes each step of a discourse as introducing a potentially very large family of possible QUDs, and later material as selecting from among these by a sort of 'backwards inference' (the *two of us* answer in (1) illustrates this). Such a perspective on QUDs has been very useful in analyzing how discourses can be interpreted as being coherent. However, viewing a QUD as a question selected only 'after the fact' from a large set of possible QUDs does not allow the notion to play a computationally tractable role in guiding a reader or listener's expectations about upcoming discourse material. In contrast, we emphasize a different perspective on QUDs. We suggest that readers may consider only a small number of likely QUDs, ones that are introduced by independently required syntactic and semantic computations. Rather than enumerating a large family of possible QUDs, this method will generate just a few QUDs, permitting them to constrain assumptions about following discourse.

We base this perspective on the currently widely accepted semantic analysis of questions, which claims that the denotation of a question is the set of possible (or true) answers (Hamblin, 1973; Karttunen, 1977; Rooth, 1992). In such an analysis, the meaning of *Who left?* is something like {*Tom left, Dick left, Harry left. . .*}. The denotation of *Did Tom leave* is {*Tom left, Tom didn't leave*}. That is, the denotation of a question is a set of alternatives; a legitimate answer is the selection of one or more of these alternatives. A QUD that is introduced by an explicit or implicit question is simply the set of alternatives that potentially answer the question. An answer that selects an alternative or alternatives is expected, and contributes to discourse coherence. However, formal alternatives can be introduced by other syntactic and pragmatic devices such as contrastive focus and focus particles like *only*. Other alternatives relevant to our analysis of QUDs can be introduced by grammatical devices such as disjunction (e.g., *Tom or Dick left*) or indefinite reference (*I bet on a horse*, as opposed to *I bet on the horse*), and (as we illustrate below) certain implicatures.

The power of an analysis in terms of QUDs is that independently-motivated linguistic analyses propose that various linguistic structures and devices can introduce alternatives. A reader presented (perhaps implicitly) with a set of alternatives can legitimately expect the following discourse to select from among them. Meeting this expectation will increase the coherence of a discourse and, we assume, facilitate its comprehension. In the General Discussion, we briefly discuss some limitations on the power of a QUD to guide comprehension. Most saliently, a reader must be responsive to the QUD, which may depend on the structure of the discourse (e.g., material in the main assertion of a sentence is more likely to guide comprehension than material in a subordinate clause or 'not at issue'

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