Semantic opposition coordination: An argument for good-questionhood

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Abstract. This paper studies coordination by *whereas* and "semantic opposition" *but*, and asks to what extent the conjuncts should parallel and differ from each other. I argue for a question-based analysis in line with Jasinskaja and Zeevat (2008, 2009) and Toosarvandani (2014) but also with key differences from them: *whereas* requires there to be a question under discussion (QUD) whose subquestions are *good questions* that are then answered by the clauses combined by *whereas*. This analysis is motivated by novel data that point to a strong correlation between the felicity of *whereas*-sentences and the felicity of its conjuncts as direct answers to the QUD. The finding of a dedicated lexical item *whereas* for semantic opposition suggests that semantic opposition is a distinct use of *but*, supporting Toosarvandani (2014). *Whereas*- and *but*-coordination shows the linguistic and cognitive reality of the notions of good-questionhood and informativeness, which the felicity of these coordinated structures depends on. This paper also provides a new diagnostic of question-answerhood that relies not on question-answer pairs, but on *whereas*- and *but*-sentences, declarative sentences that are nevertheless closely related to question-answering.

Keywords: question under discussion, semantic opposition, informativeness, good question, partition theory of questions, *whereas*, *but*, coordination.

1. Introduction

Whereas combines clauses that contrast with each other in two parts. I call those clauses *conjuncts* of *whereas*. (1) is an example of a *whereas*-sentence whose conjuncts contrast in the subject and polarity (contrasts are underlined).

(1)   Oleg bought a Ferrari, whereas Roma didn't.

This paper investigates the constraints on the conjuncts of *whereas* by asking how much contrast is allowed and required between them, with a focus on novel data of *whereas*-sentences that are less parallel than (1), such as (2) and (3):

(2)   Oleg bought a Ferrari, whereas Roma couldn't even find a car dealer.

(3)   #Oleg met a girl who bought a Ferrari, whereas she (=the girl Oleg met) didn't buy a Chevy.

Close examination of these examples leads to a question-based analysis in line with Jasinskaja and Zeevat (2008, 2009) and Toosarvandani (2014) but also with key differences from them: *whereas* requires there to be a question under discussion (QUD) whose subquestions are *good questions* that are then answered by the conjuncts of *whereas*. This analysis is based on the observation that there is a strong correlation between the felicity of *whereas*-sentences and the felicity of its conjuncts as direct answers to the QUD. For example, I will argue that (1) is felicitous because its conjuncts are felicitous answers to the questions in (4)–(5), and these questions are also appropriate questions to ask given the contexts.

(4)   Q: Who bought a Ferrari? Did Oleg buy a Ferrari?
       A: (Yes,) Oleg bought a Ferrari.

(5)   Q: Who bought a Ferrari? Did Roma buy a Ferrari?
        A: (No,) Roma didn't buy a Ferrari.

Conversely, if there is no QUD that the conjuncts of a *whereas*-sentence can answer felicitously, then the *whereas*-sentence is infelicitous. For example, I will argue that the infelicity of (3) is the result of failure to find a felicitous QUD to license it. The two most promising QUD candidates for (3) both fail to be good questions for its conjuncts: in one case, the question we find contains a presupposition trigger like *the* but the answer (i.e. the first conjunct of (3)) does not (6); in the other case, the reverse is true–the question doesn't use a presupposition trigger but the answer (i.e. the second conjunct of (3)) does (7). With default prosody on the answers, the dialogues are odd in both cases.

(6)   Q: Did the girl that Oleg met buy a Ferrari?
        A: #Oleg met a girl who bought a Ferrari.

(7)   Q: Did Oleg meet a girl who bought a Ferrari?
        A: #The girl that Oleg met didn't buy a Ferrari.

After noting the direct connection between the (in)felicity of *whereas*-sentences and the (in)felicity of the corresponding question-answer pairs, I suggest an explanation for why the dialogues in (6) and (7) are odd: they are odd not because the answers are odd as Doron and Wehbe (2022) claimed, but rather because the questions are odd questions to ask in the respective contexts. For example, by using an indefinite, the answerer in (6) suggests that they do not accept the question's presupposition that Oleg only met one girl, and thus this question is not appropriate in the answerer's opinion.

My analysis has three implications. First, I observe that *whereas* has the same meaning as a use of *but* called *semantic opposition*. My finding that *whereas* is dedicated for semantic opposition suggests that semantic opposition is a distinct use of *but*, and is distinct from its other uses, supporting Toosarvandani's (2014) three-way distinction of the meanings of *but*.

Second, there have been many different proposals about how well an answer may address a question (e.g. relevance and good-answerhood by Groenendijk and Stokhof 1984; informativeness, licensing and pertinence by Groenendijk 1999). This paper argues for the linguistic and cognitive reality of *informativeness* and *good-questionhood* by showing that the felicity and infelicity of semantic opposition coordination crucially depends on these notions.

Finally, judgments in question pragmatics have traditionally relied on intuitions about question-answer pairs. Using the observation of a close correlation between the (in)felicity of *whereas*-sentences and the (in)felicity of question-answer pairs, I provide a new diagnostic of answerhood based on *whereas*-sentences, declarative sentences that are nevertheless closely related to question-answering, adding to the growing literature that does so (e.g. AnderBois 2016).

Section 2 shows that *whereas* has the same meaning as semantic opposition *but*, and thus the current analysis also applies to semantic opposition *but*. Section 3 introduces the necessary background and the two main approaches in the literature to semantic opposition *but*, and section 4 presents novel data that challenge those two approaches. This then leads to the current proposal in section 5. Section 6 concludes the paper.

2. *Whereas* **is equivalent to the semantic opposition use of** *but*

English *whereas* has not been discussed before in the literature to my knowledge, but it is closely related to the semantic opposition use of *but*, which was examined in many languages (e.g. Blakemore 1989; Lakoff 1971; Sæbø 2003; Umbach 2004, 2005; Jasinskaja and Zeevat 2008, 2009; Jasinskaja 2010, 2012; Winterstein 2010a, 2010b). The previous proposals for that use of *but* are therefore relevant to the current analysis of *whereas*, which I will review in the next section. But before doing so, I first provide some background on *but* that will be relevant to that discussion.

But in English can have many different meanings. Toosarvandani (2014) claimed that *but* has at least three different uses: *counterexpectation* (8), *correction* (9) and *semantic opposition* (10). The first conjunct of counterexpectational *but* creates an expectation that is rejected by the second conjunct. For example, the first conjunct of (8a) creates the expectation that the player is clumsy, and the second conjunct rejects this expectation. In contrast, the first conjunct of semantic opposition and corrective *but* does not have to create an expectation: the first conjunct in (9a) does not necessarily give rise to the expectation that Liz doesn't sing, and neither does the first conjunct of (10a) have to lead to the expectation that Roma bought a Ferrari. According to Toosarvandani (2014), the conjuncts of correction and semantic opposition must be *doubly distinct*–they involve contrasts in polarity and a constituent. Correction and semantic opposition differ in where negation occurs: the first conjunct of correction has to contain negation, while there is no such requirement in semantic opposition.

(8) *Counterexpectational* but
    a.   The player is tall but agile.   (Toosarvandani, 2014: 6)
    b.   We were hungry, but the restaurants were closed.
    c.   It's raining, but I'm going to take an umbrella.   (Winter and Rimon, 1994: 369)

(9) *Corrective* but
    a.   <u>Liz</u> does<u>n't</u> <u>dance</u>, but <u>sing</u>.   (Toosarvandani, 2014: 3)
    b.   #Liz <u>dances</u>, but <u>sings</u>.

(10) *Semantic opposition* but
    a.   <u>Oleg</u> bought a Ferrari, but <u>Roma</u> <u>didn't</u>.
    b.   Oleg <u>bought</u> a <u>Ferrari</u>, but he <u>didn't</u> buy a <u>Chevy</u>.
    c.   Oleg <u>bought</u> a <u>Ferrari</u>, but <u>Roma</u> bought a <u>Chevy</u>.

One piece of evidence that counterexpectation and correction are distinct uses is that many languages use distinct lexical items for these two meanings (e.g. German *aber* vs. *sondern,* Pusch 1975; Abraham 1979; Lang 1984; Hebrew *aval* vs. *ela,* Dascal and Katriel 1977; Spanish *pero* vs. *sino*, Schwenter 2000; Vicente 2010; Persian *vali / amma* vs. *balke*, Toosarvandani 2010). Furthermore, Winter and Rimon (1994) observed that English *yet*, *although* and *nevertheless* are dedicated for counterexpectation. But to my knowledge, there has been no such evidence for the distinctness of semantic opposition–lexical items dedicated for semantic opposition have not received much discussion.[1] This paper claims that English *whereas* is precisely such a lexical item–it has identical behavior to semantic opposition *but*:

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[1]The closest work I am aware of is Jasinskaja and Zeevat (2009), who argued that Russian *a* has both semantic opposition and corrective uses.

(11)   a.   Oleg <u>bought</u> a Ferrari, whereas <u>Roma</u> <u>didn't</u>.
        b.   Oleg <u>bought</u> a <u>Ferrari</u>, whereas he <u>didn't</u> buy a <u>Chevy</u>.
        c.   Oleg <u>bought</u> a <u>Ferrari</u>, whereas <u>Roma</u> bought a <u>Chevy</u>.

Crucially, *whereas* does not have the counterexpectational or corrective use: the first conjunct of *whereas* does not give rise to an expectation that is rejected by the second (12), and does not have to contain negation like the first conjunct of corrective *but* (11).

(12)   a.   #The player is tall, whereas he is agile.
        b.   #We were hungry, whereas the restaurants were closed.

The fact that there exists a lexical item dedicated for semantic opposition lends support to Toosarvandani's (2014) three-way distinction of the meanings of *but*, in particular that semantic opposition is a distinct use from the other two. Furthermore, because *whereas* only has the semantic opposition use, this makes *whereas*-sentences a better place to study the behavior of semantic opposition than *but*-sentences because we do not have the confounds of the other uses of *but*. Therefore, this paper will use *whereas* in all the examples for clarity, but my analysis applies to semantic opposition *but* as well.

The literature on semantic opposition focuses on sentences whose conjuncts are largely parallel except for double contrast like (10)–(11) (Jasinskaja and Zeevat 2008, 2009; Toosarvandani 2014). This paper examines less parallel sentences like (2) and (3), and argues based on them that the conjuncts of semantic opposition not only need to be doubly distinct, but they need to answer the QUD, and this QUD must be an appropriate question for the conjuncts.

3. Background and the literature

This section presents the two main approaches to semantic opposition in the literature–Jasinskaja and Zeevat (2008, 2009) and Toosarvandani (2014). Both approaches related the conjuncts of semantic opposition to a conversational topic that is represented by a question, which Toosarvandani 2014 modeled as a QUD. I will therefore present these two approaches in the QUD framework and the partition theory of questions because they will help us highlight and understand the difference between these two approaches.[2] To begin, this section will first review the necessary background on QUD and questions as partitions.

3.1. Background on QUD

Following Stalnaker (1978), Roberts' (1996; 2006) QUD framework assumed that the main goal of discourse is to discover and share information about the world we live in (i.e. to answer the big question *What's the way things are?*). Following Hamblin's (1973) question semantics, Roberts distinguished between two ways to answer a question:

(13)   a.   A *complete answer* to a question contextually entails an evaluation of truth or falsity for every member of the set of possible answers to the question.
        b.   A *partial answer* to a question contextually entails an evaluation of truth or falsity for at least one member of the set of possible answers to the question.

As interlocutors look for complete or partial answers to that big question, they may follow

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[2]Jasinskaja and Zeevat (2008, 2009) did not follow the QUD framework, and neither approach followed the partition theory of questions, but they can be converted into these theories.

a *Strategy of Inquiry* and divide the QUD into logically related subquestions that are easier to answer. Subquestions are *entailed* by the superquestion, with entailment being defined as below:

(14)   *Question entailment*
         A question q_1 entails another question q_2 iff giving a complete answer to q_1 yields a complete answer to q_2.

With these basic tools in hand, let us apply them to a simple case with two salient individuals, Oleg and Roma, and two types of cars to buy, Ferrari and Chevy. Consider the *wh*-question *What did Oleg buy?*, which denotes the set {'Oleg bought a Ferrari', 'Oleg bought a Chevy'}. Also consider the polar question *Did Oleg buy a Ferrari?*, which denotes the set {'Oleg bought a Ferrari'}. *Oleg bought a Ferrari but not a Chevy* is a complete answer to the *wh*-question, and also a complete answer to the polar question. Therefore, the *wh*-question entails and is a superquestion of the polar question. We can run this exercise with many other questions, and build the question tree in Figure 1.
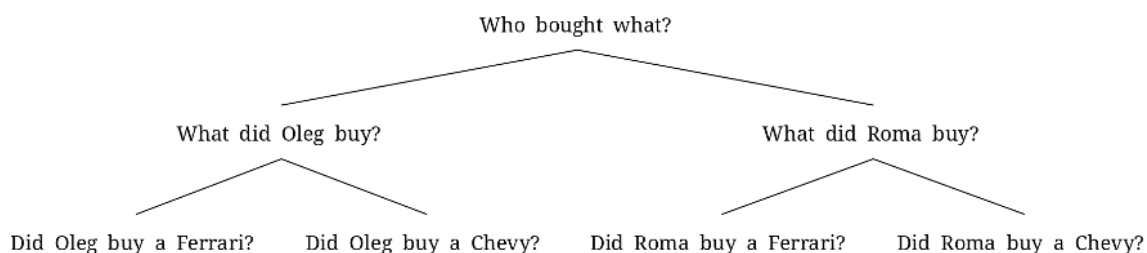

Figure 1: An example of Strategy of Inquiry

Figure 1 represents quite a regular way of dividing a question into subquestions, where none of the questions involves any presupposition. This sort of QUD structure has been the focus of the literature on semantic opposition. But there can be less regular QUD structures that involve presuppositions. For example, the *wh*-question *What did the girl that Oleg met buy?* presupposes that Oleg met only one girl, and so does the polar question *Did the girl that Oleg met buy a Chevy?*. I call this polar question *PQ1*. PQ1 is a subquestion of the *wh*-question because *The girl that Oleg met bought a Ferrari but not a Chevy* is a complete answer to the *wh*-question, and also a complete answer to PQ1.

Crucially, the superquestion may contain a presupposition that the subquestion does not have. Consider the polar question *Did Oleg meet a girl who bought a Ferrari?*, which does not presuppose that Oleg met only one girl. I call this polar question *PQ2*. The *wh*-question *What did the girl that Oleg met buy?* is a superquestion of PQ2 in Roberts' sense because *The girl that Oleg met bought a Ferrari but not a Chevy*, a complete answer to the *wh*-question, is also a complete answer to PQ2: it entails that Oleg met a girl who bought a Ferrari, one of the members of the set denoted by PQ2. Since both PQ1 and PQ2 are subquestions of the *wh*-question *What did the girl that Oleg met buy?*, we can make PQ1 and PQ2 sisters in the question tree, which leads us to Figure 2.

Figure 2 is a good tree because all the mother nodes are superquestions of their respective daughters. This will be important later in section 5, where I argue that *whereas* imposes restric-
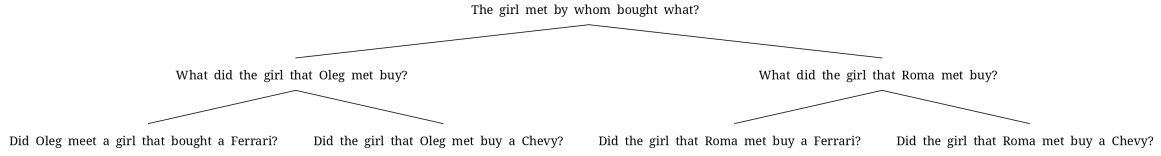
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                                    The girl met by whom bought what?
              _____|_____
             |                                                       |
  What did the girl that Oleg met buy?                    What did the girl that Roma met buy?
       _____|_____                                           _____|_____
      |             |                                         |             |
Did Oleg meet a    Did the girl that              Did the girl that      Did the girl that
girl that bought   Oleg met buy a Chevy?          Roma met buy a Ferrari? Roma met buy a Chevy?
a Ferrari?
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Figure 2: A less regular example of Strategy of Inquiry

tions on what sorts of questions its conjuncts can answer–those questions have to involve the same presuppositions or no presupposition at all like in Figure 1 but not in Figure 2.

3.2. Partition theory of questions

Stalnaker (1978) proposed that in conversations, interlocutors build a common ground of propositions they publicly and collectively accept as true. This idea can be simplified to a context set, the set of worlds compatible with all the propositions in the common ground. Jäger (1996), Hulstijn (1997) and Groenendijk (1999) applied partition semantics (Groenendijk and Stokhof 1984) to questions, and developed the idea that questions partition this context set to help us determine in which cell of the partition our world is located.

For our purposes, we can assume that a polar question ϕ? partitions the context set into two cells ϕ and $\neg\phi$. Given this partitioned context set, an assertion proposes an update to it. Here are two possible ways an assertion may update it: it may select exactly one cell (Figure 3a; *precise answer*), or a proper subset of a cell (Figure 3b; *over-informative answer*). The precise answers and over-informative answers have something in common: they eliminate at least one of the cells in the partition set by the question. Thus, I call precise and over-informative answers together as *informative answers*, following Groenendijk (1999) and Doron and Wehbe's (2022) terminology. [3]
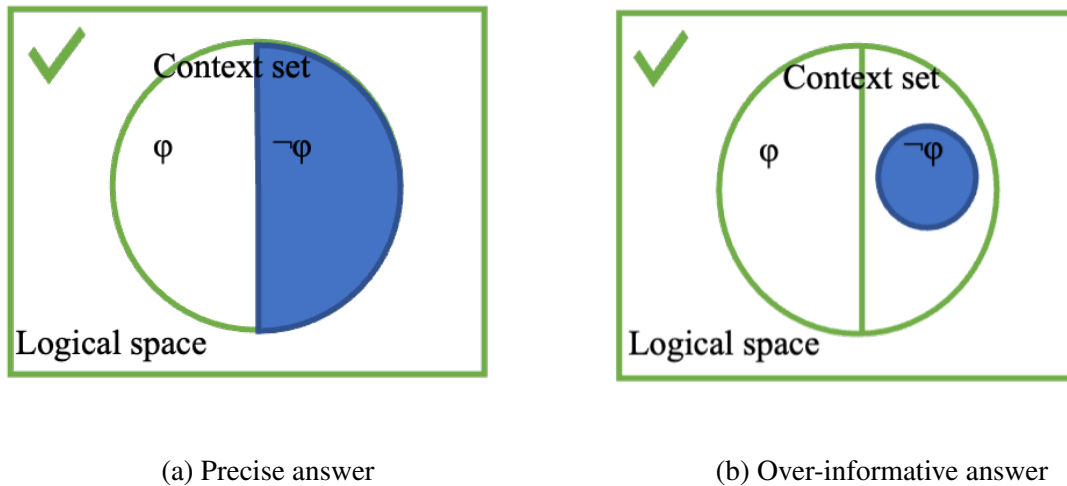

(a) Precise answer   (b) Over-informative answer

Figure 3: Two ways to answer a polar question

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[3]For a polar question which partitions the context set into two cells, to eliminate at least one of its cells is equivalent to evaluating the truth or falsity for at least one cell, thus equivalent to Roberts' (1996) *partial answer*. I will still call the precise and over-informative answers *informative* in this paper, but for the purposes of answering a polar question, they are equivalent to partial answers.

I demonstrate these two types of answers with (15):

(15)   Q: Did Roma buy a Ferrari?
        A1: He didn't.   *precise answer; Figure 3a*
        A2: He couldn't even find a car dealer.   *over-informative answer; Figure 3b*

The polar question ϕ? in (15Q) partitions the context set into two cells ϕ and $\neg\phi$ (Figure 4). (15A1) is a precise answer to this polar question because it selects $\neg\phi$. (15A2) is an over-informative answer because it selects a proper subset of $\neg\phi$ (i.e. the set of worlds in which Roma didn't buy a Ferrari and he couldn't find a car dealer). (15A2) entails $\neg\phi$ because of *even*, which under negation triggers the presupposition that Roma finding a car dealer was the most likely event to happen, and that no alternative event (specifically, Roma buying a Ferrari) occurred.
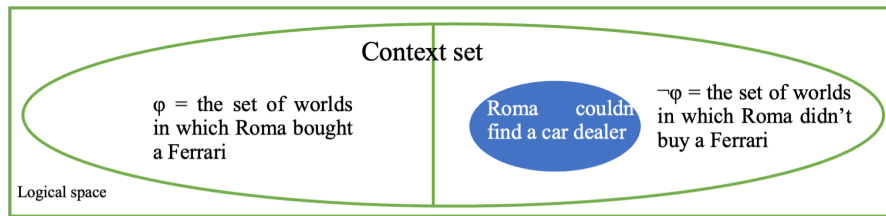

Figure 4: Partitions induced by *Did Roma buy a Ferrari?*

3.3. Existing analyses of semantic opposition

Having introduced the necessary background on QUDs and questions as partitions, I present two approaches to semantic opposition in the literature–Jasinskaja and Zeevat (2008, 2009) and Toosarvandani (2014).

3.3.1. Jasinskaja and Zeevat's (2008, 2009) precise-answer approach

Jasinskaja and Zeevat's (2008, 2009) proposal, when converted into the QUD framework and the partition theory of questions, requires the conjuncts of semantic opposition coordination to be precise answers to the polar questions entailed by the QUD.[4] I thus call it *the precise-answer approach*.

Following Toosarvandani's (2014) interpretation of their proposal, we may assume that the QUD answered by a semantic opposition sentence is a single *wh*-question (in the case of (1), *Who bought a Ferrari?*), and then divide this QUD into two polar questions with the Strategy of Inquiry (for (1), *Did Oleg buy a Ferrari? Did Roma buy a Ferrari?*). Each conjunct of *whereas* or semantic opposition *but* should contrast in polarities, and answer a polar question – that is, the first conjunct should be the positive precise answer to *Did Oleg buy a Ferrari?*, and the second conjunct should be the negative precise answer to *Did Roma buy a Ferrari?*).

The QUD is often implicit in conversations, and as we will see later in section 4.1, even when an example does provide an explicit leading question, the QUD may still be shifted to a slightly

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[4]Jasinskaja and Zeevat did not provide a formal definition of what an answer is, and I follow Toosarvandani's (2014) interpretation as a precise answer.

different one. Therefore, when a linguist tries to find out Jasinskaja and Zeevat's prediction for a *whereas*-sentence, they try to find a QUD that would satisfy Jasinskaja and Zeevat's condition given the *whereas*-sentence. If they can find at least one QUD that could satisfy Jasinskaja and Zeevat's condition, then the sentence is predicted to be good (in at least the context with that QUD). If they cannot find *any* QUD that could satisfy Jasinskaja and Zeevat's condition, then the sentence is predicted to be bad. Therefore, it only takes a good QUD for a *whereas*-sentence to be good, but it requires rejecting every potential QUD to predict a *whereas*-sentence to be bad. It may seem like a lot of work to rule out a *whereas*-sentence, but as we will see later, we only need to reject the most promising QUDs, which are usually just two QUDs due to the shape of the conjuncts. Therefore, incorporating these points, following is Jasinskaja and Zeevat's (2008, 2009) precise-answer approach:

(16)   *Jasinskaja and Zeevat's (2008, 2009) precise-answer approach*
       Semantic opposition coordination *p whereas/but q* is felicitous iff there is a QUD that entails two polar questions Q_1 and Q_2, and p is a positive precise answer to Q_1, and q is a negative precise answer to Q_2.

I develop and demonstrate a procedure for a linguist to check Jasinskaja and Zeevat's predictions for *whereas*-sentences, using (1) as an example. First, they choose a potential QUD, a single *wh*-question that (1) may address–*Who bought a Ferrari?*. In a context with two salient individuals, Oleg and Roma, this QUD can be divided into two polar subquestions *Did Oleg buy a Ferrari? Did Roma buy a Ferrari?*. Then they check if the first conjunct is the positive precise answer to the first polar question, and the second conjunct the negative precise answer to the second, and indeed they are. Because we can find at least one QUD that can satisfy Jasinskaja and Zeevat's condition, they would predict (1) to be felicitous, which is the case.

(17)   *The precise-answer approach to (7a)*
       Oleg <u>bought</u> a Ferrari, whereas <u>Roma</u> <u>didn't</u>.
       Step 1. *Find a potential QUD*: Who bought a Ferrari?
       Step 2. *Divide the QUD into two polar questions*: Did Oleg buy a Ferrari? Did Roma buy a Ferrari?
       Step 3. *Check if the first conjunct is the positive precise answer to the first polar question*: ✓
       Step 4. *Check if the second conjunct is the negative precise answer to the second polar question*: ✓

3.3.2. Toosarvandani's (2014) informative-answer approach

Toosarvandani (2014: fn 19) claimed that the precise-answer approach fails to account for semantic opposition sentences with antonyms rather than polarity contrast:

(18)   <u>John</u> is <u>quick</u>, whereas <u>Bill</u> is <u>slow</u>.   (Based on Winter & Rimon 1994:373)

According to Toosarvandani, there is no QUD such that the conjuncts of (18) are the precise answers to its polar subquestions. He did not provide further explanation, but here is my interpretation of his point, following the stepwise procedure I developed: a potential QUD is *Who is quick?*, which can be divided into two polar questions *Is John quick?* and *Is Bill quick?*. The second conjunct of (18) is not the negative precise answer to the second polar question *Is Bill*

quick? because *Bill is slow* is not equivalent to *Bill is not quick*, as someone can be neither quick nor slow.

Due to this issue, Toosarvandani revised Jasinskaja and Zeevat's precise-answer approach to the following: the conjuncts of semantic opposition coordination must *entail* precise answers to the polar questions entailed by the QUD. As Figure 3 showed, entailment of a precise answer to the polar question is equivalent to eliminating at least one cell in the partition, which was defined as an informative answer. I thus call Toosarvandani's approach *the informative-answer approach*:

(19)   *Toosarvandani's (2014) informative-answer approach*
Semantic opposition coordination *p whereas/but q* is felicitous iff there is a QUD that entails two polar questions Q_1 and Q_2, and p is a positive informative answer to Q_1, and q is a negative informative answer to Q_2.

This can account for (18) because the first conjunct is (and trivially entails) the positive precise answer to the first polar question *Is John quick?* The second conjunct entails that Bill is not quick, which is the negative precise answer to the second polar question *Is Bill quick?* Following is the complete stepwise derivation of the prediction:

(20)   *The informative-answer approach to (18)*
<u>*John*</u> *is* <u>*quick*</u>*, whereas* <u>*Bill*</u> *is* <u>*slow*</u>*.*
Step 1. *Find a potential QUD*: Who is quick?
Step 2. *Divide the QUD into two polar questions*: Is John quick? Is Bill quick?
Step 3. *Check if the first conjunct entails the positive precise answer to the first polar question*: ✓
Step 4. *Check if the second conjunct entails the negative precise answer to the second polar question*: ✓

It is worth mentioning that the precise-answer approach can account for (18) if we divide the QUD *Who is quick?* into these two less parallel subquestions *Is John quick?* and *Is Bill not slow?* instead, as is demonstrated by the derivations below. *Is Bill not slow?* is a subquestion of *Who is quick?* because *Bill is quick and John is not quick*, a complete answer to *Who is quick?*, is also a complete answer to *Is Bill not slow?*: it entails the truth of 'Bill is not slow', a member of the set denoted by the polar question.

(21)   *The precise-answer approach to (18)*
<u>*John*</u> *is* <u>*quick*</u>*, whereas* <u>*Bill*</u> *is* <u>*slow*</u>*.*
Step 1. *Find a potential QUD*: Who is quick?
Step 2. *Divide the QUD into two polar questions*: Is John quick? Is Bill not slow?
Step 3. *Check if the first conjunct is the positive precise answer to the first polar question*: ✓
Step 4. *Check if the second conjunct is the negative precise answer to the second polar question*: ✓

Therefore, we may not need to revise the precise-answer approach as Toosarvandani suggested, if we could divide the *wh*-QUD into slightly less parallel polar questions. As we will see in section 5, however, *whereas* requires the QUD to be divided into completely parallel polar questions like the tree in Figure 1 (and the definition of "parallelism" will be introduced then),

thus ruling out the derivation in (21). Once the derivation in (21) is ruled out, Toosarvandani's argument against the precise-answer approach holds, which motivates his informative-answer approach. Therefore, for now I will not consider the option of dividing the QUD into nonparallel polar questions.

4. Novel evidence that challenge both the precise-answer approach and the informative-answer approach

Having introduced the two proposals to semantic opposition and in particular the evidence that supports Toosarvandani's informative-answer approach but not Jasinskaja and Zeevat's precise-answer approach, this section will provide a piece of novel evidence that also does that. Then I will present novel evidence that even the informative-answer approach fails to account for. But before presenting the novel evidence, I first discuss what can be taken as the QUD addressed by semantic opposition coordination given the context, a question essential to the analysis of semantic opposition but not discussed before in the literature.

4.1. The QUD can be shifted

To control for the QUD, some examples in the literature provide a leading question to a semantic opposition sentence, with the implicit assumption that the leading question is the QUD addressed by the semantic opposition sentence. Following is such an example from Toosarvandani (2014: 45):

(22)   Q: Who is tall? Is John tall? Is Bill tall?
        A: John is tall, but Bill is not tall.

But even when provided with an overt leading question, that does not have to be the QUD addressed by the semantic opposition sentence. (23A) is felicitous, but if we assume that the QUD that its conjuncts should answer is (23Q), then it does not satisfy the informative-answer approach.

(23)   Q: Who is tall? Is John tall? Is Bill tall?
        A: John is tall, whereas I don't know whether Bill is tall or not.

As the following derivation shows, the problem is the second conjunct, which does not entail the negative precise answer to the second polar question *Is Bill tall?*.

(24)   *The informative-answer approach to (23A)*
        John is tall, whereas I don't know whether Bill is tall or not.
        Step 1. *Find a potential QUD*: Who is tall?
        Step 2. *Divide the QUD into two polar questions*: Is John tall? Is Bill tall?
        Step 3. *Check if the first conjunct entails the positive precise answer to the first polar question*: ✓
        Step 4. *Check if the second conjunct entails the negative precise answer to the second polar question*: ✗!

I argue that (23A) is fine because its conjuncts address a different QUD *Do you know if John and Bill are tall?* The second conjunct is and therefore entails the negative precise answer to the second polar question; the speaker's utterance of the first conjunct entails the positive precise answer to the first polar question.

(25)   *The informative-answer approach to (23A)*
John is tall, whereas I don't know whether Bill is tall or not.
Step 1. *Find a potential QUD*: Do you know if John and Bill are tall?
Step 2. *Divide the QUD into two polar questions*: Do you know if John is tall? Do you know if Bill is tall?
Step 3. *Check if the first conjunct entails the positive precise answer to the first polar question*: ✓
Step 4. *Check if the second conjunct entails the negative precise answer the second polar question*: ✓

Therefore, the QUD addressed by a semantic opposition sentence does not have to be explicitly provided. Even if a question may be explicitly provided, the answerer can still shift the QUD to a different one, and address that with a semantic opposition sentence instead. This requires linguists to go through every possible QUD for a given semantic opposition sentence, even in situations where a leading question has been provided.

4.2. Novel evidence for the informative-answer approach and against the precise-answer approach

Section 3.3.2 elaborated on Toosarvandani's (2014) objection to the precise-answer approach. This subsection provides another piece of evidence that supports the informative-answer approach but challenges the precise-answer approach. Contrast (1) with (2), repeated below, a felicitous sentence whose second conjunct is an over-informative answer to the QUD *Who bought a Ferrari?*

(2)   Oleg bought a Ferrari, whereas Roma couldn't even find a car dealer.

The precise-answer approach would predict (2) to be bad, contrary to fact. If we choose the same QUD as for (1)–*Who bought a Ferrari?*, then the second conjunct is not the negative precise answer to the second polar question in this QUD *Did Roma buy a Ferrari?* as Figure 4 demonstrates. Rather, the second conjunct entails the negative precise answer to this polar question.

As was explained in the previous subsection, because the QUD for a semantic opposition sentence is implicit, it is not sufficient to go through just one QUD to show that the precise-answer approach would predict (2) to be bad because there may be other QUDs that this approach would predict to be valid for (2). Thus, to show that this approach would predict (2) to be bad, I need to show that there is no QUD that could satisfy it. This is indeed the case: the other promising QUD is *Who could find a car dealer?*. The second conjunct of (2) is the negative precise answer to the polar question *Could Roma find a car dealer?* but the first conjunct is not the positive precise answer to the polar question *Could Oleg find a car dealer?*

Therefore, (2)'s felicity supports the informative-answer approach and shows that the semantic opposition conjuncts don't need to be precise answers to the polar questions, but can be over-informative answers.

4.3. Novel evidence against the informative-answer approach

Having provided evidence that the precise-answer approach is too strict, which motivated the informative-answer approach, I will provide evidence that even the informative-answer ap-

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proach is not sufficient because it fails to rule out infelicitous sentences where a conjunct's presupposition includes the other conjunct's asserted content. Consider (26), where one conjunct contains a presupposition trigger but the other conjunct doesn't.

(26) a. #Oleg met a girl who bought a Ferrari, whereas she (=the girl Oleg met) didn't buy a Chevy.
      b. #It is Oleg who bought a Ferrari, whereas Roma didn't buy one.
      c. #Oleg bought a Ferrari, whereas the Chevy that Roma bought was not cheap, either.
      d. #Oleg went home after buying a Ferrari, whereas he didn't buy a Chevy.
      e. #Oleg stopped smoking cigarettes, whereas he didn't smoke cigars before.

The infelicity of (26) cannot be due to the use of these presupposition triggers and the particular discourse relation between the conjuncts because if we leave out *whereas* or replace it with *and* or *but*, many of these sentences are fine:

(27) a. Oleg met a girl who bought a Ferrari, (and) she (=the girl Oleg met) didn't buy a Chevy.
      b. It is Oleg who bought a Ferrari, Roma didn't buy one.
      c. Oleg bought a Ferrari, but the Chevy that Roma bought was not cheap, either.
      d. Oleg stopped smoking cigarettes; he didn't smoke cigars before.

This suggests that the infelicity of (26) is due to their incompatibility with semantic opposition. The informative-answer approach cannot account for the infelicity of (26). Following is the stepwise analysis for (26a) as an example, with the potential QUD being *Which car x is such that Oleg met a girl who bought x?*

(28) *The informative-answer approach to (26a)*
      Oleg met a girl who <u>bought</u> a <u>Ferrari</u>, whereas she (=the girl Oleg met) <u>didn't</u> buy a <u>Chevy</u>.
      Step 1. *Find a potential QUD*: Which car x is such that Oleg met a girl who bought x?
      Step 2. *Divide the QUD into two polar questions*: Did Oleg meet a girl who bought a Ferrari? Did Oleg meet a girl who bought a Chevy?
      Step 3. *Check if the first conjunct entails the positive precise answer to the first polar question*: ✓
      Step 4. *Check if the second conjunct entails the negative precise answer to the second polar question*: ✓!

By using a pronoun that is equivalent to a definite DP, the second conjunct of (26a) presupposes that Oleg only met one girl, and asserts that that girl didn't buy a Chevy. The second conjunct thus entails that Oleg didn't meet any girl who bought a Chevy, which is the negative answer to the second polar question (Figure 5). The first conjunct is and trivially entails the positive answer to the first polar question. Thus, the conjuncts in (26a) satisfy the informative-answer approach, contrary to its infelicity.

This section has first showed that the QUD addressed by semantic opposition sentences does not have to be the explicitly provided question. Then I have provided evidence for the informative-answer approach but against the precise-answer approach, and furthermore evidence that even the informative-answer approach cannot account for.
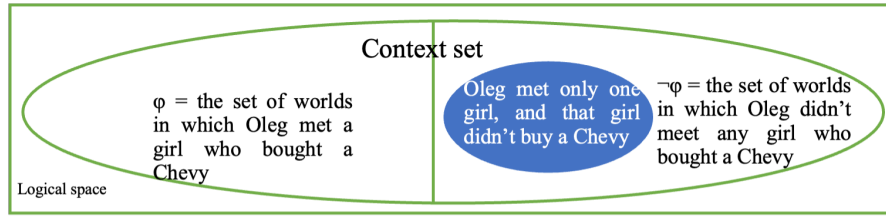
Figure 5: Partitions induced by *Did Oleg meet a girl who bought a Chevy?*

5. An account of (26)

This section provides an analysis of (26) that is based on the observation that the felicity of semantic opposition is directly correlated with the felicity of putting the polar question and the conjunct into a question-answer pair. Then I will discuss a previous analysis of question-answer pairs and show that it cannot account for the infelicity of the particular question-answer pair discussed here. After that, I will propose some constraints on the polar questions answered by the conjuncts of semantic opposition. The most promising QUDs for (26) violate those constraints, and are thus ruled out.

5.1. Observation of infelicity of the direct question-answer pair

As noted in (7), I observe that if we put the question and answer pair into a dialogue, the dialogue sounds weird. I repeat (7) below:

(7)   Q: Did Oleg meet a girl who bought a Chevy?
        A: #The girl he met didn't buy a Chevy.

I argue that (7A) is not a felicitous answer to (7Q) because (7A) tries to answer part of (7Q) with a presupposition (i.e. Oleg met only one girl). Thus, the infelicity of (7A) is a part of Heim's 2015 observation that presupposed material cannot settle the question.

To illustrate Heim's observation, consider (29). (29A1) is the precise answer, while (29A2) is over-informative because it selects a subpart of the positive cell. Strictly speaking, (29A3) is also over-informative because it selects a subset of the positive cell, but it sounds odd as an answer.

(29)   Q: Do you have children?
         A1: Yes, I do.   *precise answer; Figure 3a*
         A2: I have a daughter.   *over-informative answer; Figure 3b*
         A3: #I have to pick up my daughter now.

                                         (adapted from Elliott and Fox 2020)

One may hypothesize from (29A3) that answers to questions cannot involve any presupposition trigger that is not in the question, but this is not the case. Contrast (29A3) with (30), which is a fine dialogue, even if the answer contains the presupposition trigger *my* that the question does not have. This dialogue is fine even when the asker did not know that the answerer had a daughter.

(30)   Q: Are you coming to lunch?

A: I have to pick up my daughter now.

To explain the felicity of (30), we can assume that when the answer includes presuppositional information that the asker did not know, the asker can still *accommodate* a common ground which does satisfy the presupposition, and then evaluate the assertion with respect to that common ground. Given that the asker can accommodate the presupposition, why can't they accommodate it in (29A3)?

5.2. Doron and Wehbe's (2022) proposal and why it fails to account for (7)

This subsection will present Doron and Wehbe's (2022) account of Heim's observation, and show that it can account for the contrast between (30) and (29A3), but not for my observation in (7). The next subsection will then provide my alternative account of Heim's observation.

Aravind (2018) hinted at, and Doron and Wehbe (2022) developed further the requirement that after accommodation of the presupposition, the answer has to eliminate at least one cell in the partition created by the question. Following this proposal, (30A) is a good answer because after accommodation of the presupposition that the answerer has a daughter, the answer still eliminates the negative cell in the question (i.e. the worlds in which they are not coming to lunch). In contrast, (29A3) is an odd answer because after accommodation of the presupposition, the common ground shrinks to the set of worlds in which the answerer has a daughter, and in this common ground, the question is completely settled. Because the question does not partition the shrunk common ground into cells, the answer does not eliminate any cell, and thus violates Doron and Wehbe's condition.

While Doron and Wehbe's proposal can account for the contrast between (30) and (29A3), it cannot account for the oddness of (7). After accommodation of *the*'s presupposition that Oleg met only one girl in (7), the common ground shrinks to the set of worlds in which Oleg met only one girl. The question still partitions that context set into two cells (i.e. the set of worlds in which the girl that Oleg met bought a Chevy; and the set of worlds in which the girl that Oleg met didn't buy a Chevy). The answer in (7) eliminates the positive cell, and satisfies Doron and Wehbe's condition, contrary to its infelicity.

5.3. Preliminary proposal based on good-questionhood

Due to this inadequacy of Doron and Wehbe's proposal, I propose a change to it: the infelicity of presuppositional answers in (7) and (29A3) is not due to the failure of the answer to be informative after accommodation, but due to the failure of the question to be a good question after accommodation.

(31)   *Post-accommodation good-questionhood*
         A question-answer pair Q-A$_p$, where the answer A presupposes p, is felicitous only if after presupposition accommodation, the question is a good question.

This proposal is based on the intuition that (7Q) is an odd question to ask if the asker knows that Oleg met only one girl. Thus, after accommodation of the presupposition triggered by *the* in (7A), (7Q) is not a good question. Likewise, (29Q) is an odd question to ask if the asker knows that the answerer has a daughter, but in contrast (30Q) is not an odd question if the asker knows that the answerer has a daughter. Below I suggest a way to formalize the intuition of a *good question*:

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(32)   *Good-questionhood*
         A good question must:
         a.   Induce a partition of the context set; and
         b.   Satisfy Heim's (1991) *Maximize Presupposition!*.

Conditions (31) and (32) together have the effect that after presupposition accommodation changes the context set, the question must induce a partition of the new context set, and involve the strongest presuppositions that are satisfied by this new context set.

This manages to account for the contrast between (29) and (7): (29A3) is odd because it violates the condition in (32a): after accommodation, the question does not partition the new context set (i.e. the set of worlds in which the answerer has a daughter). (7) is odd because it violates the condition in (32b): after accommodation, the new context set is the set of worlds in which Oleg met only one girl. In this context set, the question with the definite determiner *Did the girl Oleg met buy a Chevy?* is a better question to ask than (29A3), and is thus preferred by *Maximize Presupposition!*.

The previous subsection has presented Doron and Wehbe's (2022) proposal that some question-answer pairs are odd because of the oddity of the answer after accommodation, and showed that this proposal falls short of accounting for (7). Instead, I suggest that these question-answer pairs are odd because of the oddity of the question after accommodation. I propose the following change to the informative-answer approach, incorporating the concept of good-questionhood:

(33)   *My preliminary proposal*
         Semantic opposition coordination *p whereas/but q* is felicitous iff there is a QUD that entails two polar questions Q_1 and Q_2, and
         a.   p is an informative positive answer to Q_1, and q is an informative positive answer to Q_2, and
         b. Q_1 and Q_2 are good questions for p and q respectively.

So far I have shown that the informative-answer approach incorrectly predicts (26a) to be felicitous because its conjuncts do entail the precise answers to the QUD *Which car x is such that Oleg met a girl who bought x?*, but the current analysis rules out that QUD because one of its polar questions is not a good question for the second conjunct in (26a).

5.4. Ruling out the other potential QUDs
To rule out (26a), the current analysis not only needs to show that the conjuncts do not settle the particular QUD discussed in the previous subsection, but also that they don't settle *any* potential QUD. The other QUD that is promising and should be ruled out is *Which car did the girl that Oleg met buy?* As the following derivation shows, this QUD is ruled out because the first polar question is not a good question for the first conjunct.

(34)   *My analysis of (26a)*
         Oleg met a girl who <u>bought</u> a <u>Ferrari</u>, whereas she (=the girl Oleg met) <u>didn't</u> buy a <u>Chevy</u>.
         Step 1. *Find a potential QUD*: Which car did the girl that Oleg met buy?
         Step 2. *Divide the QUD into two polar questions*: Did the girl that Oleg met buy a Ferrari? Did the girl that Oleg met buy a Chevy?

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Step 3. *Check if the first conjunct is a positive informative answer to the first polar question, and the polar question is a good question for the first conjunct*: ✗

Step 4. *Check if the second conjunct is a negative informative answer to the second polar question, and the polar question is a good question for the second conjunct*: ✓

We can highlight the oddity of the first polar question and the first conjunct by putting them into a dialogue:

(35)   Q: Did the girl that Oleg met buy a Ferrari?
          A: #Oleg met a girl who bought a Ferrari.

With the default prosody of a declarative sentence, (35A) is an odd answer to (35Q) because it selects a superset of the positive cell: the worlds in the context set (i.e. the worlds in which Oleg met only one girl and that girl bought a Ferrari) plus some worlds outside the context set (i.e. the worlds in which Oleg met more than one girl and at least one of them bought a Ferrari) (Figure 6).
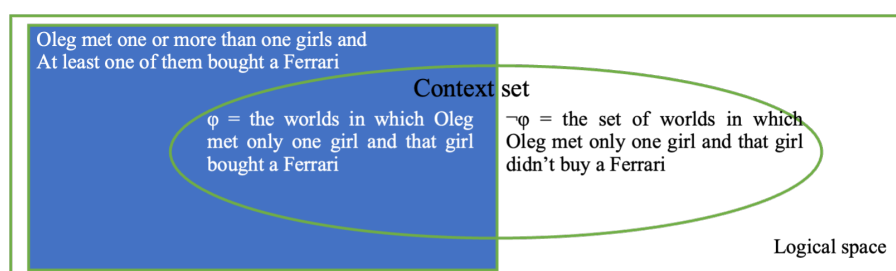

Figure 6: Partitions induced by *Which car did the girl that Oleg met buy?*

While (35A) does eliminate one of the cells and is thus technically an informative answer to (35Q), it actually suggests that (35Q) is not an appropriate question. To demonstrate this, let us put a rise-fall-rise intonation (Constant 2012) on the answer instead, which improves the dialogue:

(36)   Q: Did the girl that Oleg met buy a Ferrari?
          A: Oleg met a girl who bought a Ferrari.
                            L*+H L- H%

The indefinite *a girl* creates an anti-presuppositional effect (e.g. Heim 1991; Marty 2017): by using the indefinite, the answerer implies that they cannot use a definite DP, suggesting that they do not share the asker's belief that Oleg only met one girl. Here is how an interaction of the indefinite and the rise-fall-rise intonation creates this anti-presuppositional effect: according to Constant (2012), a speaker's use of the rise-fall-rise intonation implies that the alternative propositions cannot be safely claimed. Assuming that the entire sentence in (36A) has focus, a salient alternative proposition is *The girl that Oleg met bought a Ferrari*. The answerer implies with the rise-fall-rise intonation that this alternative proposition cannot be safely claimed, presumably because they don't accept the use of the definite in (36Q) and in particular its presupposition that Oleg only met one girl.

5.5. Semantic opposition requires the polar questions to have the same context
My preliminary proposal in (33) inherits from the informative-answer approach the idea that the two polar questions answered by the conjuncts of semantic opposition only need to be entailed by the QUD in Roberts' (1996) sense. If this is the case, then the preliminary proposal still cannot rule out (26). Let's again take (26a) as an example. In principle we could divide the *wh*-QUD *Which car did the girl that Oleg met buy?* into these two polar questions: *Did Oleg meet a girl who bought a Ferrari?* and *Did the girl that Oleg met buy a Chevy?*, as was demonstrated in section 3.1. If we allow these two polar questions, then my preliminary proposal fails to rule out (26a):

(37)   *My preliminary proposal fails to rule out (26a) if the polar questions only need to be entailed by the QUD*
         Oleg met a girl who bought a Ferrari, whereas she (=the girl Oleg met) didn't buy a Chevy.
         Step 1. *Find a potential QUD*: Which car did the girl that Oleg met buy?
         Step 2. *Divide the QUD into two polar questions*: Did Oleg meet a girl who bought a Ferrari? Did the girl that Oleg met buy a Chevy?
         Step 3. *Check if the first conjunct is a positive informative answer to the first polar question, and the polar question is a good question for the first conjunct*: ✓!
         Step 4. *Check if the second conjunct is a negative informative answer to the second polar question, and the polar question is a good question for the second conjunct*: ✓

Therefore, to rule out this derivation, I propose that the two polar questions entailed by the QUD should be strictly parallel as in Figure 1–they should have the same context set:

(38)   *My final proposal*
         Semantic opposition coordination *p whereas/but q* is felicitous iff there is a QUD that entails two polar questions Q_1 and Q_2 with the same context set, and
         a.   p is an informative positive answer to Q_1, and q is an informative negative answer to Q_2, and
         b. Q_1 and Q_2 are good questions for p and q respectively.

This would rule out the derivation in (37) because the two polar questions in Step 2 have different context sets: the second polar question's context set (i.e. the set of worlds in which Oleg only met one girl) is a subset of the first polar question's context set. If the first polar question's context set were the set of worlds in which Oleg met only one girl, then by *Maximize Presupposition!*, the first polar question should have used a definite as in *Did the girl that Oleg met buy a Ferrari?*.

To summarize, this section has proposed refinements of the informative-answer approach by imposing constraints on the polar questions entailed by the QUD: not only must they be good questions for the conjuncts of semantic opposition, but they must also have the same context set.

6. Conclusion and implications
This paper has supported Toosarvandani's (2014) three-way distinction of the meanings of *but* (counterexpectation, semantic opposition and correction) with *whereas*, a lexical item dedicated for semantic opposition. Then I have shown that the felicity of semantic opposition is directly correlated with the felicity of its conjuncts as answers to the polar questions entailed

by the QUD. The semantic opposition conjuncts can be over-informative answers to the polar questions, suggesting that Jasinskaja and Zeevat's (2008, 2009) precise-answer approach is too strict; the polar questions have to have the same context set, and be good questions for the semantic opposition conjuncts, suggesting that Toosarvandani's (2014) informative-answer approach is too relaxed.

Literature on question pragmatics has proposed many different definitions of how well an answer may address a question (e.g. relevance and good-answerhood by Groenendijk and Stokhof 1984; informativeness, licensing and pertinence by Groenendijk 1999). My study provides evidence for the linguistic and cognitive reality of *informativeness* and *good-questionhood*, by showing that the (im)possibility of semantic opposition coordination depends on whether the conjuncts are informative answers, and whether the polar questions are good questions.

Furthermore, judgments in question pragmatics have traditionally relied on intuitions about question-answer pairs. I have provided a diagnostic involving *whereas-* and *but-*coordination, declarative sentences that are nevertheless closely related to question-answering, adding to the growing literature that does so (e.g. AnderBois 2016).

<div align="right">Word count: 7,535 words</div>

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