Semantic opposition coordination: An argument for question settlement[1]

Danfeng WU — *University of Oxford*

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: the conjuncts of *whereas* should *settle* a question under discussion (QUD), with *question settlement* being defined in the partition theory of questions as selecting precisely one of the cells created by the partitioning question, or a subpart of the cell. This analysis is based on 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* and differs from its other uses, supporting Toosarvandani (2014). *Whereas*- and *but*-coordination shows the linguistic and cognitive reality of the notion of question settlement proposed in this paper, 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, settlement of questions, 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*. (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 clauses coordinated by *whereas* by asking how much contrast is allowed and required between them. I will argue for a question-based analysis in line with Jasinskaja and Zeevat (2008, 2009) and Toosarvandani (2014) but also with key differences from them: the conjuncts of *whereas* should *settle* a question under discussion (QUD), with *question settlement* being defined in the partition theory of questions as selecting precisely one of the cells created by the partitioning question, or a subpart of the cell. This analysis is based on 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. For example, I will argue that (1) is felicitous because its conjuncts are felicitous answers to the questions in (2)–(3). And crucially, a felicitous answer is one that settles the question in the sense defined in this paper.

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

[1]I would like to thank Amir Anvari, Danny Fox and Maziar Toosarvandani for helpful comments. All errors are my own.

(3) 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 also infelicitous. This 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. This paper provides a new approach based on question settlement, and argues for its linguistic and cognitive reality by showing that the felicity and infelicity of semantic opposition coordination crucially depends on this notion.

Finally, judgments in question pragmatics have traditionally relied on intuitions about question-answer pairs. Using the observation of a close correlation between the felicity of *whereas*-sentences and the 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 discusses two main approaches in the literature to semantic opposition *but*, and section 4 previews the current proposal and provides a definition of question settlement in the partition theory of questions. Section 5 presents novel data that suggest that the two approaches in the literature are either too strict or too relaxed, and thus motivate the current analysis based on question settlement. Section 6 concludes the paper.

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

English *whereas* has not been discussed before 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 relevant to the current analysis of *whereas*, but before introducing them, 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* (4), whose first conjunct creates an expectation that is rejected by the second conjunct, *correction* (5) and *semantic opposition* (6), whose first conjunct does not have to create an expectation that is rejected. For example, the first conjunct of (4a) creates the expectation that the player is clumsy, and the second conjunct rejects this expectation. But the first conjunct in (5a) does not necessarily give rise to the expectation that Liz doesn't sing, and neither does the first conjunct of (6a) have to lead to the expectation that Roma bought a Ferrari. According to Toosarvandani (2014), the conjuncts of correction and semantic opposition are *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.

(4) *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)

(5) *Corrective* but
  a. Liz doesn't dance, but sing. (Toosarvandani, 2014: 3)
  b. #Liz dances, but sings.

(6) *Semantic opposition* but
  a. Oleg bought a Ferrari, but Roma didn't.
  b. Oleg bought a Ferrari, but he didn't buy a Chevy.
  c. Oleg bought a Ferrari, but Roma bought a Chevy.

A piece of evidence that counterexpectation and correction are distinctive 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). Winter and Rimon (1994) observed that within English, *yet*, *although* and *nevertheless* are dedicated for counterexpectation. But to my knowledge, lexical items dedicated for semantic opposition have not received much discussion.[2] This paper claims that English *whereas* is precisely such a lexical item–it has identical behavior to semantic opposition *but*:

(7) a. Oleg bought a Ferrari, whereas Roma didn't.
  b. Oleg bought a Ferrari, whereas he didn't buy a Chevy.
  c. Oleg bought a Ferrari, whereas Roma bought a Chevy.

Crucially, *whereas* does not have the counterexpectational or corrective use. The first conjunct of *whereas* cannot give rise to an expectation that is rejected by the second (8). Also, *whereas* doesn't require its first conjunct to contain negation like corrective *but* does (7).

(8) 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 generally assumes that it requires its conjuncts to be doubly distinct, and one of the contrasts is often in polarity

[2]Jasinskaja and Zeevat (2009) described Russian *a*, which has both semantic opposition and corrective uses.

(Jasinskaja and Zeevat 2008, 2009; Toosarvandani 2014). This generalization applies to the semantic opposition examples we have seen so far (6)–(7). But this paper also investigates felicitous and infelicitous semantic opposition examples that look less parallel than (6)–(7) (e.g. (9) and (10)), and argues that the conjuncts of semantic opposition not only need to be doubly distinct, but they need to settle the polar questions contained in the QUD.

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

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

3. Background and the literature

Before presenting evidence for my analysis, in this section I discuss two main approaches to semantic opposition in the literature (Jasinskaja and Zeevat 2008, 2009; Toosarvandani 2014). They both related the conjuncts of semantic opposition to a conversational topic that is represented by a question. Toosarvandani followed Roberts' (1996/2012, 2004) QUD framework, an approach that uses questions to model the structure of the discourse. While Jasinskaja and Zeevat (2008, 2009) did not follow the QUD framework per se, it can still be converted into it for a direct comparison with Toosarvandani. Therefore, to understand these two approaches to semantic opposition, I first review the background on QUD.

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?*). As interlocutors look for the answers to that big question, they may follow a *Strategy of Inquiry* that involves subinquiries. They may divide the QUD into logically related subquestions that are easier to answer. Subquestions are *entailed* by the superquestion: the complete answer to the subquestion contextually entails the partial answer to the superquestion. For example, in a context with two salient individuals, Oleg and Roma, and two types of cars to buy, Ferrari and Chevy, the QUD may be a double-*wh*-question *Who bought what?*, which can be divided into two single *wh*-questions, which can be further divided into four polar questions:

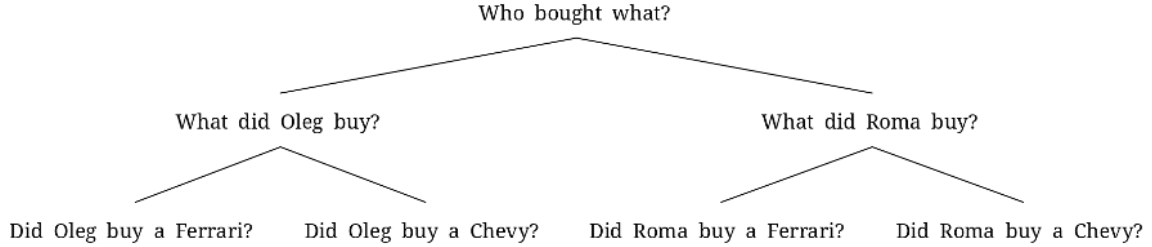


Figure 1: Strategy of Inquiry example

Besides this Strategy of Inquiry involving subquestions, Roberts also proposed a QUD stack: when an interlocutor poses a question, and this question is accepted by the other interlocutors as answerable, it is added to a stack of QUDs, committing everyone to the common goal of finding the answer. Once it has been answered or is no longer considered answerable, it is removed from the QUD stack.

3.2. Existing analyses of semantic opposition

3.2.1. Jasinskaja and Zeevat's (2008, 2009) set-membership approach

Having provided the necessary background on QUDs, I present the two approaches to semantic opposition in the literature (Jasinskaja and Zeevat 2008, 2009; Toosarvandani 2014). While their proposals were meant for "semantic opposition" *but*, I assume they also apply to *whereas*. The first approach is my interpretation of Jasinskaja and Zeevat in the QUD framework. They claimed that the conjuncts of semantic opposition must be doubly distinct answers to the QUD, and one of the contrasts must be polarity.

Jasinskaja and Zeevat did not provide a formal definition of what an answer is, but a possible interpretation is set membership. Assuming that a question denotes the set of propositions corresponding to its complete answers (Hamblin, 1973), we can think of Jasinskaja and Zeevat's proposal as a requirement that the conjuncts be doubly distinct members of the set denoted by the QUD (I call this *the set-membership approach*).

To ensure double contrast, Jasinskaja and Zeevat required the conjuncts of semantic opposition to be answers to a *whether-wh*-question that can be paraphrased as a disjoined *wh*-question. For example, the conjuncts of (1) should be answers to the question *Who bought or didn't guy a Ferrari?* Toosarvandani converted this analysis into the QUD framework: the big QUD the conjuncts should answer is a single *wh*-question (in the case of (1), *Who bought a Ferrari?*), which is divided into two polar questions by the Strategy of Inquiry (for (1), *Did Oleg buy a Ferrari? Did Roma buy a Ferrari?*), and each conjunct should contrast in polarities, and answer a polar question (i.e. the first conjunct should be the positive answer to *Did Oleg buy a Ferrari?*, and the second conjunct should be the negative answer to *Did Roma buy a Ferrari?*).

Many semantic opposition examples in the literature were presented without explicit context or QUD because QUDs are often implicit in conversations. Furthermore, as we will see later in section 3.1, even when the example does provide an explicit leading question, the semantic opposition sentence can still shift the QUD to a slightly different question, and answer that instead. 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 thus 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 and form of the conjuncts.

I develop and demonstrate a procedure for a linguist to check Jasinskaja and Zeevat's predictions for *whereas*-sentences, with (7a) as an example. First, they choose a potential QUD, a single *wh*-question that (7a) 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 each conjunct is an answer to the polar question that contrasts in polarities. The first conjunct is indeed the positive answer to the first question because it is a member of the set denoted by the question, and the second conjunct is the negative answer to the second question because it is a member of the set denoted by the question. Because we can find at least one QUD that can satisfy Jasinskaja and Zeevat's condition, they would predict (7a) to be felicitous, as is the fact.

(11) *The set-membership approach to (7a)*
Oleg bought a Ferrari, whereas Roma didn't.
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 answer to the first polar question*: ✓
Step 4. *Check if the second conjunct is the negative answer to the second polar question*: ✓

3.2.2. Toosarvandani's (2014) entailment-of-set-membership approach

Toosarvandani (2014: fn 19) observed that if we think of answerhood as membership of the set denoted by the question, then Jasinskaja and Zeevat's proposal fails to account for semantic opposition sentences that have antonyms rather than polarity contrast like (12)).

(12) John is quick, whereas Bill is slow. (Based on Winter & Rimon 1994:373)

According to Toosarvandani, there is no QUD such that the conjuncts of (12) can be members of the set denoted by this QUD. 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 (12), *Bill is slow* is not equivalent to *Bill is not quick* because not quick is not necessarily slow, as someone can be neither quick nor slow. Thus, *Bill is slow* is not a member of the set of propositions denoted by the second polar question. The same problem occurs for the other potential QUD *Who is slow?* because the first conjunct is not a member of the set of propositions denoted by *Is John slow?* Therefore, there is no QUD such that both conjuncts can be members of the set denoted by its polar questions.

Due to this issue, Toosarvandani revised Jasinskaja and Zeevat's proposal to the following: the conjuncts must *entail* doubly distinct members of the set of propositions denoted by the QUD (I call this *the entailment-of-set-membership approach*). This can account for (12) because the first conjunct is (and trivially entails) the positive answer to the first polar question *Is John quick?* The second conjunct entails that Bill is not quick, which is the negative answer to the second polar question *Is Bill quick?* Following is the complete stepwise derivation of the prediction:

(13) *The entailment-of-set-membership approach to (13)*
John is quick, whereas Bill is slow.
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 answer to the first polar question*: ✓
Step 4. *Check if the second conjunct entails the negative answer to the second polar question*: ✓

To summarize, Jasinskaja and Zeevat's set-membership approach claimed that the conjuncts must be doubly distinct answers to the question, where the conjuncts must contrast in polarities, and be members of the sets of propositions denoted by the polar questions contained in the QUD. Toosarvandani instead proposed the entailment-of-set-membership approach: the conjuncts must *entail* doubly distinct members of the set denoted by the QUD.

4. Proposal preview: Semantic opposition conjuncts must settle the QUD

Section 5 will provide novel data suggesting that the set-membership approach is too strict because it predicts felicitous semantic opposition sentences to be bad. I will also provide data suggesting that the entailment-of-set-membership approach is too weak because it fails to rule out infelicitous semantic opposition sentences.

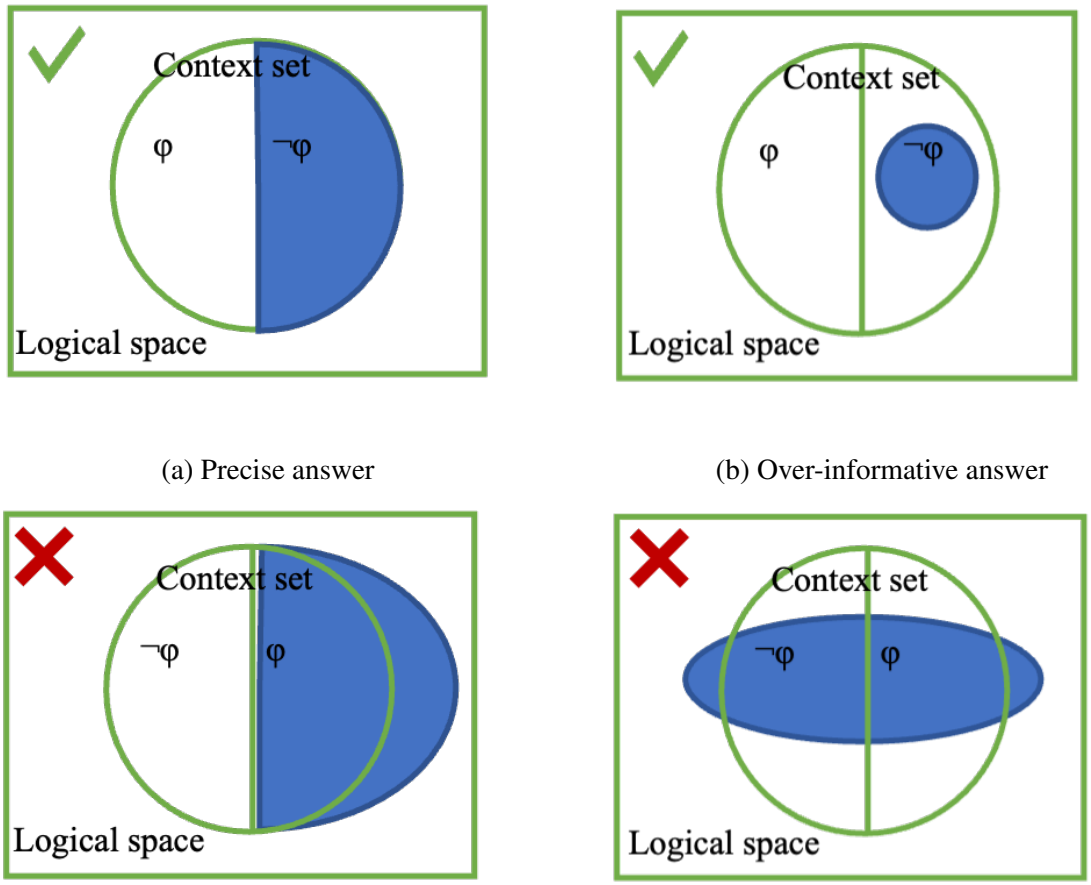
Those novel data contribute to an insight: the felicity of semantic opposition is directly correlated with whether each conjunct *settles* the polar question. This leads to the current proposal that the conjuncts of semantic opposition must settle the polar questions contained in the QUD. The rest of this section defines *question settlement*: subsection 4.1 formulates *question settlement* in the partition theory of questions, and claims that answers that settle the question may provide additional information that the question does not ask for. Then subsection 4.2 discusses Heim's 2015 observation that presupposed material cannot settle the question, which will be useful to the discussion later in section 5 .

4.1. Question settlement

Before I define question settlement, I first introduce the partition theory of questions, which it is formulated in. An important idea of Stalnaker (1978) is 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, which is 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 $\phi?$ 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 some logical possibilities of how an assertion may update it: it may select exactly one cell (Figure 2a; *precise answer*), a proper subset of a cell (Figure 2b; *over-informative answer*),

a proper superset of one of the cells, which may contain worlds that are not in the context set (Figure 2c), or parts of both cells (Figure 2d). I call precise answers and over-informative answers answers that *settle the question*.



(a) Precise answer

(b) Over-informative answer

(c) Non-settling answer

(d) Non-settling answer

Figure 2: Four ways to answer a polar question

I demonstrate these four types of answers with (14), and show that only settling answers are felicitous, and non-settling answers are quite odd.

(14) Q: Has John stopped smoking?
A1: He hasn't. *precise answer; Figure 2a*
A2: He hasn't despite not enjoying it. *over-informative answer; Figure 2b*
A3: ??He doesn't smoke. *non-settling answer; Figure 2c*
A4: #Sub28 took place in Bochum. *non-settling answer; Figure 2d*

The polar question ϕ? in (14Q) presupposes that John used to smoke, and thus assumes the context set to be the set of worlds in which John used to smoke. The polar question partitions this context set into ϕ, the set of worlds in which John has stopped smoking, and $\neg\phi$, the set of worlds in which John has not stopped smoking. (14A1) is a precise answer to this polar question because it selects $\neg\phi$. (14A2) is an over-informative answer because it selects a proper subset

of $\neg\phi$ (i.e. the set of worlds in which John has not stopped smoking and he does not enjoy smoking). Without special intonation and with just default prosody of a declarative sentence, (14A3) is an odd answer to the polar question. It does not settle the question because it selects the set of worlds in which John doesn't smoke, which not only includes $\neg\phi$, but also worlds that are not in the context set (i.e. worlds in which John never smoked before and still doesn't). In a context with no further detail, where whether SuB took place in Bochum has nothing to do with whether John has stopped smoking, (14A4) is a very odd answer to the polar question. The set of worlds selected by (14A4) intersects with both ϕ and $\neg\phi$, and thus do not settle the question.

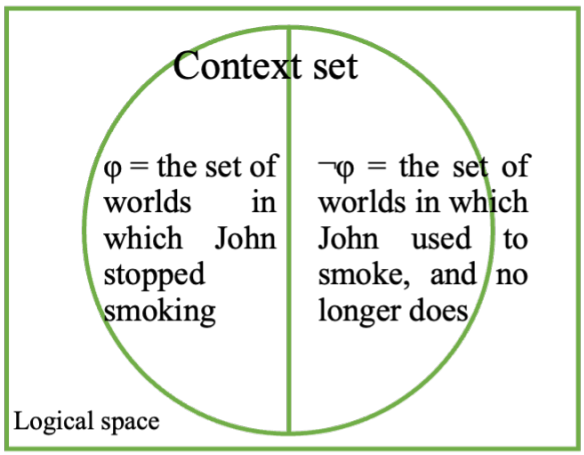


Figure 3: Partitions induced by (15Q)

I have introduced three types of answers in the partition theory of questions: precise answers, over-informative answers and non-settling answers. If we take precise answers to be members of the set denoted by the QUD, then Jasinskaja and Zeevat's (2008; 2009) set-membership approach requires the conjuncts of semantic opposition to be doubly distinct *precise answers* to the QUD. In section 5.1 I will show that this is too strict because the conjuncts can be over-informative answers to the QUD.

4.2. Presuppositions cannot settle a question

Heim (2015) observed that questions cannot be answered by an accommodated presupposition. Consider (15) for example. (15A1) is the precise answer, while (15A2) is over-informative. Strictly speaking, (15A3) is also over-informative because it selects a subset of positive cell, but it sounds odd as an answer.

(15) Q: Do you have children?
A1: Yes, I do. *precise answer; Figure 2a*
A2: I have a daughter. *over-informative answer; Figure 2b*
A3: #I have to pick up my daughter now.

The following example highlights this intuition with a minimal pair. (16A1) is an over-informative but good answer to (16Q) because it selects a subpart of the negative cell (i.e. worlds in

which the question asker cannot see the Labrador, and a girl from New York just adopted the dog). (16A2) is odd because it settles the question with a presupposition triggered by the cleft.

(16) Context: John is visiting a dog shelter because he is particularly interested in adopting a Labrador.
Q: Can I see the Labrador?
A1: A girl from New York just adopted the Lab.
A2: #It is a girl from New York who just adopted the Lab. (Elliott and Fox, 2020)

Having defined question settlement, which includes precise and over-informative answers that settle the question with at-issue content rather than presuppositions, the next section will show that only conjuncts that settle the QUD are acceptable in semantic opposition.

5. Empirical data: Conjuncts of semantic opposition must settle the QUD

5.1. Conjuncts of semantic opposition can be over-informative answers to the QUD

Recall that the set-membership approach requires the conjuncts of semantic opposition to be precise answers to the QUD. Toosarvandani (2014: fn 19) showed that this fails to allow semantic opposition with antonyms. This subsection provides another piece of evidence that the set-membership approach is too strict. Contrast (7a) with (9), repeated below, a felicitous semantic opposition sentence whose second conjunct is an over-informative answer to the QUD *Who bought a Ferrari?*

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

The set-membership approach would predict (9) to be bad, contrary to fact. The first three steps are identical to those for (7a). Step 4 fails because the second conjunct is not the negative precise answer to the second polar question *Did Roma buy a Ferrari?* as Figure 4 demonstrates.

(17) *The set-membership approach to (9)*
Oleg bought a Ferrari, whereas Roma couldn't even find a car dealer.
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*: ✗!

As was explained in section 3.2, because the QUD for a semantic opposition sentence is implicit, it is not sufficient to go through just one QUD to show that the set-membership approach would predict (9) to be bad because there may be other QUDs that this approach would predict to be valid for (9). Thus, to show that this approach would predict (9) to be bad, I need to show that there is no QUD that could satisfy the set-membership requirement. This is indeed the case: because not even being able to find a car dealer generally entails not buying a Ferrari, we

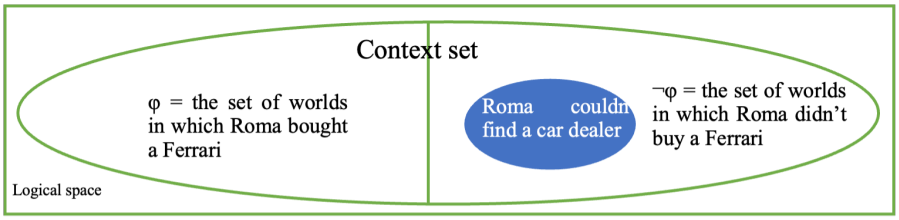


Figure 4: Partitions induced by *Did Roma buy a Ferrari?*

cannot find a QUD where the conjuncts of (9) are precise answers to its polar questions. For example, a potential QUD may be *Who could find a car dealer?* The second conjunct of (9) 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?*

But (9) is felicitous, suggesting that the semantic opposition conjuncts don't need to be precise answers to the polar questions, but can be over-informative answers. The felicity of over-informative conjuncts of semantic opposition parallels the felicity of over-informative answers to questions:

(18) Q: Did Roma buy a Ferrari?
A: She couldn't even find a car dealer.

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):

(19) 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. (20A) is felicitous, but if we assume that the QUD that its conjuncts should settle is (20Q), then it does not meet the current proposed requirement.[3]

(20) 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 settle the second polar question *Is Bill tall?* because the second conjunct is neither the negative precise answer nor over-informative answer to it.

(21) *The set-membership approach to (20A)*
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 settles the first polar question*: ✓
Step 4. *Check if the second conjunct settles the second polar question*: ✗!

[3]I am grateful to Bernhard Schwarz (p.c.) for pointing this out to me.

I argue that (20A) is fine because its conjuncts address a different QUD *Do you know who is tall?* The second conjunct settles the second polar question because it is the precise negative answer; the first conjunct is an over-informative answer to the first polar question, and thus also settles it.

(22) *The set-membership approach to (20A)*
John is tall, whereas I don't know whether Bill is tall or not.
Step 1. *Find a potential QUD*: Who do you know is 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 settles the first polar question*: ✓
Step 4. *Check if the second conjunct settles 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 the 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.

5.2. Conjuncts of semantic opposition cannot answer the QUD with presuppositions

Having provided evidence that the set-membership approach is too strict, I will provide evidence that the entailment-of-set-membership approach is too strong. In semantic opposition, a conjunct's presupposition cannot include the other conjunct's asserted content. This can be illustrated with sentences where one of the conjuncts contains a presupposition trigger like a pronoun (23a), a cleft (23b), *after* (23c) and *stopped* (23d).

(23) 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 went home after buying a Ferrari, whereas he didn't buy a Chevy.

d. #Oleg stopped smoking cigarettes, whereas he didn't smoke cigars before.

The infelicity of (23) 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*, many of these sentences are fine:

(24) 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 stopped smoking cigarettes; he didn't smoke cigars before.

This suggests that the infelicity of (23) is due to their incompatibility with semantic opposition. The entailment-of-set-membership approach cannot account for the infelicity of (23). Following is the stepwise analysis for (23a) as an example, with the potential QUD being *Which car x is such that Oleg met a girl who bought x?*

(25) *The entailment-of-set-membership approach to (24a)*
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 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 answer to the first polar question*: ✓
Step 4. *Check if the second conjunct entails the negative answer to the second polar question*: ✓!

What is crucial is that by using a pronoun that refers to a definite DP, the second conjunct of (23a) 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 (23a) satisfy the entailment-of-set-membership requirement, and are predicted to be okay, contrary to fact.

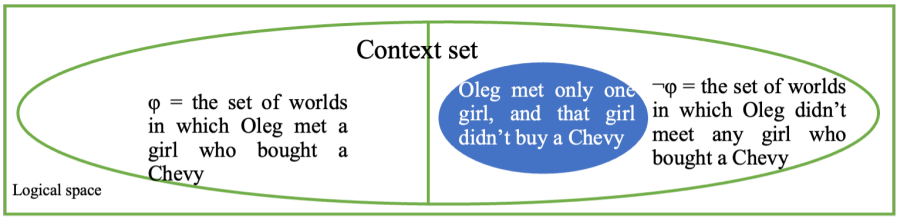


Figure 5: Partitions induced by *Did Oleg meet a girl who bought a Chevy?*

The current proposal based on question settlement manages to rule out (23a) correctly. Although the second conjunct in (23a) entails the negative cell of the polar question, it does not settle that polar question because it answers part of the question with a presupposition. This can be demonstrated by putting the question and answer pair into a dialog:

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

Sentence (26A) is not a felicitous answer to (26Q) for the same reason that (15A3) and (16A2) are odd answers to their respective questions: (26A) tries to answer part of (26Q) with a presupposition (i.e. Oleg met only one girl), and presupposed material cannot settle the question.

It is worth mentioning that the infelicity of (23a) suggests that the polar questions addressed by each conjunct have to be *subquestions of the same QUD*. If (23a) did not involve *whereas*, as in (24a), the sentence is fine. This suggests that normally as the discourse proceeds, the presupposition triggered by the pronoun can be satisfied by the indefinite in the first conjunct. If we think of each conjunct in (24a) also as answering a polar question, then the polar question

answered by the first conjunct does not have a presupposition (e.g. *Did Oleg meet a girl who bought a Ferrari?*), but the polar question answered by the second conjunct does (e.g. *Did the girl Oleg met buy a Chevy?*). Therefore, in an *and*-sentence, the polar questions answered by each conjunct do not have to be parallel subquestions of the same QUD, and the second polar question may be "updated" depending on the content in the first conjunct: the second polar question may involve a presupposition that is introduced by the first conjunct.[4] But this is not the case for *whereas*-sentences: the second polar question cannot be "updated" this way, but must be a subquestion of the QUD, in parallel to the first polar question.

I have shown that the entailment-by-set-membership approach incorrectly predicts (23a) to be felicitous because the conjuncts entail the 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 for (23a) because the second conjunct in (23a) cannot settle the question with a presupposition. But to rule out (23a) and predict it to be infelicitous, the current analysis not only needs to show that the conjuncts do not settle that particular QUD, 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 conjunct does not settle the first polar question.

(27) *My analysis of (23a)*
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 the girl that Oleg met buy a Ferrari? Did the girl that Oleg met buy a Chevy?
Step 3. *Check if the first conjunct settles the first polar question*: ✗
Step 4. *Check if the second conjunct settles the second polar question*: ✓

We can highlight the failure of the first conjunct to settle the first polar question by putting the question and answer pair into a dialog:

(28) 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, (28A) is an odd answer to (28Q) because it selects a superset of the positive cell: worlds in the context set (i.e. worlds in which Oleg met only one girl and that girl bought a Ferrari) plus worlds outside the context set (i.e. worlds in which Oleg met more than one girls and at least one of them bought a Ferrari). This parallels (14A3) and corresponds to the configuration in Figure 2c, and thus fails to settle the question.

The answer (28A) may be improved with a rise-fall-rise intonation (Constant 2012):

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

[4]If we replace *and* in (24a) with counterexpectational *but* or *however*, the sentence is also fine, suggesting that the questions answered by the conjuncts of counterexpectational *but* do not have to be subquestions of the same QUD, in contrast to semantic opposition *but*. I think the fact that there is a greater degree of "parallelism" between the conjuncts of semantic opposition than between the conjuncts of counterexpectation is key to understanding the subtle differences in meaning between these different uses of *but*. I leave this question to future research.

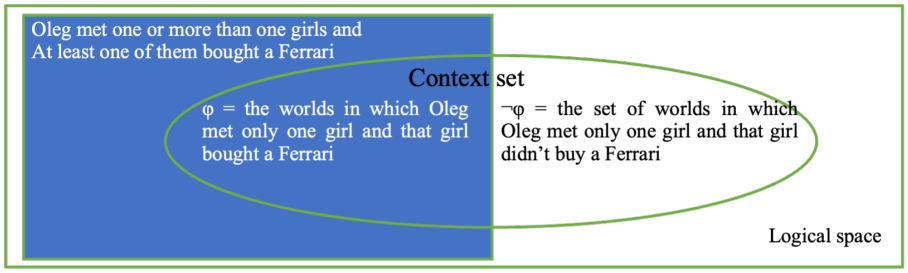


Figure 6: Partitions induced by *Which car did the girl that Oleg met buy?*

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 (29A) 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 and in particular its presupposition that Oleg only met one girl.

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 contained in the QUD. The semantic opposition conjuncts can be over-informative answers to the polar questions, suggesting that Jasinskaja and Zeevat's (2008, 2009) set-membership approach is too strict; the semantic opposition conjuncts have to settle the polar questions, and cannot do so with presuppositions, suggesting that Toosarvandani's (2014) entailment-of-set-membership 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 *question settlement*, by showing that the (im)possibility of semantic opposition coordination depends on whether the conjuncts settle the relevant question.

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).

References

Abraham, W. (1979). BUT. *Studia Linguistica 33*(2), 89–119.

AnderBois, S. (2016). A QUD-based account of the discourse particle naman in Tagalog. In H. Nomoto, T. Miyauchi, and A. Shiohara (Eds.), *Proceedings of AFLA 23*, pp. 20–34. Asia-Pacific Linguistics, The Australian National University.

Blakemore, D. (1989). Denial and contrast: A relevance theoretic analysis of "but". *Linguistics and Philosophy 12*(1), 15–37.

Constant, N. (2012). English rise-fall-rise: a study in the semantics and pragmatics of intonation. *Linguistics and Philosophy 35*(5), 407–442.

Dascal, M. and T. Katriel (1977). Between semantics and pragmatics: The two types of 'but' – Hebrew 'Aval' and 'Ela'. *Theoretical Linguistics 4*(1-3), 143–172.

Elliott, P. and D. Fox (2020). Lecture notes for Pragmatics in Linguistic Theory. Ms., Cambridge, MA.

Groenendijk, J. (1999). The logic of interrogation: Classical version. *Semantics and Linguistic Theory 9*, 109.

Groenendijk, J. and M. Stokhof (1984). *Studies on the Semantics of Questions and the Pragmatics of Answers*. Ph. D. thesis, University of Amsterdam.

Hamblin, C. L. (1973). Questions in Montague English. *Foundations of Language 10*(1), 41–53. Publisher: Springer.

Heim, I. (1991). Artikel und Definitheit [articles and definiteness]. In A. Von Stechow and D. Wunderlich (Eds.), *Semantik*, pp. 487–535. De Gruyter.

Heim, I. (2015). Lecture notes for Pragmatics in Linguistic Theory. Ms., Cambridge, MA.

Hulstijn, J. (1997). Structured information states: Raising and resolving issues. In A. Benz and G. Jäger (Eds.), *Proceedings of MunDial*, Volume 97, pp. 99–117. Citeseer.

Jäger, G. (1996). Only updates: On the dynamics of the focus particle only. In M. Aloni, A. Butler, and P. Dekker (Eds.), *Questions in Dynamic Semantics*, Volume 17 of *Current Research in the Semantics/Pragmatics Interface*, pp. 103–122. Brill.

Jasinskaja, K. (2010). Corrective contrast in Russian, in contrast. *Oslo Studies in Language 2*(2), 433–466.

Jasinskaja, K. (2012). Correction by adversative and additive markers. *Lingua 122*(15), 1899–1918.

Jasinskaja, K. and H. Zeevat (2008). Explaining additive, adversative, and contrast marking in Russian and English. *Revue de Sémantique et Pragmatique 4*, 65–91.

Jasinskaja, K. and H. Zeevat (2009). Explaining conjunction systems in Russian, English, and German. *Proceedings of Sinn und Bedeutung 13*(1), 231–245.

Lakoff, R. (1971). If's, and's, and but's about conjunction. In C. J. Fillmore and D. T. Langendoen (Eds.), *Studies in linguistic semantics*, pp. 114–149. New York: Holt, Rinehart, & Winston.

Lang, E. (1984). *The Semantics of Coordination*, Volume 9 of *Studies in Language Companion Series*. Amsterdam: John Benjamins Publishing Company.

Marty, P. (2017). *Implicatures in the DP Domain*. Ph. D. thesis, Massachusetts Institute of Technology, Cambridge, MA.

Pusch, L. (1975). Über den Unterschied zwischen *aber* und *sondern* oder die Kunst des Widersprechens. In I. Bátori, L. Pusch, and J. Levin (Eds.), *Syntaktische und Semantische Studien*

zur Koordination, pp. 45–62. Tübingen: Gunter Narr.

Roberts, C. (1996). Information structure in discourse: Towards an integrated formal theory of pragmatics. *Semantics and Pragmatics 5*, 1–69.

Roberts, C. (2006). Context in Dynamic Interpretation. In L. R. Horn and G. Ward (Eds.), *The Handbook of Pragmatics* (1 ed.)., pp. 197–220. Wiley.

Schwenter, S. (2000). Spanish connectives and pragmatic implicatures. In H. Campos, E. Herburger, A. Morales-Front, and T. J. Walsh (Eds.), *Hispanic linguistics at the turn of the millennium: Papers from the 3rd Hispanic Linguistics Symposium*, Somerville, MA, pp. 292–307. Cascadilla Press.

Stalnaker, R. C. (1978). Assertion. In P. Cole (Ed.), *Pragmatics*, pp. 315–332. Brill.

Sæbø, K. J. (2003). Presupposition and contrast: German 'aber' as a topic particle. In *Proceedings of Sinn und Bedeutung 7*, pp. 257–271.

Toosarvandani, M. (2010). *Association with Foci*. Ph. D. thesis, University of California, Berkeley.

Toosarvandani, M. (2014, April). Contrast and the structure of discourse. *Semantics and Pragmatics 7*(4), 1–57.

Umbach, C. (2004). On the notion of contrast in information structure and discourse structure. *Journal of Semantics 21*(2), 155–175.

Umbach, C. (2005). Contrast and information structure: A focus-based analysis of *but*. *Linguistics 43*(1), 207–232.

Vicente, L. (2010). On the syntax of adversative coordination. *Natural Language & Linguistic Theory 28*(2), 381–415.

Winter, Y. and M. Rimon (1994). Contrast and implication in natural language. *Journal of Semantics 11*(4), 365–406.

Winterstein, G. (2010a). *La Dimension Probabiliste des Marqueurs de Discours: Nouvelles Perspectives sur l'Argumentation dans la Langue*. Ph. D. thesis, Université' Paris Diderot.

Winterstein, G. (2010b). Linking argumentativity and information structure in adversatives. In *Proceedings of Sinn und Bedeutung 14*, 14, pp. 421–437.