

A NOTE ON PRESUPPOSITIONS, DISCOURSE ATTACHMENT AND RELEVANCE

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Abstract In this short paper, I clarify the status of the observation by Jayez (2010), echoing a previous proposal by Ducrot (1972), that non main content material is dealt with differently than main content material in discourse attachment. I show that the discourse relations for which the observations in question hold are *Bayesian* in nature, that is, they exploit probability dependencies between propositions and that, in combination with the specific intentional features of the main content, Sperber and Wilson's relevance theory predicts the limitations that have been observed.

1. INTRODUCTION

I address here the following question. How is it that 'implicit' information, that is, presuppositions (PP) and conventional or conversational implicatures, are subject to attachment restrictions in discourse, as initially observed by Ducrot (1972) for PP and confirmed by Jayez (2010) in the general case? A simple answer is that this kind of information is somehow kept in the background and, accordingly, separated from the main flow of discourse. However, this explanation predicts an overall resistance to attachment in the case of PP and implicatures, whereas what we observe is more complex: attachment is felt as odd with *only certain* discourse relations. Focusing on the case of PP, I show that the observed attachment restrictions result from an interaction between code and inference. On the one hand, linguistic messages are conventionally divided into a *main content* part, corresponding very roughly to Grice's notion of *what is said* plus *explicatures* in the sense of relevance theory (Sperber & Wilson 1986) and a *non main content* part, including PP and implicatures. This division has lexical and syntactic marking and operates at the level of the intentional structures associated with speech acts. On the other hand, discourse planning considerations preclude situations in which a speaker makes manifest goals that she abruptly abandons in the course of communication, that is, without providing any evidence that she is doing so. This would be equivalent to requiring from the addressee that she process coded information without repaying her with any noticeable effect, a clear violation of the relevance principle of Sperber and Wilson (1986). In section 2, I tackle the issue of how to conceive the relation between PP and main content through question-answer pairs. I first recall Grimshaw's classic analysis (2.1) before discussing a more recent proposal by Simons. I argue that Simons's perspective is problematic, essentially because it tends to make the role of PP depend only on pragmatic considerations. In section 3, I present an alternative proposal, in which the main content is an obligatory target for attachment by means of *Bayesian* discourse relations, defined in 3.1, an observation that I motivate in 3.2, by pointing out that, within the framework of relevance theory (Sperber & Wilson 1986), it is a direct consequence of the basic intentional structure of speech acts.

2. RELEVANCE AND PRESUPPOSITIONS

2.1. Presuppositions as answers. Basics

It is well-known that PP tend to escape the 'normal' flow of discourse. For instance, they are not used to answer questions in a natural way, as observed by Grimshaw (1979). In (1), the two responses sound (at least) a little bit 'off the track', which reflects the fact that, in order to answer the question whether Bill left, the responder uses the PP that Bill left.

- (1) Question: Did Bill leave?
 Response: It's odd that he did.
 I'd forgotten that he did.
 (Grimshaw's example 154, p. 321)

Grimshaw explains the relative oddness of (1) and similar examples by claiming that one cannot take as granted (presuppose) something which is *under discussion* (in the terms of Roberts 1996/1998). The intuition is that one cannot act as if something was established (i.e. presuppose it) and, simultaneously, as if it was not (i.e. use it to answer a question). Although the intuition is clear, it is not necessarily convincing. Stalnaker (1974) mentions the case of *informative* PP, that is, PP that are used to convey new information to the addressee. What one should do with such cases is unclear. In Stalnaker's approach, PP are pieces of information that are 'normally' part of the *common ground*, the shared knowledge of participants. If 'normally' is taken to refer to the objective belief state of participants, presupposing new information cannot count as a genuine case of PP. In other terms, when participants know that a certain proposition *p* is *not* part of their shared beliefs, communicating that *p* is not presupposing that *p* and, so, we might expect that *p* can be used naturally to answer a question, at least in some cases.

Stalnaker himself adopts a different perspective. He says: "[...] one actually does make the presuppositions that one seems to make even when one is only pretending to have the beliefs that one normally has when one makes presuppositions. Presupposing is thus not a mental attitude like believing, but is rather a linguistic disposition—a disposition to behave in one's use of language as if one had certain beliefs, or were making certain assumptions". Under that perspective, it is unlikely that answering a question by means of a PP is ever natural, since choosing a presuppositional form involves a needless pretense. Why would a user of language bother to use a form of words that conveys that she pretends to have in mind a certain image of the common ground, if (i) it is public knowledge that she does not, in fact, have this image in mind and (ii) this pretense does not serve the purpose of answering the question?

At this stage, we have two different predictions. If being part of the common ground is defined as an objective property of PP, answering a question by means of a presuppositional form seems possible, since, in that case, it is enough that the 'normally' presupposed proposition is in fact new information and, so, is not a genuine PP. If being part of the common ground can be an element of some 'as if' game, answering a question by means of a presuppositional form is unnecessary, since a more direct form would fulfill exactly the same goal without introducing a presuppositional structure.

2.2. Formal presuppositions as answers. Simons's (2007) theory

Simons (2007) argues that, whereas it is not possible to answer questions by means of a *substantive* PP, which must be part of the common ground,¹ it is possible to answer questions by means of a *formally* presuppositional structure, that is, by using a PP trigger in contexts where, clearly, the PP is not part of the common ground. If Simons is right, the prediction described at the end of the previous section is not borne out. For instance, according to her, in examples like (2), the embedded clause carries the main point of the utterance, the main clause has an evidential function and the embedding verb *discover* is, in such cases, non-presuppositional.

1 *De facto*, Simons agrees with Grimshaw on this point, even if she does not mention Grimshaw's paper.

- (2) A: Where was Harriet yesterday?
 B: Henry discovered she had a job interview at Princeton.
 (Simons's example 1, p. 1035)

I cannot discuss here all the features of Simons's rich and subtle analysis. I will focus on the three aspects that are directly relevant to my concern. In a nutshell, I am going to argue that the main content, not the PP, is *always* an obligatory ingredient in answering a question and that, in this respect, Simons's proposal is not entirely correct.

In what follows, I use a distinction between *response* and *answer*. For a given question Q, a response is the sentence or the discourse that the addressee offers as a reaction to Q. An answer is the proposition that can be extracted from the response and that addresses the question. In many cases the response and the answer coincide but in some cases they don't, for instance when an adverb triggers a conventional implicature that is not relevant to the question (see Potts (2005) for conventional implicatures). For instance, in (3), the fact that Henry's discovery is surprising does not really address the question and must be kept apart from the answer.

- (3) A: Where was Harriet yesterday?
 B: Surprisingly, Henry discovered she had a job interview at Princeton.

2.2.1. 'Where' is the answer?

The first aspect I want to discuss is the claim by Simons that the embedded clause constitutes the main point, since it answers the question. This appears to be rather obvious for (2) and similar examples, but, on second thought, it is not entirely clear. Simons's idea is that there are various ways of proffering basically the same answer with different degrees of certainty and different sources of information (hence the introduction of evidentiality). E.g., the various answers in (4) suggest different forms/degrees of evidence.

- (4) A: Where was Harriet yesterday?
 B: I heard she had a job interview at Princeton.
 C: Henry thinks she had a job interview at Princeton.
 D: Henry told me she had a job interview at Princeton.

Although I agree with Simons that the embedded clause carries the main point in some formal sense, it does not follow that, for instance, (4B-D) convey the same answer. More precisely, I would say that the embedded clause expresses a proposition that is a *possible answer type* to the question and that the answer is the interpretation of the *whole* sentence in the context (the latter including the question). There are a number of reasons for interpreting the whole sentence—rather than the embedded clause—as the answer.

First, paraphrasing the answer accurately must mention the matrix verb in some way or other. For instance, suppose that we want to describe the different exchanges in (4). It would be accurate to say "A inquired about what Harriet had done the day before and B answered that she had heard that Harriet had had a job interview", but it would be potentially misleading to say "A inquired about what Harriet had done the day before and B answered that Harriet had had a job interview". Similarly, it would be accurate to say "A inquired about what Harriet had done the day before and C answered that Henry thinks that Harriet had had a job interview" but not simply "A inquired about what Harriet had done the day before and C answered that Harriet had had a job interview". Simons

herself introduces a form of qualification in the paraphrase of the answer, since she would propose² to paraphrase C's answer in (4) as "C's answer to A's question might be that Harriet had had a job interview. The source of the claim that Harriet had had a job interview is Henry; but Henry is not fully committed to its truth." What the modal verb *might* means with respect to (4) is a bit obscure. C's answer is not a possible answer but an actual one and its content corresponds to Henry's opinion regarding what Harriet had done the day before. C *might* indeed answer that Harriet had had a job interview if she later came to be convinced that Henry's opinion was right. So the *might* modality used by Simons cannot refer to the answer as such but only to a conditional inference that is drawn from the answer. I conclude that there is no clear evidence at this stage that the main clause is not an integral part of the answer.

One can object that it is 'obvious' that the answer cannot (always) include the main clause because this clause is not relevant to the question. I suspect that Simons has something of this kind in mind when she explains (p. 1038) that, in examples like (4C), it is the content of the belief that "the speaker is proffering as an answer". Why should it be so? The main clause has clearly some relevance to the quality of the sentence *qua* answer, since it not just *any* main verb that is appropriate. As noted by Simons herself, when the main verb is not open to an evidential interpretation, the resulting dialogue may sound strange. See (5), which makes sense only if we assume that Henry's dreams might have some information value (premonition, etc.)

- (5) A: Were was Harriet yesterday?
 B: ? Henry dreamt that she had a job interview at Princeton.

How could the semantic content of the main verb relevant? Because it helps understand the relation between the question and the response. A response of the form *x thinks that p*, where *p* corresponds to a possible answer type, is appropriate only if *x*'s attitude can influence the beliefs of the questioner with respect to *p*. For instance, presented with a response of the form *x thinks that p*, the questioner might reason that *x* has some information that is conducive to the belief that *p* is true. Whereas the responder does not commit herself to asserting that *p*, she provides the questioner with a piece of information (*x*'s opinion) which can help the questioner to make her uncertainty decrease. It is not necessarily so, though. The questioner might consider that *x* is totally unreliable and that her opinion does not matter much. It is sufficient that *x*'s opinion constitutes a *potential* element for making the questioner's uncertainty decrease. Since it is impossible to ignore the main verb to assess the relevance of the response to the question, I conclude that its content is a part of the answer and not just a qualification of it in terms of degree of certainty or identity of the source.

Another argument in the same direction is provided by the *you are wrong* test. Normally, objecting *you are wrong* to a speaker A is intended to refute A's opinion or claim. Consider contrasts of the following type. In (6), A replies to B's answer by claiming that the (hedged) opinion expressed by B is false. In (7), A simply fails to do what she pretends to do, that is, refuting B's opinion. The most obvious explanation for this failure is that B has not really expressed an opinion, although she has contributed to answer A's question by mentioning Henry's opinion.³

- (6) A: Were was Harriet yesterday?
 B: I guess she had this job interview at Princeton, but I'm not sure.
 A: You are wrong. The interview is next month.

² I adapt Simons's paraphrase (5) of her example (4) (Simons (2007), pp. 1036-1037).

³ This observation involves the notion of *main point*, as used by Simons. I come back to that in section 2.2.3.

- (7) A: Were was Harriet yesterday?
 B: Henry thinks she had a job interview at Princeton.
 A: ? You are wrong. The interview is next month.

The upshot of this discussion is that there is no reason to consider that the main clause is not an integral part of the answer. However, I have selected only a subset of the cases considered in Simons's paper, roughly speaking those where the responder suggests what a positive answer to a *wh*-question might be. Other cases seem to be much less favorable to my claim.

2.2.2. Exclusionary answers

Consider (8). It seems that the answer is conveyed by the parenthetical adverbial *entirely wrongly* and that the rest of the sentence does not help much in resolving the question.

- (8) A: Which course did Jane fail?
 B: Henry, *entirely wrongly*, is convinced that she failed calculus.
 (Simons's example 18, p. 1042)

(8) illustrates *exclusionary* answers, by which a speakers intends to exclude some possible answers. Simons points out (pp. 1042-1043) that the justification of an exclusionary answer where someone else's opinion is mentioned, as in (8), is to exclude this particular opinion because it has been expressed. I must confess that Simons's justification is not transparent to me.⁴ It is clear that excluding a possibility corresponds to a possible answer, as in (9B), and that mentioning an opinion is also a possible answer, as in (9C), which parallels (4C). (9B) can make the uncertainty of A (the questioner) decrease since it potentially eliminates a candidate from a set of possible answers.

- (9) A: Which course did Jane fail?
 B: She didn't fail calculus.
 C: Henry is convinced that she failed calculus

What (8B) does is much less clear. If the purpose of the response was to exclude Henry's answer, one would expect to be able to reverse its information profile. In (8B), the main content corresponds to Henry's opinion and the adverbial *entirely wrongly* is a conventional implicature, see Potts (2005). In (10), the adverbial is integrated into the main content. As far as I can tell, this response is not very natural. In fact, it seems to make (some) sense in a context where it is common knowledge that Henry believes that Jane failed the calculus exam, but, even in that type of context, there is an impression of topic shift: the responder does not provide an answer to the initial question. The question is thus why (10B) is not an adequate response.

- (10) A: Which course did Jane fail?
 B: ? Henry is convinced that she failed calculus *entirely wrongly*.

If one follows Simons, (10B) should *not* convey an exclusionary answer. However, it excludes and mentions a possible answer. (10B) information structure has the following form.

- (11) TOPIC = Henry is convinced that Jane failed calculus
 FOCUS = Henry is wrong in believing that

⁴ Moreover, I am not sure that (8B) is *entirely* natural.

One can get a fairly exact and more intuitive rendering of the relation between (10A) and (10B) by copying the structure of (11).

- (12) A: Which course did Jane fail?
 B: ? Henry is wrong/mistaken in believing that she failed calculus.

The focus corresponds to Henry's mistake. In a context where Henry's opinion is common knowledge (or *presupposed*), why would excluding this opinion not make sense? It seems that it is a possible scenario for making the uncertainty decrease: there is an idea around that Jane failed calculus and the responder indicates that this opinion is incorrect. I suppose that Simons could account for the oddness of (10B) or (12B) by saying that, in such cases, the responder does not *point out*⁵ that someone else has offered an answer but rather takes this event for granted. Although I agree with this explanation, it has still to be motivated.

The dominant intuition about (10B) and (12B) is that the response 'misses the point' to some extent. A and B know that Henry believes that Jane failed the calculus exam. The main content of the response consists in asserting that Henry is wrong. This entails that Jane passed the calculus exam, which excludes a possible answer. Following Grimshaw, one might exclude such responses on the basis of the fact that the answer (or a part of it) is conveyed by a PP. However, it would amount to little more than applying Simons's criterion within the Grimshaw framework. For exclusionary answers, the answer must consist in mentioning an opinion (Simons). When the latter is presupposed information it cannot constitute an answer (Grimshaw). So, we end up with a contradiction and we predict that the resulting response is anomalous. Unfortunately, we have not explained why the answer has to mention an opinion. Moreover, the combination of Simons's and Grimshaw's criteria does not always deliver the right predictions. In (13), B's response mentions an opinion and does not mark it linguistically as presupposed. Yet the response is infelicitous.

- (13) A: Which course did Jane fail?
 B: ? Henry, who is convinced that she failed calculus, is wrong.

Comparing (8B) and (9C) on the one hand with (10B, 12B, 13B) on the other hand suggests that the critical difference lies in the fact that, in the latter examples, the main content (Henry's opinion is incorrect) is not a good *reason* for believing that the refuted proposition (Jane failed the calculus exam) is false or, equivalently, that the opposite proposition (Jane passed the calculus exam) is true. To clarify what I mean, I invite the reader to have a look at (14). All the micro-discourses in (14) sound a bit strange, most probably because they amount to justifying a certain proposition by (re)asserting it. Consider (14c), for instance. The reason for claiming that Jane passed the exam is that Henry's belief is wrong. Why Henry is wrong is left totally opaque. I suppose that the perception of the examples in (14) and similar ones could be improved in a context where the speaker has no personal evidence that Henry is wrong and just accepts someone else's opinion. In that case, the intended reading can be paraphrased by *Jane passed the exam since someone has evidence that contradicts the opposite proposition*.

5 "One way to justify an exclusionary answer is by pointing out that someone else has incorrectly proffered the same answer as true" (Simons (2007), p. 1042).

- (14) a. ? Jane passed the exam since Henry is wrong in believing that she didn't.
 b. ? Jane didn't fail the exam since Henry is wrong in believing that she did.
 c. ? Jane passed the exam since Henry, who believes that she didn't, is wrong.
 d. ? Jane didn't fail the exam since Henry, who believes that she did, is wrong.

Returning to (10B, 12B, 13B), we see that the responder presents the proposition that Henry is wrong as a reason to believe the opposite proposition (Jane passed the calculus exam). Intuitively, this type of move is problematic in general. If we could explain why, the oddness of examples like those in (14) would follow.

It is generally assumed that the function of an answer is either to make the uncertainty attached to the question decrease or, at least, to help the questioner to construct a new plan for resolving her question, see Ginzburg (2012, pp. 53-56) for a liberal interpretation of the relation between questions and answers. One could argue that responses of the type (10B, 12B, 13B) entail the falsity of a possible answer and, thereby, make the uncertainty attached to the question decrease. There are two ways in which a responder can make the uncertainty decrease, either by providing or excluding a partial or total answer to the question or by communicating information that makes the probability of a partial/total answer increase or decrease. (10B, 12B, 13B) correspond to the latter strategy since B does not provide a partial or total answer. Let us then assume that B intends to provide relevant information, which affects the probability of some partial or total answer. The resulting configuration is shown in (15). Configuration (16) correspond to examples of type (8B).

- (15) Main content: The proposition that p is false
 Non main content: Henry believes that p
 (16) Main content: Henry believes that p
 Non main content: The proposition that p is false

We saw above that (8B) is intuitively better than (10B, 12B, 13B). The contrast between (15) and (16) suggests that this is due to the difference in the distribution of the main vs. non main content. It cannot be due to a difference in the truth-conditional content, since both (8B) and (10B, 12B, 13B) entail exactly the same proposition, namely that Henry believes that Jane failed the calculus exam and that Jane did not fail the calculus exam. The main content of (15) cannot constitute a partial or a total answer, so it has to affect the probability of a partial or total answer. However, the main content of (15) is nothing else than the partial answer that the speaker wants to exclude, so that her move amounts to justifying that it is false that Jane failed the calculus exam by the very same proposition, which is obviously strange.

At this point, a different picture than the one offered by Simons begins to emerge. For a response to be adequate, it is necessary that its main content could be interpreted as a potential answer to the question that is, as making the uncertainty attached to the question decrease. This is *also* true for exclusionary answers, which have nothing special in this regard. (10B, 12B, 13B) are anomalous because the main content conveys the proposition it is supposed to justify. This offers an account of why (13B) is an infelicitous response without forcing one to resort to Simons's condition that exclusionary answers should *point out* an opinion. Unless one can provide independent evidence for this constraint, I take it to be a side-effect of Simons's analysis. The idea that main content must contribute a potential answer also directly explains why the following example (Simons (2007), note 11, p. 1043) is odd, without resorting to the rather complex explanation provided by Simons. The main content of (17B) is not a potential explanation of Louise not coming to the meetings anymore.

- (17) A: Why isn't Louise coming to our meetings these days?
 B: Henry, falsely, believes that she is still in town.

What I have done in this section is to show that there is a simple constraint that (i) accounts for the observations reviewed in Simons's paper and (ii) does not raise the problems her approach raises, in particular the fact that it is difficult, under Simons's perspective, to explain why the answer is conveyed by the main content according to the refutation test (6-7) and why there is a difference between different types of exclusionary answers, for instance (8B, 9C) and (10B, 12B, 13B). If we assume that the main content must be involved in providing an answer, we can readily account for the observed contrasts.

2.2.3. *Answers and PP: where relevance comes into the picture*

Simons argues that the complements of factives can be the main point of an utterance that serves as a response. In such cases, the complement is not part of the common ground and the speaker does not pretend it is. Let me clarify the status of this claim in the context of the present paper. I do not doubt that it is possible to provide a natural response to a question by means of a factive verb like *discover*, *realize*, etc. I also do not doubt that, in such cases, for reasons made clear by Grimshaw, the embedded clause cannot be substantively presupposed. Finally, I do not doubt that the embedded clause plays a crucial role in constructing an answer. My qualm is with Simons's assertion that in examples like (2) and (18), "there is no option but to take the embedded clause content as main point" (Simons (2007), p. 1046).

- (2) A: Where was Harriet yesterday?
 B: Henry discovered she had a job interview at Princeton.
 (18) A: How will Louise get to the picnic?
 B: Henry realized that she can take a bus.
 (Simons's example 22, p. 1045).

Simons defines the notion of main point as follows (p. 1035): "the main point of an utterance U of a declarative sentence S is the proposition *p*, communicated by U, which renders U relevant. The notion of relevance assumed here is whatever notion is needed for the satisfaction of the Gricean Maxim of Relation. Note that this definition does not require that *p* be the literal content of the sentence uttered, or of any of its constituents; *p* need only be communicated by the utterance. Thus, an implicature, a presupposition, or any other implied proposition may constitute the main point."

Keeping this definition in mind, let us consider the following situation. A and B mutually know that Harriet might have a job interview at Princeton. At the time of the dialogue in (19), B knows that Harriet had an interview but A does not. Why is B's response strange? In the terms of Simons, the embedded clause conveys a relevant answer: given the context and the PP trigger, B clearly believes that Harriet had a job interview. There is nothing in (19B) that forces us to assume that B takes the interview event for granted, so the event is not substantively presupposed.

- (19) A: Where was Harriet yesterday?
 B: ? Henry did not realize that she finally had the job interview at Princeton

The only way out is to assume that the answer conveyed by the embedded clause is not enough to make the utterance relevant. This seems rather truistic: why mention Henry's ignorance if the main point is the job interview? However, by the same reasoning, (2B) and (18B) should sound

incoherent. Why mention Henry's knowledge if the main point is the content of the embedded clause? In Simons's approach, the difference between the two cases is that Henry's knowledge can be interpreted as relevant because Henry is the source of the information (evidentiality) and that this fact is worth mentioning. An apparently similar observation is provided by Simons in an example partially copied in (20).

- (20) A: Where was Harriet yesterday?
 B: ? Henry knows that she was in Princeton.
 (from Simons's example example 35, p. 1049)

She accounts for (20) by noting that the mention of Henry's knowledge is redundant, given that the speaker commits herself to the truth of the embedded clause. I agree with the redundancy interpretation but I don't see why this should not apply to (2B) or (18B) in the same way. The difficulty here stems from the interpretation that Simons chooses for the term *evidential*. An evidential embedding verb, in her view, indicates the source of the information. For instance, she remarks (p. 1048) that an 'evidential' variant of (20B) like *I know from Henry that she was in Princeton* would be perfect. This leaves us with the same problem: we don't really explain why *Henry discovered that p* would be 'more evidential' than *Henry knows that p*. In both cases, Henry is presented as the source of the knowledge that *p*. What is different is the scenario suggested by verbs like *discover* or *realize*. Such verbs directly refer to a transition from ignorance or doubt to belief and imply that the agent who undergoes the transition became aware of certain 'elements of proof'. The existence of such elements is relevant to the question because it potentially affects the probability of the answer. When no such element is hinted at, as with *know* or *be aware*, it is more difficult to assign a function to the main verb.

The conclusion I draw from this discussion can be summarized in two points. First, I agree with Simons that the main verb has to play a role in the communication. This is in line with Relevance Theory (Sperber & Wilson 1986, Clark 2013), which says that a piece of information cannot be introduced into the discourse 'for free'. Since it increases the processing load, it must help the addressee draw or, more generally, manipulate inferences. This is why the mention of Henry's ignorance in (19B) is strange. Second, contrary to Simons, I don't think that the main clause can be left apart from the main point. In fact, the main clause *must* participate in constructing the main point, in other terms it must be *relevant* to the main point. In the next section, I develop and clarify this claim.

3. RELEVANCE TO THE MAIN CONTENT

It is by now widely acknowledged that linguistic forms offer the opportunity to *hierarchize* linguistic messages, as evidenced by the abundant literature on PP and implicatures. A message can convey a main content and one or several PP and implicatures. I will call this distribution the *layering* of information. Since communication always comes at a cost, it would be surprising if layering did not serve any function. Why would a speaker bother to organize information in some specific way if she had no reason for doing so?

3.1 Attachment restrictions

Ducrot (1972) observed that, in monologues, it is difficult to attach a discourse constituent to a PP whereas it is always possible, within the limits of plausibility, to attach a constituent to the main content. In (21a), the explanation introduced by *because* bears on the main content (Paul doesn't

have caviar) but not on the PP (think of the oddness of *Paul had caviar because it is/was too expensive*). In (21b), the intended reading, i.e. the proposition that Paul had caviar because he liked the taste, cannot be constructed.⁶

- (21) a. Paul doesn't have caviar anymore for breakfast because it's too expensive.
(Translated from Ducrot (1972), p. 81)
- b. ? Paul doesn't have caviar anymore for breakfast because he liked the taste.

Jayez (2010) confirms and generalizes these observations experimentally in a judgment task on a set of French presupposition and conventional implicature triggers. When presented with two sentence discourses where a causal/justification or consequence relation made explicit by *parce que* (*because*) and *alors* (*so*) bears on the non main content (PP, implicature), subjects reject massively the item, even though there is a plausible relation between the non main content and the rest of the discourse. Winterstein (2013) proposes a similar analysis of the attachment restrictions for scalar implicatures.

This suggests that the function of the main content is to be the default attachment site in monologues. So, layering would allow the language users to identify the target of discourse attachment and to reduce the volume of possible inferences, exactly like explicit discourse markers can facilitate the choice of a discourse relation. Unfortunately, there is a little hitch in this idea. Winterstein (2010, p. 110) observes that, with *aussi* (*too*), it is possible to attach a constituent to the non main content. (22) shows a case where the PP trigger *too* fetches a presupposed antecedent (both are underlined).

- (22) Lemmy is proud to be a bass player. Ritchie plays bass too but he doesn't flaunt himself like Lemmy.

Jayez (2010) suggests that the attachment constraint might hold for only a subset of discourse relations. Which ones? There is at the moment no precise inventory, but it seems that the relations for which attachment is not free include all the relations defined in (24). Causal, justification and concession/opposition relations provide typical examples. Causal or justification relations imply that a certain proposition makes another proposition more probable, with certainty being the limit case. Concession and opposition relations imply that a certain proposition makes another proposition less probable, with certainty of falsity being the limit case. This dependency can be described in a *Bayesian* framework where the main element is the conditional probability $\mathbb{P}(q|p)$, the probability that q given p . At a symbolic level, the organization of propositions together with their dependencies can be described by a *Bayesian network*, that is, a special graph where the nodes are descriptions of states of affairs and edges correspond to probabilistic influence, positive or negative, see Jensen & Nielsen (2007) for an introduction. A description (node) can take several values and the description it affects, positively or negatively, can also take several values. In the rest of the paper, I assume that the networks under consideration are *belief* networks, that is, the nodes represent propositions and their possible values are degrees of belief. Conditional probabilities of the form $\mathbb{P}(q = b|p = a)$ describe to what extent the fact that p takes the value a impinges on the fact that q takes the value b . If \mathbf{B} is a Bayesian (belief) network, I note $p >_{\mathbf{B}} q$ the fact that, if the value of p increases the value of q increases too. $p <_{\mathbf{B}} q$ is defined similarly.

- (23) $p >_{\mathbf{B}} q =_{\text{df}}$ if $a' > a$ and $b' > b$, then $\mathbb{P}(q = b'|p = a') > \mathbb{P}(q = b|p = a')$ and $\mathbb{P}(q = b'|p = a) < \mathbb{P}(q = b|p = a)$, for every a, a' and b, b' in the sets of possible values for p and q .

⁶ Note also that, in (21a), the PP does not seem to play a significant role in the attachment.

The definition for $<_{\mathbf{B}}$ is symmetric.

Next, one can define a Bayesian discourse relation as a relation involving a positive or negative dependency.

- (24) A discourse relation is *Bayesian* with respect to a network \mathbf{B} whenever it associates two propositions p and q such that either $p >_{\mathbf{B}} q$ or $p <_{\mathbf{B}} q$.⁷

What is the point of using a Bayesian discourse relation? Presumably to allow the addressee to adjust her inference system. By indicating the existence of a causal relation, for instance, the speaker invites the addressee to focus on the dependency between the cause and its effect. The inferential effects in the network of the addressee depend on the initial situation. The probability of the effect and/or the cause could increase and/or the probability of alternative possible causes could decrease (inhibitory effect). This corresponds to assumption manipulation in relevance theory. A more radical change is the creation of a new link between the cause and its effect.

Unfortunately, the relationship between Bayesian networks, or other symbolic dependency-based representation tools like neural networks, the neural architecture of reasoning and the working-memory dynamics is at present very poorly understood (see Patterson & Barbey 2012 for a survey of the problems connected with causal reasoning). So, it is premature to speculate on the real cognitive effects of discourse, and we must limit ourselves to using coarse representation tools for packaging information. I will make the minimal assumption that the discourse relations that obviously imply the existence of a dependency between propositions can be represented in a Bayesian network, without committing myself to any precise theory about the network dynamics.

3.2 Attachment and main content

In this section, I defend the hypothesis that the attachment restrictions observed for Bayesian discourse relations in monologues have a rather simple explanation, based on the discourse role of speech acts. In the introduction of section 3, I recalled that, empirically, layering is a central property of natural languages and suggested that, in view of this importance, it has probably a specific function. In the classic Searlian theory of speech acts (Searle 1969), each illocutionary act has a *point*, which can be defined as the conventional minimal effect of the act. For instance, the point of a statement is to commit the speaker to the truth of the expressed proposition. Searle sees the effect of speech acts as relative to the speaker. It is possible to adopt a complementary perspective under which each speech act has a conventional intended effect on the addressee. For example, the intended effect of a statement is to trigger an update of the addressee's belief state with the expressed proposition, the intended effect of a question is to get an answer from the addressee, etc. A simple but crucial point is that the intended effect involves intention attribution. By choosing a particular speech act, the speaker makes it manifest that she has a particular intention. It is at this point that layering enters the stage. The intended effect concerns primarily the main content. More exactly, what we call the 'main content' is the part of the message that is conventionally highlighted as being the propositional content of the intended effect. This is not to say that an addressee cannot attribute to the speaker the intention of communicating a non main content element, as in the case of informative presuppositions. In fact, the main content corresponds to the conventional *minimal*

⁷ Using a Bayesian discourse relation does not necessarily suggest that the addressee should modify the probability of a proposition. For instance, a discourse of the form p *although* q signals that q makes the probability of p decrease. If p and q are considered to be true by the addressee, the probability of the former cannot decrease. This is a possible situation in a Bayesian network because, in such cases, we can make the calculations in the network 'halt', which does not suppress the edge connecting p and q .

intended effect, which does not preclude the attribution of other intentions to the speaker. A typical case can be described as in (25).

- (25)
1. Main intention (corresponding to main content): the speaker aims at making the addressee execute a certain procedure, basing her execution on the main content.
 2. Additional intention (corresponding to non main content): the speaker aims at making the addressee execute a certain procedure, basing her execution on the non main content.
 3. Signaling epistemic state (corresponding to main and/or non main content: the speaker aims at making the addressee believe that the speaker believes a certain proposition.

Aspect 1 (main intention) is part of the conventional content of a speech act. Aspect 2 is optional and depends on the context. Aspect 3 can be optional or conventional. Speech acts like statements, described in (26), illustrate the latter case. I have underlined the crucial part of the constraint

- (26) A statement with main content p and non main content p' conventionally communicates that the speaker intends the addressee_i to make the probability of p raise in her_i belief network and to make the probability of the proposition that the speaker believes that p raise in her_i belief network. If p' is a PP or a conventional implicature, the statement also conventionally communicates that the speaker intends the addressee_i to make the probability of the proposition that the speaker believes that p' raise in her_i belief network. If p' is a conversational implicature, it is up to the addressee_i, given the context, to attribute to the speaker the intention that the addressee_i make the probability of the proposition that the speaker believes that p' raise in her_i belief network.

We can now assemble the description of the conventionally intended effect of speech acts and that of the Bayesian discourse relations, in order to understand how it is that, for such relations, attachment to the main content is obligatory in monologues.

When a speaker issues a speech act, she communicates that she intends that the addressee ‘do something’ with the main content. This is the core communicative effect of speech acts. So, the speakers makes it manifest that it is part of her plan that the addressee execute a certain procedure involving the main content. We saw in section 3.1 that a Bayesian discourse relation involves adjusting the addressee’s belief network. Suppose that the information provided by the speaker for this adjustment does not concern the main content at all, then we have the following situation: (a) the speaker tries to make the addressee use the main content (conventional effect of the speech act), (b) the speaker gives information pertaining to belief adjustment about *non* main content. Although such a situation is not logically contradictory, it corresponds to a kind of planning mismatch. To take an intuitive analogy, suppose that I am engaged into making you use a certain tool, and that, simultaneously I provide information on another, quite different tool. What would be the point of my communicative strategy? Of course, in the case of speech acts, the situation may be more complex since, for instance, the PP is not ‘quite different’ from the main content. If I assert *Henry discovered that Jane had a job interview*, the proposition that Jane had a job interview is a part of the main content and cannot just be put apart, unlike a conventional implicature (e.g. *That stupid Henry discovered that Jane had a job interview*). The contribution of the sentence is characterized in (27).

(27) Sentence: *Henry discovered that Jane had a job interview*

Conventional effects:

Main intention: the speaker intends the addressee to make the probability of ‘Henry discovered that Jane had a job interview’ raise

Signaling epistemic states: the speaker intends the addressee to make (a) the probability of ‘the speaker believes that Henry discovered that Jane had a job interview’ raise and (b) the probability of ‘the speaker believes that Jane had a job interview’ raise.

If the same speaker (monologue) connects this sentence to another discourse constituent by means of a Bayesian discourse relation, she makes it manifest that she gives indications pertaining to the probabilistic dependence of a proposition. This hardly can be the proposition that the speaker believes this or that, because the speaker_i, at utterance time, has (or pretends to have) fixed beliefs and does not have to ‘convince’ the addressee of her_i entertaining the beliefs she_i has (pretends to have). In other terms, if I am ‘officially’ claiming that *p*, the only interesting strategy is to convince you that *p* is true, not that I believe that *p*.

Of course, you might come to suspect that I have fake beliefs, that my goal is actually to convince you that I believe that *p* and that I don’t care so much about the truth of *p*. But how could I do that if I did not produce an argument *about p*, not just about my *believing* that *p*? Certainly, giving reasons for *p* is giving reasons for believing *p* but not just for believing that someone believes *p*. Returning to (27), one can understand the difference as follows: the ‘signaling epistemic states’ part has two components (two goals that can be attributed to the speaker). Each of them consists in making the addressee believe that the speaker believes a certain proposition. Suppose that the speaker starts providing arguments in favor of her believing the proposition *without* arguing in favor of the truth of the proposition itself. For instance, the speaker might mention aspects of her behavior that suggest that she believes the proposition. In that case, the main intention (conventional effect) would be left hanging. We would then witness a fairly strange situation: the speaker declares officially (main effect) that she intends the addressee_i to update the part of her_i belief network that concerns *p* but proceeds to provide information that does *not* concern *p* but, rather, her own belief that *p*. Although, to repeat, this strategy is not logically impossible, it would be pragmatically misguided.

Summarizing, with Bayesian discourse relations, any attachment that would ‘miss’ the main content would be highly problematic in terms of plan coherence, since the speaker would give the impression that she abandons abruptly a plan that she was executing, without giving any indication about her reasons for doing that or any signal that she intends to change the course of her discourse actions. This would be a blatant violation of relevance, in the sense of Sperber and Wilson: the speaker would require that the addressee process some conventional intentional information and act as if this information was not to be exploited in any way. Given its central status, it is possible that the selection of the main content by Bayesian discourse relations has been conventionalized and is an element of the lexical profile of various items, but this is a topic which needs further investigation.

4. CONCLUSION

In this paper, I have defended the claim that certain attachment restrictions in discourse are the hallmark of the main content of speech acts. The only assumption I have made concerns the connection between the layered structure of language and the minimal intentions that define speech acts. Specifically, I have assumed that the core intention associated with a speech act draws its propositional material from the main content. This idea is reminiscent of Grice’s (1975) notion of

what is said (the *literal content* in other terminologies). Grice distinguishes between what is said and what is implied, and puts conventional and conversational implicatures in the implied content. PP can also be considered as elements of the implied content. Although, to my best knowledge, there is no absolutely compelling test of the difference between what is said and what is implied, or, equivalently, between main and non main content, there is a fairly robust property of the *non* main content, which is its capacity to *project*, to borrow the current terminology of the literature on PP. Projection designates the fact a proposition is left untouched by operators that normally suspend or cancel the truth of a proposition, like negation, interrogation marker or *if*. We have a straightforward explanation of projection if we assume that the non main content does not involve the main goal of the speaker and that, as a result, a probability-modifying operator is going to target primarily whatever carries this goal, i.e. the main content. As explained in Jayez (2010), the non main content *can* also be affected by a probability-modifying operator, but this remains an option, whereas the main content *has* to combine with the operator. In this respect, the perspective defended here is different from that of Simons et al. (2011), which, like Simons's (2007) approach, is radically pragmatic. The observations made in the paper suggest rather we must take into account aspects of the linguistic *code* that are not context-sensitive and study their modes of processing within theories which, like relevance theory, develop appropriate conceptual and/or technical tools for conceptualizing the relation between code and inference.

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