

Annotation Guidelines for Questions under Discussion and Information Structure

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Abstract

We present a detailed manual for a pragmatic, i.e. meaning-based, method for the information-structural analysis of naturally attested data, which is built on the idea that for any assertion contained in a text (or transcript of spoken discourse) there is an implicit Question under Discussion (QUD) that determines which parts of the assertion are focused or backgrounded (and which ones are non-at-issue, i.e. not part of the assertion at all). We formulate a number of constraints which allow the analyst/annotator to derive QUDs from the previous or upcoming discourse context and demonstrate the method using corpus examples (of French, German, and English). Since we avoid making reference to language-specific morphosyntactic or prosodic properties, we claim that our method is also crosslinguistically applicable beyond our example languages.

Keywords: information structure, annotation, corpus, pragmatics, discourse structure, focus, background, topic, non-at-issue content

1 Introduction

1.1 Information structure

It is well known that the information conveyed by an utterance can be divided into *background* information, which is usually *given* in the context, and *focus* information, which can be interpreted as the answer to some currently relevant question. The study of this so-called *information structure* of sentences (e.g. Halliday 1967, Rooth 1985, 1992, Vallduví 1992, Lambrecht 1994, Hajičová et al. 1998, Schwarzschild 1999, Büring 2003, 2016, Krifka 2007, Beaver and Clark 2008, Roberts 2012) in actual written and spoken

corpora is receiving increased interest in linguistics, as the attention has shifted from the analysis of constructed sentences to the question of how information is packaged in sentences that occur in real contexts. Depending on the language, information structure may be expressed via morphologic, syntactic and/or prosodic means. Such linguistic means, however, are typically underspecified and often leave room for ambiguity. A well-known example is *focus projection* in English (Selkirk 1995; Gussenhoven 1999), but also syntactic means, such as fronting and clefting, or morphological means, like specific morphemes (cf. the long standing debate, started with Kuno 1973, on Japanese *wa*), normally do not uniquely identify a single information-structural configuration within or across languages. In other words, the way information is conveyed by an utterance in isolation may often remain linguistically opaque. Yet, the information structure can be largely recovered by the listener/reader when the whole discourse in which the utterance is inserted is taken into account, namely when the utterances that precede and (to a minor extent) follow the target utterance are considered.

1.2 Discourse structure and Questions under Discussion (QUDs)

In the present paper, we want to make explicit the way the listener/reader recovers the information structure of the utterances of a text.¹ In order to do that, we need to formulate assumptions concerning the way discourse is organized. Our main assumption is that discourse is not linear but hierarchically organized in the form of a discourse tree. This assumption goes back to theories of discourse structure (Hobbs 1985, Grosz and Sidner 1986, Polanyi 1988, Mann and Thompson 1988, Van Kuppevelt 1995, Asher and Lascarides 2003, Taboada and Mann 2006) and information structure (Roberts 2012, Büring 2003, Beaver and Clark 2008) but the implementations of the actual trees (and sometimes graphs) differ. On the one hand, theories of discourse structure usually assume that a text is built from so-called *elementary discourse units* (roughly: clauses), which themselves represent the nodes of discourse trees and which are connected via discourse (or rhetorical) relations (ELABORATION, NARRATION, EXPLANATION, etc.). On the other hand, theories of information structure based on Questions under Discussion (QUDs), following Roberts (2012), typically postulate the existence of *QUD stacks*, which are abstract objects that contain increasingly

¹ Throughout this document, when we speak of *text* we do not only refer to written text, such as narratives, newspaper articles etc., but we also include transcripts of spoken discourse or dialogue.

specific questions, ordered by an entailment relation.² The connection between discourse structure and QUDs has also recently received attention in work by Onea (2016), Velleman and Beaver (2016), Hunter and Abrusán (to appear) and Riester (to appear). These authors investigate whether QUDs can be integrated into existing discourse trees, e.g. of SDRT, (probably yes); what kind of changes have to apply to the representation formats; whether the original QUD framework of Roberts (2012) is too restrictive to handle truly naturalistic text (again, probably yes); and whether QUDs and rhetorical relations are interchangeable (probably not without information loss, in either direction).

The discourse trees we have in mind combine elements from both discourse structure theories and theories of Questions under Discussion. Our goal is to transform natural discourse into a compact tree representation, *QUD trees*, cf. Riester (to appear), whose non-terminal elements are *questions* and whose terminal elements are the *assertions* contained in the text, in their linear order, as shown in Figure 1. This representation format is compatible with earlier approaches to discourse structure, especially SDRT (cf. Riester, to appear). It is meant to help visualizing the discourse structure, but at the same time to allow the analyst to read off the text in its linear order. QUD trees also have a theoretical motivation in that they represent the topical structure of any piece of discourse, much like sections and subsections of an article, but in a much more fine-grained manner.

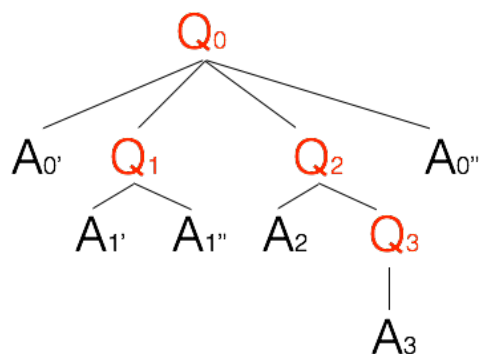


Figure 1 Discourse tree with Questions under Discussion (QUD tree).

When faced with the task of reconstructing the information structure of the sentences of a text, the analyst must first reconstruct its QUDs, and, in the course of this, the geometry of the discourse tree. Then, by making explicit the link between discourse structure and informational categories, the information structure of each utterance will be derived. In the

² Note that perhaps the earliest relevant work on the discourse-structuring properties of implicit questions is Klein and von Stutterheim (1987). In this work, what later became known as QUDs are called *Quaestiones*.

remainder of this paper, we are going to explicitly spell out the necessary steps of such an analysis.

1.3 Universality of information-structural notions

We are aware that some scholars reject the possibility of the existence of universal information-structural categories (see for instance Matic' and Wedgwood 2013, and a few critical remarks on it in Riester 2015). The justified core of the criticism is based on the fact that often, in the literature, languages have been claimed to possess a syntactic position for focus or topic, a “focus accent” or “focus particle” while, in reality, the morphosyntactic and prosodic realization of any sentence depends on a bundle of factors, and expressive means like the ones mentioned may fulfill several functions simultaneously or occur only under favorable conditions. It is, therefore, mostly misleading to call them “focus markers”. Few people, however, would deny that information structure does have a strong influence on sentence realization and that this deserves to be studied by linguists. The problem with Matic' and Wedgwood (2013), in our opinion, is that, beyond their valuable criticism of bad linguistic practice, they make it sound as if there cannot even exist semantic-pragmatically defined (and therefore universal) information-structural categories, i.e. that the meaning of central concepts like *focus* or *topic* differs from language to language. Such a position ultimately undermines the very study of information structure from a comparative point of view. We believe, however, that such a comparative study is possible and we also believe in the benefit of universal information-structural concepts in general. We are therefore going to provide a method to recover the information structure of a sentence, for the most part *independently from its form*, i.e., only by looking at its place, informational content and function within the discourse. If we prove this to be possible, our procedure will be a valuable instrument for scholars who study the interface between information structure and its linguistic realization by morphological, syntactic and/or prosodic means, since we avoid the often-bemoaned circularity sometimes found in information-structure research, when formal criteria, like constituent order or prosody lead to pragmatic annotations which, in turn, are used for the study of syntactic or prosodic properties. Furthermore, the procedure will be applicable to any language.

In order to make the approach clear, we will provide examples taken from different texts and in three different languages: French, German, and English. What these examples have in common is that they are extracted from corpora of naturally attested data, but they belong to different text genres – semi-spontaneous speech such as interviews and radio debates, as

well as planned written texts such as newspaper articles or read news, etc. – and can be either dialogues or monologues. The choice of data has no consequences on the formulation of the guidelines, which unanimously apply to all of them. The main difference between the sources is that some discourse genres contain a number of explicit questions (on which, see discussion in Section 5.2), while others don't. The corpus resources are listed in Appendix 1. Reference to corpora will be indicated above each of the examples. We are aware of the fact that the choice to illustrate our method with examples from three well-known European languages does not do justice to proving our conviction of its universal applicability and, particularly, of its applicability to lesser-studied languages whose information structure marking is still unknown. One reason of our choice is simply that we are familiar with the three chosen languages, while our own experience with lesser-studied languages is unfortunately limited and would require collaboration with language specialists. First promising annotation attempts in collaboration with typologists studying the Austronesian languages Sumbawa and Tagalog, as well as the North Cushitic language Beja have been made, but the data have not been verified carefully enough to warrant their publication yet. Another important reason for our limited language sample is that the matter presented in this article is already quite complex and would have not become easier if linguistically more diverse examples were chosen, although the program, for sure, might perhaps have looked more appealing. But since it is precisely our hope that the framework presented in this article will inspire researchers working on, and sometimes struggling with, information-structural analyses in fieldwork data of lesser-studied languages, we nevertheless firmly believe that the article is published in exactly the right volume at the right time. In the proposal for the current book, the editors mention, among other issues, two obstacles to the study of information structure in lesser-described or endangered languages. One is the lack of explicit question-answer pairs in the limited textual resources available for some languages (cf. Schultze-Berndt and Simard 2012). With our method, we expect to overcome this problem since it is precisely our goal to enhance textual resources with (implicit) questions. The other obstacle is that the study of information structure is still considered a “luxury problem” which presupposes excellent knowledge of both the syntactic and prosodic structure of the language. While our approach certainly builds on linguistic data that must be well understood, to the extent that good glosses and translations are available, it does not require any higher-level syntactic or prosodic analysis. Finally, it is certainly justified to point out that claims about universality in language can never be “proven” on any small range of languages, and adding a few examples from typologically diverse and/or lesser-studied

languages wouldn't make our claim stronger. So, our selling point of universal applicability can, of course, never be more than a working hypothesis, although we believe that we have good reasons for bringing it up for discussion and for inviting other researchers to give the method a try.

2 Preliminaries for the reconstruction of QUDs (and the creation of discourse trees)

In this section and the following one, we will describe the necessary steps of the proposed procedure in terms of QUD reconstruction. We will start with the preparation of the text, i.e. the segmentation into separate assertions. Then (Section 3) we will present the principles constraining the adequate formulation of QUDs. In Section 4 we will specify how the information structure of each utterance is derived from its QUD. Section 5 is dedicated to a discussion of parallel structures and their special properties with respect to the formulation of QUDs. Section 6 discusses the necessary criteria for the identification of non-at-issue content, and Section 7, building on insights from Sections 5 and 6, proposes an analysis for conditionals. Finally, three appendices list the corpus resources employed, provide a short summary of the analysis procedure, and present a short annotated text from an interview in English. Some parts of the procedure presented in Sections 3-5 have already been sketched in Riester (2015), a semantic interpretation can be found in Reyle and Riester (2016), and more information about the particular format of *QUD trees* and their relation to discourse-structure theory is found in Riester (to appear).

2.1 Understanding the text

It is very important that the text that will be analyzed in terms of information structure is well understood by the annotator. As should be general practice in the study of language, the annotator should be familiar with the language to a substantial degree, or at least have verified the glosses and translation carefully with a native speaker or expert in the language. A second potential source of misunderstanding is the content of the text itself. Incoherence, deliberate artistic freedom found in literary texts, or other stylistic factors may blur the speaker/writer's goals or pattern of argumentation. To analyze the information structure of the utterances of such a discourse may turn out to be difficult.

2.2 Preparing the text

The annotator will split the text into separate assertions. Complex sentences will be split into clauses at sentence-level conjunctions or disjunctions (marked e.g. by *and*, *or*, *but*, but also those without explicit marking), in order to isolate single assertions, as in Examples (1) and (2). Each separate assertion is marked by an *A*. This can be understood as the beginning of the actual annotation procedure, which can be carried out in a simple text editor.³

(1) [German, SWR]

A: Wir haben ja nun alle von Konflikten gehört,
We have as.you.know now all of conflicts heard
‘Now, we have all heard of conflicts’

A: aber es gibt immer Konflikte
but there gives always conflicts
‘but there are always conflicts’

A: und das bedeutet nicht automatisch, dass dann Tausende von
and that means not automatically that then thousands of
Flüchtlingen bis nach Deutschland kommen.
refugees until to Germany come
‘and that doesn’t mean per se that thousands of refugees will be coming to Germany.’

(2) [German, SWR]

A: Viele Menschen sehen zu wenig Demokratie,
many people see too little democracy
‘Many people are experiencing too little democracy’

A: und deshalb laufen sie zum Teil falschen Propheten hinterher.
and therefore run they for.a part false prophets after
‘and, therefore, some of them are following false prophets.’

³ We do not exclude, however, the possibility that the annotation be done using some more sophisticated annotation tool.

Segmentation is also applied to other types of coordinations, e.g. NP- or VP-coordinations.⁴ For such coordinations in particular, it may be helpful for the annotator to reconstruct the elided semantic material, as we do in Examples (3) to (5) (and subsequent examples in the text) by marking it as crossed out and gray. This material, however, is not meant to be included in the final annotation.⁵

(3) [German, SWR]

A: Da sollen Fenster in Teeküchen vorgeschrieben werden

there shall windows in staff.kitchens prescribed be

‘They are going to prescribe having windows in staff kitchens’

A: oder auch die Helligkeit am Heimarbeitsplatz ~~soll vorgeschrieben werden.~~

or also the brightness at.the home.workplace shall prescribed be

‘as well as the brightness of the home workplace.’

(4) [French, CFPP2000]

A: y’a absolument rien pour euh s’amuser

there.is absolutely nothing for ehm have.fun

‘there is absolutely nothing to have fun with’

A: ou euh y’a ~~absolument rien~~ pour sortir le soir

or ehm there.is absolutely nothing for go.out the evening

‘or to go out in the evening’

A: ou y’a ~~absolument rien~~ pour aller faire ses courses de

or there.is absolutely nothing for go make one’s purchases of

dernière minute

last minute

‘or to go for last-minute shopping’

⁴ In all cases, we assume that each conjunct has an illocutionary force on its own, even if it is not syntactically independent.

⁵ Given the purposes and interests of the present paper, we do not make any claim concerning the nature of such elided material, and we do not take part in the long-standing debate between structural approaches to ellipsis, which argue for a syntactic hidden representation of the elided material (cf. Fiengo and May 1994, Merchant 2001, etc.) and non-structural ones (cf. Hardt 1999, Dalrymple 2005, etc.).

(5) [French, EUR]

- A: La construction européenne c'était un moyen d'assurer la paix
the construction European it.was a means to.ensure the peace
entre les pays d'Europe de l'Ouest
between the countries of.Europe of the.West
'The construction of Europe was a means to ensure peace among the Western European countries'
- A: et ~~e'était~~ en même temps ~~un moyen~~ d'assurer une prospérité commune
and it.was at same time a means to.ensure a prosperity common
'and at the same time a means to ensure a common prosperity'
- A: et ~~e'était un moyen d'assurer~~ une défense vis-à-vis la menace soviétique.
and it.was a means to.ensure a defense towards the threat Sovietic
'and a defense against the Sovietic threat.'

In principle, all coordinations should be dealt with according to this procedure of separation and elliptic reconstruction.⁶ In doing so, we account for the assumption that coordination is a means to efficiently communicate a series of parallel statements in one go (more on parallelism in Section 5), and the idea that coordinated phrases are often in contrast with each other and that, therefore, each of them contains an instantiation of the same focus variable, cf. Lang and Umbach (2002), Jasinskaja and Zeevat (2009), and others.

At this stage of the annotation, subordinate clauses (argument or adjunct clauses) will not be separated from their verbal heads, as shown in (6) (complement clause and relative clause), (7) (concessive clause), and the third assertion of (1) (complement clause).

(6) [German, SWR]

- A: Ich glaube, viele Menschen sind mit vielem, was in Europa läuft,
I believe many people are with a.lot that in Europe goes.on
unzufrieden.
unhappy

⁶ There are two relatively rare exceptions, which should not lead to the splitting of a coordination. The first one is represented by idiomatic expressions (e.g. *nuts and bolts*). The second one is more involved: a coordination that is not focal but part of the information-structural background, e.g. when an expression like *the couple* is later on referred to as *the woman and the man*. Since this case anticipates a lot of what we first need to discuss in detail, it will be ignored here.

‘I believe that many people are unhappy with a lot of things that are happening in Europe.’

(7) [French, *www.monde-diplomatique.fr*]

A: Bien que les règles statutaires définissent des langues officielles(...),
even though the rules statutory define INDEF languages official
un monolinguisme de fait s’impose peu à peu.
a monolingualism of fact itself.establish little to little

‘Although statutory rules set out the official languages (...), monolingualism is in fact establishing itself little by little.’

This last point will be revised at a later stage of the annotation procedure, namely in Section 6, where we will discuss the notion of *non-at-issue content*. As a matter of fact, whether a subordinate clause is separated from the root clause or not depends on whether its content is *at issue* or not, and as we will see, many instances of *non-at-issue content* are expressed by subordinate clauses (and adjunct ones in particular, such as temporal, conditional, concessive, causal or non-restrictive relative clauses).

3 Formulating Questions under Discussion

The annotator is now ready to formulate a QUD for each utterance of the text. In the following, we will provide a number of explicit principles that are meant to constrain the formulation of QUDs and to make the analysis transparent and reproducible by other analysts.

Primarily and most importantly, the QUD must be such that an assertion below the question is *congruent* with it (i.e. it must indeed answer the question).

Q-A-Congruence:

QUDs must be answerable by the assertion(s) that they immediately dominate.

The principle of Q-A-CONGRUENCE allows that the QUD can, at the outset, target any constituent of the assertion. For instance, a sentence like the assertion *A* in (8), when uttered

in isolation, could be the answer to any of the questions Q shown in (8), and perhaps to others.

(8) [English, SNO]

Q: *What happened?*

Q: *What about you?*

Q: *Who were you working for until last summer?*

A: You were working until last summer for the NSA.

The typical situation we are faced with, however, is that assertions are not made in isolation but occur within a context. In this situation, the formulation of QUDs is subject to further constraints. The most important of these constraints is that QUDs should make reference to the immediately preceding discourse, i.e. a QUD should contain as much given material as possible. This principle, which we call MAXIMIZE-Q-ANAPHORICITY, is a variant of earlier linguistic principles discussed by, among others, Heim (1991), Williams (1997), Schwarzschild (1999), and Büring (2008), which require that discourse should be made maximally coherent by the use of presuppositions and the marking of anaphoric material.

Maximize-Q-Anaphoricity:

Implicit QUDs should contain as much given material as possible.

Consider the utterance in (8) within its context, as in (9). *Snowden* is already mentioned in the preceding utterance, therefore a question like *What happened?*, which does not include any given material, will be ruled out by MAXIMIZE-Q-ANAPHORICITY.

(9) [English, SNO]

A: Edward Snowden is, in the meantime, a household name for the whistleblower in the age of the internet.

~~Q: *What happened?*~~

Q: *What about you?*

Q: *Who were you working for until last summer?*

A: You [=Snowden] were working until last summer for the NSA.

As for another example illustrating the choice of the QUD according to the principle above, consider (1), repeated below (without glosses) as (10). After utterance A_3 , several questions could be formulated, for instance, a very general question like *What is the way things are?* (Roberts 2012), to which A_4 would be an answer. However, MAXIMIZE-Q-ANAPHORICITY instructs us to integrate the available given material of A_4 (*conflicts*) in Q_4 , as shown below.

We will adopt the convention in this article to indicate implicit QUDs in curly brackets. Furthermore, each assertion is assigned a number that matches the number of its respective question. By means of indentations (> symbols) we symbolize the tree structure. Generally, in order to keep trees compact, a question that makes use of material given in the immediately preceding assertion A will attach as a sister node of (i.e. at the same level as) A , cf. Rieber (to appear). The abstract representation of the tree in (10) is provided in Figure 2.

(10) [German, SWR]

A_3 : Wir haben ja nun alle von Konflikten gehört,
‘Now, we have all heard of conflicts’

Q_4 : {What about conflicts?}

> A_4 : aber es gibt immer Konflikte
‘but there are always conflicts’

> Q_5 : {What follows from the fact that there are always conflicts?}

>> A_5 : und das bedeutet nicht automatisch, dass dann Tausende von Flüchtlingen bis
nach Deutschland kommen.
‘and that doesn’t mean per se, that thousands of refugees will be coming to
Germany.’

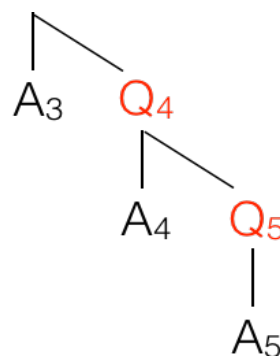


Figure 2 QUD tree for the discourse in (10)

If QUDs cannot be formulated using given material, this means that the respective section of text is not very coherent, i.e. that the writer or speaker randomly switches to a completely different topic. If it happens that no connection to the previous discourse can be established,

then the only possible question is a very general one, which only contains general concepts like *to happen* (i.e. a question like *What happened?*, *What is going on?*, or *What is the way things are?*). This will also essentially mean the return to the root node of the tree.

While the MAXIMIZE-Q-ANAPHORICITY principle instructs us to integrate in the current QUD all material from the previous discourse which appears in the answer, we still need a principle that regulates what *cannot* be included in the question, viz. completely new material.

Q-Givenness:

Implicit QUDs can only consist of given (or, at least, highly salient) material.

The principle of Q-GIVENNESS is derived from the GIVENNESS principle by Schwarzschild (1999).⁷ The constraint indicates that implicit QUDs differ from explicit ones. Only explicit QUDs can, under certain conditions, introduce new material into the discourse,⁸ while implicit QUDs cannot.

Consider again Example (9). Questions *What about you?* *Who were you working for until last summer?* all satisfy MAXIMIZE-Q-ANAPHORICITY, but only *What about you?* is such that it does not introduce new material, in the context of the previous discourse.

Again on this point, consider Example (11). In principle (and partly using heavy intonation), we could imagine questions targeting any constituent of utterance A_8 . Possible questions are: *What about this alliance of intelligence operations?*, *Who is known as the Five Eyes?*, *What about the Five Eyes?*, etc. However, only *What about this this alliance of intelligence operations?* contains only given material, provided that *this alliance of intelligence operations* and *a multilateral agreement for co-operation* refer to the same entity, and, therefore, satisfies all constraints defined above.

⁷ Consider Example (i). Schwarzschild (1999:155) requires non-given information (in A_1 , the phrase *was littered with plastic bags*) to be focused (F-marked).

- i. A_0 : Paul went to the beach.
 Q_1 : {What about the beach?}
> A_1 : The beach [was littered with plastic bags]_F.

Since the focused material in an assertion is replaced by a wh-phrase (in Q_1 : *what about*) in its corresponding QUD, we conclude that the implicit question cannot contain discourse-new (non-salient) information.

⁸ See Ginzburg (2012) for in-depth analysis of explicit questions in spoken conversation.

(11) [English, SNO]

A₇: There is a multilateral agreement for co-operation among the services

Q₈: {What about this multilateral agreement for co-operation among the services?}

> A₈: and this alliance of intelligence operations is known as the Five Eyes.

According to the principle of Q-GIVENNESS, a QUD can also consist of ‘highly salient’ material. The *salience* of a word simply means its active presence in the hearer or reader’s mind right before its actual occurrence in the text. Note that it is difficult to provide a general account of what may count as salient. Certainly, all function words and very general concepts like, *status*, *name*, *event*, or *property*, may always be used in the formulation of a QUD, but it is not excluded that certain specific information may become active in a situation without having been explicitly mentioned. As an illustration, consider utterance A₇ in Example (12).

(12) [German, SWR]

A₆: Mein Opa hat eine Staublunge gehabt.

my grandpa has a black.lung had

‘My grandpa suffered from silicosis.’

Q₇: {What did grandpa do (after the war)?}

> A₇: Der war im Schieferbergwerk nach dem Krieg.

that.one was in.the slate.mine after the war

‘He was working in a slate mine after the war.’

Assertion A₇ in (12) contains the phrase *after the war*, which might arguably be classified as salient (rather than truly new) information after the mention of the speaker’s grandfather (and presuming the addressee’s awareness of the impact and omnipresence of World War II – “the war” – in German history of the 20th century), although the phrase itself was not mentioned before. To get a sense of the difference between potentially salient and clearly non-salient information, it suffices to replace the expression *after the war* by a more informative phrase, like *from 1949 to 1963*. However, as we said, it is difficult to establish a general rule for this, which is why analyses can occasionally become ambiguous when matters of salience are involved. In this connection, the problem is not so much to *detect* salient information but, rather, not to assign the label too generously. Annotators should

always ask themselves whether it is acceptable to include the allegedly salient (but strictly-speaking discourse-new) information into the QUD without thereby altering the discourse.

Two true exceptions to Q-GIVENNESS may come in the form of parallelisms and the beginnings of discourses. The former will be discussed in detail in Section 5 below. As for the latter, according to the theory formulated in Roberts (2012), the initial question of a text should always be the so-called “Big Question” *What is the way things are?* (alternatively: *What is going on? What happened?* etc.). However, language-specific syntactic or prosodic information may force a discourse-initial sentence to be analyzed with a narrow, rather than wide, question. For instance, Example (13) is the beginning of a radio news bulletin, which picks up on a debate about wage dumping – a hot topic at the time of the broadcast. In German, the adjunct phrase *notfalls per Gesetz* ‘if necessary by law’ would occur, by default, before the argument phrase *gegen sittenwidrige Minilöhne* ‘against unethical dumping wages’. The fact that, in (13), the order is reversed is an indicator that everything besides the adjunct is backgrounded. Hence, besides the Big Question Q_0 , the analysis contains the narrow question $Q_{0.1}$ asking for the information provided by the adjunct. (As will be explained in Section 5.2, a numbering of this kind indicates *entailment* between a super- and a subquestion.)

(13) [German, DIRNDL]

Q_0 : {What is going on?}

> $Q_{0.1}$: {How is the CDU planning to crack down on unethical dumping wages?}

>> $A_{0.1}$: In der CDU wächst die Bereitschaft, gegen sittenwidrige

in the CDU grows the willingness against unethical

Minilöhne **notfalls per Gesetz** vorzugehen.

dumping.wages if.necessary by law to.crack.down

‘In the Christian Democratic Party, there is a growing willingness to crack down on unethical dumping wages, **if necessary by law.**’

Since such an explanation is language-specific and based on syntactic information, it is not considered to be part of our QUD framework, which would simply predict the wide question Q_0 in this case. Note that our approach is conservative and will, in such cases, assume a question which is too wide, never one that is too narrow. However, the annotator is encouraged to narrow down the question as soon as language-specific rules have been

established with a reasonable degree of certainty. Relatedly, a discourse-initial assertion may contain a so-called *presupposition trigger* (cf. van der Sandt 1992, Geurts and Beaver 2011), e.g. a cleft, which lets the hearer accommodate a more specific question. We may find a case like this for instance at the beginning of a novel, where the presupposition usually gives rise to a stylistic effect of some sort (cf. (14), first sentence of the novel *Vivement dimanche!*, French translation of Charles Williams' novel *The long Saturday night*).⁹

(14) [French, *Vivement dimanche!*]¹⁰

Q₀: {What happened?}

> Q_{0.1}: {When did everything begin?}

>> A_{0.1}: C'est le 5 janvier que tout a commencé.

it.is the 5 January that all has begun

'It's on January 5th that everything began.'

Since our account of QUDs and information structure relies on context, it is not surprising that it has limits precisely when no context is available, i.e. at the beginning of a discourse. As a consequence, especially when studying the information structure of lesser-studied languages, it is advisable not to draw premature conclusions from the analysis of the beginnings of texts, which, in the absence of language-specific clues, will always be analyzed as all-new.

4 Adding information-structural markup

Before presenting a second way to define QUDs in a text (and, in particular, the role of parallelism, see Section 5), we show in this section how the information structure of the assertions of a text can be straightforwardly annotated on the basis of the QUDs obtained by following the instructions detailed above. In line with different approaches to information structure theory, such as Vallduví (1992), Lambrecht (1994), as well as more contemporary work following the paradigm of *Alternative Semantics* (Rooth 1985, 1992, 1996), such as Krifka (2007), Beaver and Clark (2008), and especially Büring (2008, 2016), we assume that assertions contain an obligatory *focus* and an optional *background*. The combination of the

⁹ On this *in medias res* effect, see also Firbas (1992:40).

¹⁰ *Vivement dimanche!* by Charles Williams, Gallimard, 1963 (page 7).

focus and the (potentially empty) background is called a *focus domain* (marked by the \sim symbol originally defined in Rooth 1992). The availability of QUDs allows us to identify the focus (F) as that part of an assertion that answers its respective QUD, while the background (not labeled) corresponds to the lexical material already present in the QUD, which as we said, following Q-GIVENNESS, only consists of given material.¹¹

A further category marked in the annotation is an *aboutness topic* (T). Along the lines of work such as Reinhart (1981), Portner and Yabushita (1994), Jacobs (2001), Krifka (2007) (see also McNally 1998 for a review of the literature on this notion), *topic* is here intended as a distinguished discourse referent identifying what the sentence is about. We will therefore simply label as T a referential expression (term) inside the background.¹² While all aboutness topics are necessarily backgrounded, not all material in the background clearly qualifies as a topic. One might argue that not all referential expressions inside the background are actually aboutness topics, and our procedure is not meant to single out the best topic candidate. At this point we do not intend to provide any rules to distinguish between better and worse topic candidates,¹³ although our approach considerably facilitates such a selection since it excludes all focal expressions.

With these specifications at hand, we are able to perform an information-structural analysis of our data. For instance, the answers in (11) and (10) are analyzed as (15) and (16) respectively.

(15) [English, SNO]

A₇: There is a multilateral agreement for co-operation among the services

Q₈: {What about this multilateral agreement for co-operation among the services?}

> A₈: and [[this alliance of intelligence operations]_T [is known as the Five Eyes]_F]_~.

(16) [German, SWR]

A₃: Wir haben ja nun alle von Konflikten gehört,

¹¹ Or the repeated material of parallel sentences, see Section 5.

¹² We are aware of the fact that certain non-referential expressions may occupy typical topic positions in several languages (cf. Endriss 2006). Nevertheless, in this work, we consider referentiality to be a necessary property of aboutness topics (cf. also Jacobs 2001).

¹³ In order to pursue such an analysis, semantic and thematic role properties of the different topic candidates should be analyzed, see Brunetti (2009, and references quoted therein) for more details on this point.

- ‘Now, we have all heard of conflicts’
- Q₄: {What about conflicts?}
- > A₄: aber [[es gibt immer]_F [Konflikte]_T]~
 ‘but [[there are always]_F [conflicts]_T]~’
- > Q₅: {What does it mean that there are always conflicts?}
- >> A₅: und [[das]_T [bedeutet nicht automatisch, dass dann Tausende von Flüchtlingen bis nach Deutschland kommen]_F]~.
 ‘and [[that]_T [doesn’t mean per se, that thousands of refugees will be coming to Germany]_F]~.’

These examples show how the complete annotation – including both QUD structure and information structure – will look like in a text editor. The information structure labels can then be transferred to some layered annotation tool (Elan, Praat, EXMARaLDA, or other). As for the QUD structure, it does not seem impossible – though perhaps not ideal – to add it as a further additional layer. A technical solution more specific and appropriate to this kind of annotation is yet to be found. In the rest of the paper, all examples with a QUD structure will also display the corresponding information-structural markup.

5 QUDs and information structure in parallel structures

5.1 *Parallel structures with a single variable*

We have said in Section 2 that an (implicit) QUD can only consist of given (or, at least, highly salient) material. However, a violation of this principle is acceptable in some cases, as we have seen before, at the end of Section 3. Another such case is described in the current section. When it seems difficult to link an assertion directly to the previous discourse, this can be the signal that the assertion occurs within a parallel structure, i.e. a QUD that is answered by a series of structurally analogous assertions. In these cases, the QUD is defined by the parallelism.¹⁴ For example, in (17), the phrase *you can wire tap* is not present in the discourse preceding *A_{15.1}*, and Q-GIVENNESS would only allow for Question *Q₁₅*. But the

¹⁴ Note that what we call *parallelism* here is not confined to the discourse relation PARALLEL (cf. Asher and Lascarides 2003), but presumably comprises as well all other *coordinating* discourse relations, including CONTRAST, NARRATION etc.

presence of the phrase in $Q_{15.1}$ is motivated by the parallelism between $A_{15.1'}$ and $A_{15.1''}$. Structurally, the example corresponds to the tree in Figure 3.

(17) [English, SNO]

A_{14} : and then you realize the power you have.

Q_{15} : {What power do you [*i.e. the employees of the NSA*] have?}

> $Q_{15.1}$: {Whom can you wire tap?}

>> $A_{15.1'}$: [[You]_T can wire tap [the President of the United States]_F]~,

>> $A_{15.1''}$: [[you]_T can wire tap [a Federal Judge]_F]~

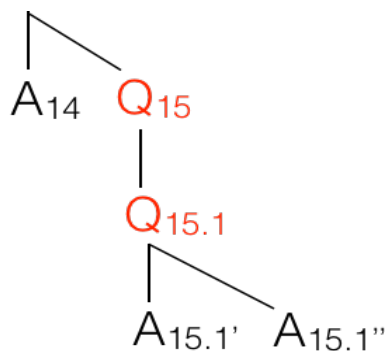


Figure 3 Question under Discussion with two partial answers

The parallelism can consist of two or more utterances. In the simplest case, two utterances are identified as parallel because they contain semantic-pragmatically identical (synonymous or coreferent) material and one syntactic position in which they differ (the focus variable). The identical material, in turn, helps us formulate their common QUD: the constant material must re-occur inside the QUD, while the alternating parts of the assertions correspond to the wh-word in the QUD. Parallel answers to the same question Q_i are marked by A_i , A_i' , A_i'' etc., see Example (17) and the following ones. Note, furthermore, that we shall assume that discourse connectors at the beginning of an utterance, such as *and*, *or*, *but*, *although* etc., stand outside the focus domain. While they are essentially the signposts of discourse structure, they do not themselves take part in the information structure of a sentence. The same rule applies to discourse particles (like *even* or *also*), as far as possible.

(18) [German, SWR]

A_0 : Ein anderes Projekt, bei dem, die Arbeitgeber Sie mit dem
a other project at which the employers you with the
 Bürokratievorwurf überziehen, ist die Arbeitsstättenverordnung.

bureaucracy.accusation coat is the workplace.regulation.bill

‘Another project for which employers are accusing you of bureaucratisation is the workplace regulation bill.’

Q₁: {What will be prescribed?}

> A₁: [Da_T sollen [Fenster in Teeküchen]_F vorgeschrieben werden]~
there shall windows in staff.kitchens prescribed be

‘There (in the bill) they are going to prescribe having windows in staff kitchens’

> A₁’: oder auch [[die Helligkeit am Heimarbeitsplatz]_F soll vorgeschrieben
or also the brightness at.the home.workplace shall prescribed
werden]~.

be

‘as well as the brightness of home workplaces.’

The annotator will make sure that all the parallelisms provided by a text are identified, thus acknowledging the text-internal coherence. We can say that finding a common question to two or more assertions means to identify “the lowest common denominator” of all the answers, i.e. a semantically constant element that is contained in all answers, while the alternating parts are replaced by a wh-phrase.¹⁵ A slightly more complex example is given below.

(19) [French, *www.monde-diplomatique.fr*]

Q₁₂: {In what other way is export beneficial?}

> A₁₂: (...) [[l’export]_T [permet également à l’Etat de réduire quelque peu

¹⁵ It may in fact occur that within a list of sentences sharing some semantic content, the first one is not an appropriate alternative to the others. This happens, for instance, when the first sentence is a presentational construction introducing a new referent, which also constitutes the shared semantic content among the sentences, cf. *a wizard* in Lambrecht’s (1994:177) (slightly adapted) example below. In this case, the first sentence will not be part of the parallelism and will be preceded by a different (less specific) QUD (cf. *Q₀*).

ii. Q₀: {What happened in the story?}

> A₀: [[Once there was a wizard.]_F]~

> Q₁: {What about this wizard?}

>> A₁: [[He]_T [was very wise,]_F]~

>> A₁’: and [[was married to a beautiful witch]_F]~.

*the.export allows also to the.state to reduce some little
 ses engagements consentis au titre du soutien à des industries
 its commitments granted in.the name of.the support to INDEF industries
 nationales d'importance stratégique]*_F~
national of.importance strategic

‘(arms) export also allows the state to slightly reduce its commitments in
 supporting national industries of strategic importance’

> A₁₂": et [~~P~~*export* [contribue donc à alléger ses dépenses budgétaires
and the.export contributes therefore to reduce its expenses budgetary
 en matière de défense]_F~.
in matter of defense

‘and it therefore contributes to reducing the government’s defense spending.’

Consider finally Example (20).

(20) [German, SWR]

A₃₈: von 2600 Euro, wenn man da rechnet...
of 2600 Euros if you there calculate
 ‘with € 2600, if you start calculating...’

Q₃₉: {What do you need to reckon in?}

> A₃₉": [[Man]_T [hat eine Wohnung]_F,]~
one has an apartment
 ‘You’ve got an apartment,’

> A₃₉": [[man]_T [will was essen]_F,]~
one wants something eat
 ‘you want to eat something,’

> A₃₉": [[man]_T [braucht Klamotten]_F,]~
one needs clothes
 ‘you need clothes,’

> A₃₉^{iv}: [[man]_T [hat Steuern]_F,]~
one has taxes
 ‘you’ve got to pay taxes,’

> A₃₉^v: [~~man~~ [~~hat~~ Versicherung]_F,]~
one has insurance

‘insurance’
 > A₃₉^{vi}: und [~~man~~ [~~hat~~ Telefon]_F.]~
 and ~~one~~ ~~has~~ telephone
 ‘and telephone.’

In (20), not just two but several clauses are parallel, to the extent that they have the same subject, the generic pronoun *man* ‘one’, which is expressed overtly in A₃₉^v to A₃₉^{iv}, and implicitly in the last two assertions.

5.2 Parallel structures with two variables: contrastive topic + focus

There is a more complex case of parallelism we need to discuss. Such a parallelism (also referred to as a discourse-structural CONTRAST relation, cf. Asher and Lascarides 2003, Umbach 2004) involves two (or more) assertions, which are contrasted against each other at two different positions. An example is given in (21).

(21) [English, SNO]

A₀: In many countries, as in America, too, the agencies like the NSA are not allowed to spy within their own borders on their own people.

Q₁: {Who can spy on whom?}

> Q_{1.1}: {Who can the Brits spy on?}

>> A_{1.1}: So [[the Brits]_{CT}, for example, [they]_T can spy on [everybody but the Brits]_F]~

> Q_{1.2}: {Who can the NSA spy on?}

>> A_{1.2}: but [[the NSA]_{CT} can conduct surveillance [in England.]_F]~

A question – whom agencies can spy on in (21) – is sometimes not answered directly but broken down into partial answers about smaller parts or elements of the original term. Following the influential work of Büring (2003), these parts are called *contrastive topics* (and they are indexed in the annotation as CT). Note that the term *topic* used here in combination with *contrastive* does not express the same notion as that of (*aboutness*) *topic* seen in Section 4 and marked as T. In line with Büring’s (2003) account, a CT represents the instantiation of a variable within the background, and therefore can, but need not, be referential. Only when a CT is a referential expression will it resemble a T. The structure resulting from the annotation in (21) is shown in Figure 4. Note that the *contrastive topics* are *backgrounded* with respect to the subquestions Q_{1.1} and Q_{1.2} but behave like *foci* with

respect to the higher question Q_I .

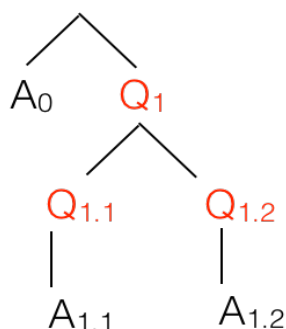


Figure 4 QUD with two entailed subquestions and answers

The reason why we use sub-numbers in such constellations is that the superquestion Q_1 and the subquestions $Q_{1.1}$, $Q_{1.2}$ stand in an *entailment relation*. This means that any answer to the subquestions is, at the same time, a (partial) answer to the superquestion, cf. Roberts (2012). Throughout the analysis task, whenever a question is identified as being entailed by its parent question, the entailment can be made visible using the convention of sub-numbering, even in the absence of CTs, see, for instance, Examples (13), (14) or (23). Another example of complex parallelism is given in (22).

(22) [French, CFPP2000]

Q_{15} : spk1: et ils travaillaient dans quelle profession?

and they worked in what profession

‘and what was their [=the addressee’s parents’] profession?’

> $Q_{15.1}$: {What was your mother’s profession?}

>> $A_{15.1}$: spk2: [[Maman]_{CT} [elle]_T (...) était [soudeuse (...) des agrafes (...)]_F]~

mum she was welder of staples

‘My mum was a staple welder’

> $Q_{15.2}$: spk1: Et votre père?

and your father

‘And your father?’

>> $A_{15.2}$: spk2: [Mon [père]_{CT} [il]_T était [monteur en bronze]_F]~

my father he was fitter in bronze

‘My father was a bronze fitter’

It is interesting to note that in this example, explicit and implicit QUDs alternate in the text: Q_{15} is explicit, the first subquestion $Q_{15.1}$ is implicit, and the second subquestion $Q_{15.2}$ is

again explicit. An explicit question coincides with the QUD when, trivially, the answer given in the text actually answers it, as it is the case with $Q_{15.2}$ in (22). Sometimes, however, the interlocutor may decide not to answer an explicit question but to say something else – that is, to answer a different (implicit) question. In that case, an implicit QUD is inserted. In (22), the question about the interlocutor’s parents is not answered immediately: the interlocutor rather answers a question about his mother, and then, after an explicit subquestion about his father, he completes his answer to the question about his parents.¹⁶

A QUD structure similar to the one shown above is constructed when a referent is semantically related to an antecedent in the previous discourse by some kind of *bridging* relation (Clark 1977, Asher and Lascarides 1998). The only difference with respect to the double contrastive-topic construction is that there aren’t several parallel subquestions but just one. The analogous analysis is motivated by the fact that also in this case, the background contains information that is new with respect to a superordinate question, but given with respect to a subquestion whose answer partially answers the superordinate question. Consider the French example in (23) about arms sale by France. *Le ministre de la défense* ‘the defense minister’ in $A_{9.1.1}$ is linked by a bridging relation (specifically, a *necessary parts* relation, see Clark 1977), to *le gouvernement actuel* ‘the present government’ in the preceding assertion (A_9): the government’s action is conducted through the action put forward by the defense minister. In order to account for the link between *le gouvernement actuel* ‘the present government’ and *le ministre de la defense* ‘the defense minister’, the questions preceding $A_{9.1.1}$ are taken to be subquestions of Q_9 . Note that *le ministre de la défense* is marked as a contrastive topic although it does not actually *contrast* overtly with some other minister. The resulting tree is given in Figure 5.

(23) [French, *www.monde-diplomatique.fr*]

Q_9 : {What about the present government?}

> A_9 : [[Le gouvernement actuel]_T [s’est fortement impliqué dans la
The government current itself.is strongly committed in the
 conquête de marchés]_F.]~

¹⁶ An explicit question may sometimes not receive an answer at all. This is common in dialogues and conversations, where the goals and intentions of the participants may be different and sometimes contradictory (consider, for instance, an interview of a journalist with a politician who wants to gloss over some fact). In this case, an implicit QUD must be reconstructed while the explicit question is a terminal node in the tree.

conquest of markets

‘The present government has committed itself strongly to conquering markets.’

> Q_{9.1}: {What have different people in the government done to achieve this?}

>> Q_{9.1.1}: {What has the defense minister done?}

>>> A_{9.1.1}: [[Le ministre de la défense]_{CT}, [a payé de sa personne,]_F]~

The minister of the defense has paid of his person

‘The Secretary of Defense put in a lot of personal effort,’

>>> Q_{9.1.1.1}: {By multiplying WHAT did the minister put in a lot of effort?}

>>>> A_{9.1.1.1}: [multipliant [les déplacements]_F]~

multiplying the displacements

‘by multiplying trips’

>>>> A_{9.1.1.1}’: et [[conciliabules]_F]~

and consultations

‘and meetings.’

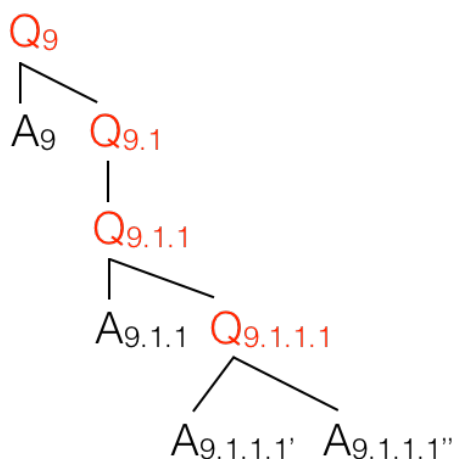


Figure 5. A QUD followed by a subquestion that is followed by two parallel answers.

By adding subquestions $Q_{9.1}$ and $Q_{9.1.1}$, we account for the fact that $A_{9.1.1}$ does not directly respond to the same question A_9 responds to. We also account for the fact that these two assertions are clearly not alternatives to each other, so they do not form a complex parallelism. Finally, if we treated them as answers to independent questions we would miss the fact that both sentences talk about what is going on in the government.

5.3 Embedded focus

Recall that it is part of the procedure discussed in Section 2 that we split coordinated

structures, which may make it necessary to reconstruct elided material. In this section, we talk about a special case of coordination which occurs in subordinate clauses. In this case, the reconstructed material will involve (at least) the entire matrix clause. Note that, as in the previous sections, we are again dealing with a kind of parallelism, which allows us to account for the ellipses and to reconstruct the QUD. A simple example which illustrates this is given in (24).

(24) [German, Stuttgart21]

A₁₈: Das Ziel des Aktionsbündnisses, wie es immer erzählt wird, wie es
the goal of the coalition for action as it always told is as it
 vermittelt wird, ist einen integralen Taktfahrplan in Stuttgart
communicated is is an integral time table in Stuttgart
 durchzuführen.

to execute

‘The goal of the cooperation, how it is always told, is to have an integral railway schedule in Stuttgart.’

> Q₁₉: {What does that mean for trains to follow an integral railway schedule?}

>> A₁₉: [Das heißt, dass [alle Züge]_T [zu einem bestimmten Zeitpunkt...]¹⁷
that means that all trains at a certain point of time
 bis zu einem bestimmten Zeitpunkt eintreffen,]_F~
until to a certain point of time arrive

‘This means that all trains will arrive at a certain point of time,’

>> A₁₉: [~~Das heißt~~, dass dann [zwischen]_F [allen Zügen]_T [ein Umsteigen
that means that then between all trains a change
 möglich ist,]_F~
possible is

‘that there will then be the possibility to transfer between all the trains’

>> A₁₉: und [~~das heißt, dass~~ dann [alle Züge]_T [nach und nach den
and that means that then all trains after and after the
 Bahnhof wieder verlassen.]_F~
train station again leave

‘and that the trains will then leave the station again one by one.’

¹⁷ Speaker hesitates.

In this example, the focus of the three utterances coincides with the predicates of the subordinate declarative clauses, while the shared background involves the matrix part and the topic *all trains*. In the example below, the focus is, again, part of a subordinate clause. The parallelism between $A_{25'}$ and $A_{25''}$ in (25) imposes a common question whose answer is given by the narrow focus inside the embedded clause. Due to syntactic constraints in English,¹⁸ the question answered by an embedded narrow focus looks generally like an echo question (see Q_{25} , as well as $Q_{9.1.1.1}$ in (23) and the subquestions in (26)).

(25) [French, EUR]

Q_{25} : {Countries which are not European in WHAT sense of the word are knocking at the door?}

> $A_{25'}$: mais voilà que [maintenant des pays qui ne sont pas
but there.you.go that now INDEF countries that not are not
 européens au sens [géographique]_F du terme frappent à la
European in.the sense geographical of.the term knock at the
 porte]~
door

‘But now countries that aren’t European in the geographical sense’

> $A_{25''}$: ni même parfois [des pays qui ne sont pas européens
not even sometimes INDEF Countries that-not are not European
 au sens [historique]_F du terme frappent à la porte]~
in.the sense historical of.the term knock at the door

‘and sometimes not even in the historical sense of the word are knocking at the door’

In the previous example, the question is simply defined in the usual way, by the parallelism of the utterances. In the next example, we can see how the size of the focus constituent can sometimes shrink during a sequence of parallel assertions.

(26) [German, SWR]

¹⁸ Cf. the Complex NP Constraint (Ross 1967), which does not allow for extraction out of a clause (here, a relative one) modifying the Noun head of an NP. In Q_{25} *Countries which are not European in WHAT sense are knocking at the door?*, the phrase *in what sense* cannot be extracted out of the relative clause modifying the Noun *countries*, so it remains *in situ*.

- Q₁₈: {What kind of people is the speaker concerned with?}
- > A₁₈: [[Ich]_T beschäftige mich mit denjenigen, [die in diese
I concern myself with those who into these
 Unterkünfte hineingehen,]_{F(18)}~
accommodations enter
 ‘I am concerned with those people who go into these accommodations,’
- > Q_{18.1}: {The speaker is concerned with people who do WHAT with the refugees?}
- >> A_{18.1}: [~~Ich~~ beschäftige mich mit denjenigen, [die mit [den
I concern myself with those who with the
 Flüchtlingen]_T [reden,]_{F(18.1)}]_{F(18)}~
refugees talk
 ‘who talk to the refugees,’
- >> Q_{18.1.1}: {The speaker is concerned with people who take the refugees WHERE?}
- >>> A_{18.1.1'}: [~~Ich~~ beschäftige mich mit denjenigen, [die [sie]_T
I concern myself with those who them
 [mitnehmen auch [zu sich]_{F(18.1.1)}]_{F(18.1)}]_{F(18)}~
take also to themselves
 ‘take them home with them’
- >>> A_{18.1.1''}: oder [~~ich~~ beschäftige mich mit denjenigen, [die sie
or I concern myself with those who them
 [mitnehmen [in den Sportverein]_{F(18.1.1)}]_{F(18.1)}]_{F(18)}~
take into the sports.club
 ‘or to the sports club.’

The QUD-tree of (26) is represented in Figure 6.

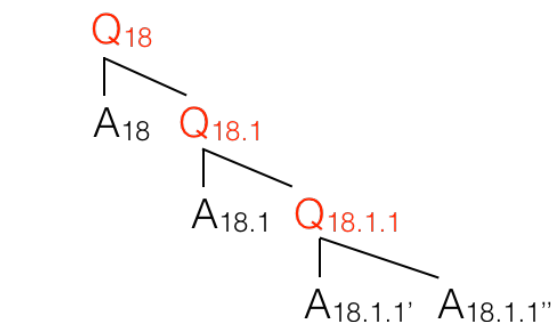


Figure 6. A QUD followed by several subquestions. Each assertion answers both its own QUD as well as the higher questions.

In (26) it is necessary to introduce increasingly specific subquestions in order to capture the fact that, firstly, we are still dealing with a kind of parallelism construction albeit, secondly, one in which the focus is getting narrower and narrower. The outermost focus, the answer to Q_{18} , is represented by the two overt relative clauses in A_{18} and $A_{18.1}$ respectively; however, a narrower focus (on the verb) must be assumed in order to account for the parallelism between the last three assertions, which all talk about the refugees; finally, a yet narrower focus is needed for the last two assertions, whose parallelism concerns taking the refugees to different locations. The subscripts of the foci indicate which of the questions they are answering. As can be seen, there is one focus indicated in A_{18} , two in $A_{18.1}$, and three in each of $A_{18.1.1'}$ and $A_{18.1.1''}$ (nested inside each other) but we assume that only the innermost focus in each of the assertions is the actual one (which is prosodically marked in German). Naturally, when the size of a focus becomes smaller, its background is extended correspondingly. The elided material has again been reconstructed in order to make the interpretation of this complex example transparent.

6 Non-at-issue content

The parts of a clause that do not answer the current QUD can be grouped together under the notion of *non-at-issue content* (Simons et al. 2010). Note that there is some terminological confusion in the literature since, sometimes, background (as opposed to focal) material is also, in some sense, not at issue (and focal material is at issue). However, in our approach we would like to exclude background material from the class of non-at-issue content. What we have in mind is a stricter definition of *non-at-issue content*, equivalent to the notion of *conventional implicature* (Potts, 2005). In general, this term refers to *optional information* that does not contribute to the truth or falsity of the assertion. With respect to the QUD annotation procedure, non-at-issue content can be defined as a – discourse-new – part of the utterance that does not relate to the current QUD, or in other words, a part of the utterance that does not belong to the focus domain.

Non-at-issue content (relative to Q)

An expression X whose denotation is discourse-new and which is contained in an assertion A is non-at-issue with respect to the current QUD Q iff X is optional with respect to Q , where optional means that under deletion of X , A is still an answer to Q .

It is probably impossible to define non-at-issue content by referring to the syntactic form of an expression, because at-issueness mostly depends on the context in which the expression occurs. Nevertheless, there is a list of expressions which typically take the role of non-at-issue content in a sentence, and whose optional status the annotator should therefore always check.

The two major types of non-at-issue material are, firstly, *supplements* such as parentheticals, non-restrictive modifiers and other adjunct-like material. The second type of non-at-issue content consists of *evidentials* and other speaker-oriented material. In our annotations, we mark non-at-issue content by the feature *nai*. A gray background additionally signals that this is material which – for the time being – does not contribute to the main structure of our discourse tree.

Examples of different kinds of supplements are given below: an apposition and a temporal adjunct phrase in (27), two appositions in (28), parentheticals in (29), and a concessive adjunct clause in (7), repeated below as (30).

(27) [French, *www.monde-diplomatique.fr*]

Q₆: {What did Patrice Bouveret do?}

> A₆: [Animateur de l'Observatoire des armements]_{nai} [[Patrice Bouveret]_T
leader of the.monitoring.center of.the arms Patrice Bouveret
 [avait relancé, [lors du colloque organisé le mois dernier
had revived at.the.time of.the conference organized the month last
 par des sénatrices communistes devant un parterre de
by INDEF senators communist in.front.of an audience of
 syndicalistes]_{nai} une série de propositions pour un meilleur contrôle (...)]_F~.
trade.unionists a series of propositions for a better control

‘In his function as the leader of the Arms Monitoring Center, Patrice Bouveret revived, during a conference organized last month by some communist senators in front of an audience of trade unionists, a series of propositions for a better control (...)’

(28) [English, *www.nytimes.com*]

Q₂₆: {Who was among those named in the Panama Papers?}

> A₂₆: [Among those named (*in the Panama Papers*) were (...) [Mr Gunnlaugsson,]_F~

[then the prime minister of Iceland]_{nai}

> A₂₆: (and) [among those named was [the former emir of Qatar]_F]~ [Hamad bin Khalifa al-Thani]_{nai}

(29) [French, *www.monde-diplomatique.fr*]

Q₁: {What about French arms export?}

> A₁: Les exportations françaises d'armement ne font l'objet d'aucun
the export French of arms not make the object of any
débat en France
debate in France

'French arms export isn't the object of any debate in France'

> Q₂: {What are the exceptions to this?}

>> A₂: sinon [en cas [de scandale]_F]~ [(frégates de Taiwan ou Angolagate)_{nai}]¹⁹
except in case of scandal frigates of Taiwan or Angolagate
'except in case of scandal (frigates of Taiwan, or Angolagate)'

>> A₂: [[de drame]_F]~ [(l'attentat de Karachi)_{nai}]
of drama the attack of Karachi
'of drama (the suicide attack in Karachi)'

>> A₂: ou [[lorsque l'exécutif se prend les pieds dans le tapis]_F]~
or when the executive itself takes the feet in the carpet
[(comme avec cette vente de navires de projection et de commandement
like with this sale of ship of projection and of commandment
à la Russie (...))]_{nai}
to the Russia
'or when the executive stumbles over (as with that sale of demonstration and commanding ships to Russia)'

(30) [French, *www.monde-diplomatique.fr*]

Q₃: {What is the debate on linguistic policy about?}

> A₃: [Bien que les règles statutaires définissent des langues
even though the rules statutory define INDEF languages

¹⁹ Since the nai content in this example is sentence-final it can be treated as a separate assertion, cf. the discussion at the end of Section 6.

officielles (...)]_{nai} [[un monolingualisme de fait s'impose peu à peu.]_F]~
official a monolingualism of fact itself.establish little to little
 'Although statutory rules define the official languages (...), monolingualism is in fact establishing itself little by little'

Examples of evidentials are given in (31), (32), and an expressive in (33).

(31) [German, SWR]

Q₂: {What is the current status of the bill?}

> A₂: [Jetzt heißt es,]_{nai} [[das Kanzleramt hat]_F [diese Verordnung]_T
now means it the Chancellery has this bill
 gestoppt]_F]~.

stopped

'Now they are saying that the Chancellery has stopped this bill.'

(32) [French, *www.monde-diplomatique.fr*]

Q₁: {What about the English language in international organisations?}

> A₁: [Les défenseurs de l'anglais affirment]_{nai} [qu'[il]_T [s'est
the defenders of the.English maintain that.it itself.has
 internationalisé]_F]~.

internationalized

'The defenders of the English language maintain that it has become internationalized.'

(33) [German, SWR]

Q₅: {What has changed because of the measures?}

> A₅: [(...) [[dadurch]_T(...) sind [Gott sei Dank]_{nai} [die Anzahl
through.this are God be thank the number
 der Toten (...) massiv zurückgegangen]_F]~

of.the dead massively decreased

'Because of that – Thank God! – the number of casualties has massively decreased.'

It might sometimes seem difficult to decide which part of an utterance is *at-issue* and which one isn't. However, once the QUD is formulated in accordance with the principles defined in Sections 3 and 5 the ambiguity should disappear.

Note that we do not analyze non-at-issue content in more detail, although it can be assumed that it has an information structure of its own (and therefore also its own QUD); for a discussion see Riester and Baumann (2013). Importantly, however, we will analyze sentence-final non-at-issue material simply as if it represents a separate assertion (which it arguably *does*), cf. AnderBois et al. (2010), Syrett and Koev (2015). An example, already mentioned in (28), is shown in (34) (the sentence final expression is an apposition). See also the last QUD of Example (23), which is answered by a VP adjunct. If the sentence-final expression is an evidential, its QUD will be a sort of meta-question about the speaker's attitude towards the preceding assertion.²⁰

(34) [English, www.nytimes.com]

Q₂₆: {Who was among those named in the Panama Papers?}

> A₂₆: [Among those named (in the Panama Papers) were (...) [Mr Gunnlaugsson,]_F~

> Q₂₇: {Who was Mr Gunnlaugsson?}

>> A₂₇: [then [the prime minister of Iceland]_F~

7 Conditionals

In this section we briefly address the treatment and analysis of conditionals. No new categories or structures will be introduced. Instead, we make use of concepts already introduced in Sections 5.2 (on contrastive topics) and 6 (on non-at-issue content). Following Iatridou (1991), Haegeman (2003), or Ebert et al. (2014) we distinguish (at least) two types of conditionals. So-called *relevance conditionals*²¹ “specify the circumstances in which the

²⁰ If we assume that all non-at-issue content (even non-sentence-final one) answers an implicit QUD, then ways have to be found to represent this in the tree structure (see Onea 2016 for such an attempt). Although we do not include it in the current guidelines, it would be desirable to settle this issue in the future, especially since the same non-at issue material may occupy different syntactic positions cross-linguistically (cf. e.g. head-final relative clauses in Chinese).

²¹ They are also often called *biscuit conditionals*, in reference to the famous Example (iii), by Austin (1961). iii. There are biscuits on the sideboard, if you want them.

consequent is relevant” (Iatridou 1991: 51). An example is given in (35).

(35) [German, SWR]

Q₃₃: {What about the passion concerning Europe?}

> A₃₃: [Wenn man den aktuellen ARD-Europatrend anschaut,]_{nai} [dann ist
if you the current ARD.Europe.Trend watch then is
es mit [der Leidenschaft]_T [nicht so weit her]_F~.
it with the passion not so far from
‘If you look at the current ARD Europe Trend (on German TV), then the passion
leaves much to be desired.’

As can be seen in (35), the antecedent is simply treated as an – optional – adjunct clause, which is non-at-issue. The situation is different with ordinary (*hypothetical*) conditionals, Example (36). These conditionals provide the reader with a true choice. We realize this using the pattern and discourse structure familiar from the CT-F pairs introduced in Section 5.2.²²

(36) [German, Stuttgart21]

A₀: Wenn die Deutsche Bahn auf die Idee kommt, solche Bahnhöfe
if the German railway on the idea comes such stations
vom Fernverkehr abzuhängen, kann sie zumachen. (...)
from long-distance.traffic to.unhitch can she close.down
‘If the German railway company tries to unhitch such train stations from
long-distance connections, then they can close down.’

Q₁: {For which cities does it make sense to unhitch the main station?}

> Q_{1.1}: {Does it make sense in Kassel to unhitch the main station?}

>> A_{1.1}: [Wenn sie in [Kassel]_{CT} den Hauptbahnhof abhängen, dann ist das
if you in Kassel the main.station unhitch then is that
[richtig]_F~.
correct

‘If you unhitch the main station in Kassel then that makes sense.’

> Q_{1.2}: {Does it make sense in Stuttgart to unhitch the main station?}

²² Note that yet another type of conditional might be one that has a completely given (and therefore backgrounded) antecedent clause.

>> A_{1,2}: [Wenn sie es in [Stuttgart]_{CT} machen, ist es [falsch]_F]~.
If they it in Stuttgart do is it wrong
 ‘If you unhitch the main station in Stuttgart then that doesn’t make sense.’

The if-clauses in the example in (36) contain the contrastive topics, the cities Kassel and Stuttgart, and the main clauses contain the foci.

Note that the CT-F pattern, and its associated structure consisting of a super-question and several subquestions is a very powerful analysis tool, which is also applicable to other kinds of discourse-structuring expressions like ordinals (*Firstly, Secondly* etc.), contrast markers (*on the one hand, on the other hand*), which all function as (semantically rather thin) contrastive topics. CTs can also play a role in polarity contrasts. (*He [didn’t]_{CT} buy [apples]_F but he [did]_{CT} buy [peaches]_F.) Finally, it is likely that even subsequent events in narratives can be analyzed in this way (*What happened at time t₁? What happened at time t₂?*), but this clearly needs to be investigated more carefully.*

8 Conclusions

In this paper, we have introduced our methodology for a combined analysis of naturally occurring data in terms of both discourse structure and information structure, using Questions under Discussion. We have identified the necessary steps of a procedure based on QUDs and demonstrated the method on authentic data taken from spoken and written English, French, and German corpora. We have defined pragmatic principles that allow us to analyze the discourse structure, formulate adequate QUDs, and analyze the information structure of individual utterances in the discourse. Based on an analysis of authentic data, we have illustrated that the formulation of QUDs can be successfully guided by the defined principles, and that QUDs play a crucial role in accounting for discourse structural configurations. At the same time, they also provide an objective means to determine the information structure, including both the focus-background divide and non-at-issue content.

This research has interesting applications in at least two respects. On the one hand, a precise methodology for the analysis of the information structure in naturally occurring data provides the opportunity to empirically evaluate theoretical notions such as focus, contrastive topic, or non-at-issue content. For instance, we have suggested a number of practical applications for contrastive topics, or we have pointed out how to identify focus

constituents in embedded sentences. On the other hand, being independent from linguistic form, our methodology has two important applications. Firstly, it constitutes a valuable instrument to identify the exact information structure of an utterance when the linguistic means to express it are underspecified or unclear. As an example, consider French subject clitic left dislocations (*Maman, elle était soudeuse* ‘Mum, she was a welder’). The interplay between syntax, prosody and the pragmatic function of the “dislocated” subject NP is not clear and the NP can be a topic, a contrastive topic, or part of the focus (see Brunetti et al. 2012 for discussion, and references quoted in there). Naturalistic data that are independently annotated according to our scheme would provide a powerful resource to understand which syntactic and, more importantly, prosodic markings might be related to the different pragmatic functions of the dislocated subject. Speaking more generally, annotated spoken corpora can be used to complement existing laboratory-phonetic investigations on the prosody of various languages, which typically rely on constructed data.

Secondly, our research constitutes a valuable instrument to discover and analyze linguistic means to express information structure. This point is particularly important if a language is poorly described. For instance, a straightforward recipe for fundamental research in the domain of the information structure of lesser-described languages would be to annotate a body of data gathered in fieldwork using our method, to formulate a hypothesis about the default constituent order (of agent, verb, and patient in intransitive clauses, for instance), and to test whether deviations from the default are correlated with specific constellations of the annotated information-structural categories. Inversely, the annotation procedure can help to single out specific information-structural patterns and lead to hypotheses on their potential linguistic marking. As an illustration, consider Example (37) from Sumbawa, a Malayo-Polynesian (Austronesian) language spoken in Indonesia.

(37) [Sumbawa, Shiohara (forthcoming)]

Q3: {What if we eat pork undeliberately or knowingly?}

> Q3.1: {What if we do it undeliberately?}

>> A3.1’: [lamin [nongka tu=sangaja]_{CT} [no sikuda]_F]~
if neg.pst 1pl=act.deliberately neg problem
 ‘If we don’t act deliberately, it is no problem.’

> Q3.2: {What if we do it knowingly?}

>> A3.2: tapi [lamin [ka=tu=to]_{CT} [kan]_{nai} [no roa]_F [dean nan]_T]~
but if pst=1pl=know you.know neg comfortable the that

‘but if we know, we are not comfortable with that, right?’

This example shows a very clear case of complex parallelism. QUD and information structure annotations on data from this language will therefore be a valuable starting point to make hypotheses concerning the marking of such a pragmatic construction in Sumbawa.

Finally, this research may provide the opportunity to study the characteristics of texts themselves, namely their coherence and clarity, their genre, etc. Do the speakers answer explicit questions or rather their own implicit ones? Does a speaker return to her original question or not? Is the discourse actually a set of separate mini-discourses? etc. The QUD-structure may also help identifying the specific features of different text genres. For instance, a narrative text might be recognizable by the high frequency of parallel topic-sharing assertions. By contrast, we may suppose that an expository or descriptive text will contain more variety concerning both the presence of subquestions and the depth of their embedding, or that an argumentative text will contain more parallel structures with two variables, which help expressing contrast and comparison. We will leave such a thorough investigation of possible links between QUD structures and genuine text properties to future research.

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Appendix 1

The following corpora have been or are currently in the process of being analyzed/annotated for discourse and information structure, using QUDs (amount of data indicated).

CFPP2000: Parisian Spoken French Corpus (Branca-Rosoff et al. 2012); French interviews to inhabitants of different districts of Paris, about life in their district. Two interviews of 47 minutes and 70 minutes are currently being annotated.

EUR: Europe corpus (Portes 2004); French radio conversation, ca. 45 minutes (completely annotated).

SWR: Stuttgart SFB 732 Silver Standard Collection (Eckart and Gärtner 2016); German radio interviews from SWR2 public radio (*Interview der Woche*, 13 interviews of 10 minutes each are currently being annotated, in total 24,114 word tokens, 1,356 sentences).

SNO: Interview with Edward Snowden (English), ARD TV, January 2014 (various sections annotated).

Some scattered examples were also taken from written texts and web resources (see examples in the text for specific references) as well as from the following corpora:

DIRNDL: German radio news corpus (Eckart et al. 2012)

STUTTGART21: German panel discussion, Phoenix TV, Oct – Nov 2010

Appendix 2: Summary of instructions

- a) Read the entire text carefully and make sure to understand what it is about and whether it makes sense.
- b) Segment the text at sentence boundaries and at sentence-level conjunctions so to isolate assertions.
 - b') Do not separate sentential arguments from their verbal heads.
 - b'') Separate sentence-final adjuncts from their verbal heads.
 - b''') Segment coordinated units. It is helpful to reconstruct elided material.

- c) For each assertion, formulate the respective QUD, in accordance with the principles below:

Q-A-CONGRUENCE:

QUDs must be answerable by the assertion(s) that they immediately dominate.

MAXIMIZE-Q-ANAPHORICITY:

Implicit QUDs should contain as much given material as possible.

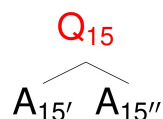
Q-GIVENNESS:

Implicit QUDs can only consist of given (or, at least, highly salient) material.

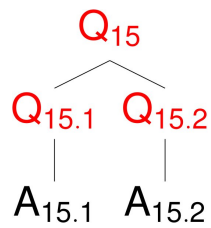
Specific instructions:

- c') An assertion at the very beginning of a text should be preceded by a very general QUD, such as: *What is the way things are?*,
 - c'') An explicit question may coincide with the QUD, if the answer is congruent with it.
- d) Parallelism

- d') Find a common QUD for two or more assertions such that it contains “the lowest common denominator” of all the answers, i.e. semantically constant elements (including synonymous or coreferent material) that are contained in all answers, while the alternating parts are replaced by a wh-phrase. Structure:



- d'') Parallel assertions that vary in two syntactic positions give rise to a structure with a superquestion and a subquestion for each of the assertions:



e) Non-at-issue (nai) content (relative to Q)

An expression X whose denotation is discourse-new and which is contained in an assertion A is non-at-issue with respect to the current QUD Q iff X is optional with respect to Q , where optional means that under deletion of X , A is still an answer to Q

Typical nai content:

- e') *supplements*: parentheticals, non-restrictive modifiers and other adjunct-like material.
- e'') *evidentials* and other speaker-oriented material

f) Information structure, label inventory

Tag	Definition
<i>Focus (F)</i>	The part of a clause that answers the current QUD
<i>Focus domain (~)</i>	A piece of discourse containing both a focus and, usually, some background. In general, the focus domain directly corresponds to the QUD. If a sentence isthetic (i.e. all-focus), the focus and focus-domain coincide, and the respective QUD is of the kind <i>What happened?</i> or <i>What is the way things are?</i>
<i>Background</i>	The non-focal part of a focus domain (that part which is already mentioned in the current QUD)
<i>(Aboutness) topic (T)</i>	A referential entity (“term”) in the background which constitutes what the utterance is about.
<i>Contrastive topic (CT)</i>	The instantiation of a variable within the background, which signals the existence of a superquestion-subquestion discourse structure. CTs are backgrounded w.r.t the subquestion and focal with respect to the superquestion.
<i>Non-at-issue content (nai)</i>	The part of a clause which provides optional information with respect to the current QUD

Table 1 Inventory of information-structure labels

Appendix 3

An example annotation

(38) [English, SNO]

Hubert Seipel, journalist:

Q₁: Mr Snowden did you sleep well the last couple of nights?

> Q₂: {Why is the interviewer asking this question about Snowden?}

>> Q_{2.1}: {What about Snowden?}

>>> A_{2.1'}: because [I was reading that]_{nai} [[you]_T [asked for a kind of police protection]_F].~

>>> Q₃: Are there any threats?

>>>> Q_{3.1}: {What kind of threats are there to Snowden?}

Edward Snowden:

>>>>> A_{3.1'}: [There are [significant]_F threats]~

>>>>> Q₄: {How does Snowden sleep, given these threats?}

>>>>>> A₄: but [[I]_T sleep [I]_T sleep [very well]_F].~

>>>>> A_{3.1''}: [There was [an article that came out in an online outlet called Buzz Feed]_F].~

>>>>> Q₅: {What officials did they interview in that article?}

>>>>>> A_{5'}: [[where]_T [they]_T interviewed officials [from the Pentagon]_F].~

>>>>>> A_{5''}: [[they]_T interviewed officials [from the National Security Agency]_F].~

>>>>>> Q₆: {What did the reporters allow these people to do in these interviews?}

>>>>>>> A₆: and [[they]_T [gave]_F [them]_T [anonymity]_F].~

>>>>>>> Q₇: {Why did they give them anonymity?}

>>>>>>>> A₇: [[to be able to say what]_F [they]_T [want]_F].~

>>>>>>>> Q₈: {What did these people tell the reporter that they wanted to do with Snowden?}

>>>>>>>>> A_{8'}: and [what [they]_T told the reporter was that [they]_T wanted [to murder]_F [me]_T].~

>>>>>>>>>> A_{8''}: [[These individuals]_T [- and these are acting government officials -]_{nai} [they]_T said [they]_T would be happy, they would love [to put a bullet in]_F [my]_T [head]_F].~

>>>>>>>>> A₈^m: [[to poison]_F [me]_T]~

>>>>>>>>> Q₉: {When would they want to poison Snowden?}

>>>>>>>>> A₉: [as [I]_T [was returning from the grocery store]_F]~

>>>>>>>>> A₈^{iv}: and [[have] [me]_T [die]_F]~

>>>>>>>>> Q₁₀: {Where would they have him die?}

>>>>>>>>> A₁₀: [in the shower]_F]~

Journalist:

>>> A_{2.1}[']: But [fortunately]_{nai} [[you]_T [are still alive with us]_F]~ .

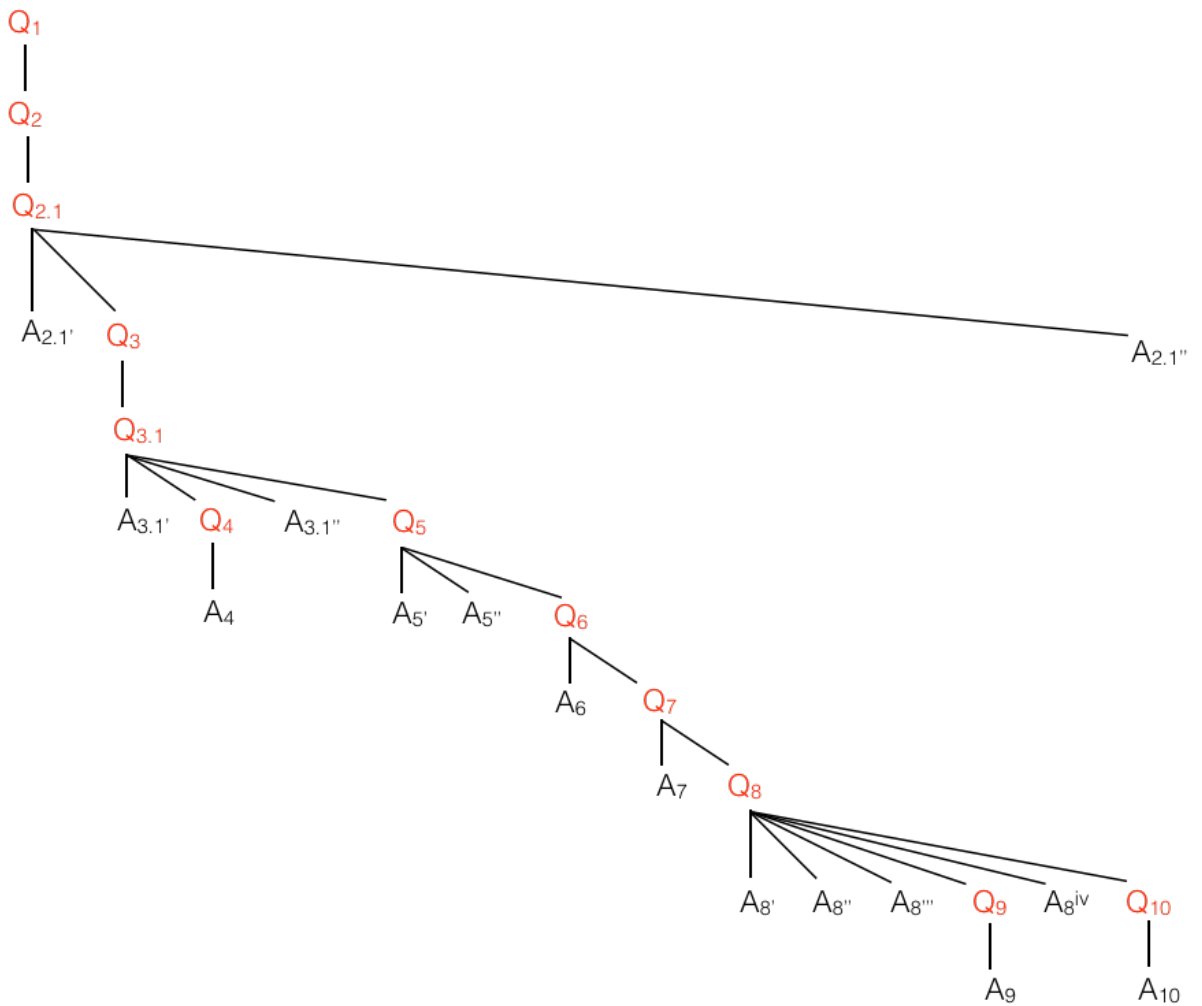


Figure 7. QUD-tree of Example (38)