Ludics and Presupposition Projection*

Grégoire Winterstein[1]

Université Paris 8, Laboratoire Structures Formelles du Langage
gregoire.winterstein@linguist.jussieu.fr,
http://www.linguist.univ-paris-diderot.fr/~gwinterstein/

Abstract. This work looks at the way a ludics-inspired approach to discourse deals with the discursive notions of projection and attachment of semantic content. An illustration of the case of presupposition is studied and discussed in the light of recent theories of presupposition projection. The case of the *proviso problem* and conditional sentences is also touched upon. It is then proposed to describe a specific use of *but* as an indicator of a meta-game, i.e. an invitation to revise a previous utterance which then grants access to previously inaccessible material such as presupposition.

This paper deals with a fairly recent model of discourse interpretation proposed by Lecomte & Quatrini (2009,2010,2011) that rests on the *ludics* framework initiated by Girard (2001) as a way to rebuild the foundations of logic.

The goal of this paper is to evaluate the ludics approach to discourse with regards to the question of the accessibility and attachment to discourse material conveyed by a discourse move. This question is prominently discussed in the literature on discourse interpretation, for example by Asher & Lascarides (2003) through the notion of *right frontier*, or more recently in works like Simons et al. (2010) about the notion of *projective material*, i.e. material that is conveyed by an utterance even though it is embedded under operators that are not usually veridical. It is thus worth to see in which way a ludics-based approach can deal with such facts.

We first begin by outlining the ludics approach, after which we cover the empirical domain of projective material along with some recent proposals of analysis for this phenomenon. We then evaluate the way a ludics approach can handle the question of the *projection* of presupposed content as well as the impossibility to attach to presupposed material to establish a discourse relation. In a final part, we discuss the possibility to characterize the so-called *monadic* use of *but* as a marker of revision in the studied framework.

1 Ludics and Discourse Interpretation

In this section, I briefly review the main assumptions and hypotheses about discourse interpretation in the framework of *ludics*.

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Ludics, as proposed by Girard (2001), offers a framework for proof theory that is built on the notion of *interaction*. As such, it can easily be interpreted in a dialogical perspective for natural language, and it is what has been proposed by Lecomte & Quatrini (2009,2010,2011). It is not our intention to repeat the formal and foundational definitions behind ludics, and the interested reader should consult either the presentation made by Lecomte & Quatrini (2011) or the foundational text by Girard (2001).

One of the main ideas of the application of ludics to natural language semantics is to drop the usual semantic postulate that equates the meaning of a sentence to its truth conditions. Ludics rather considers that the meaning of a sentence is the set of its *proofs*. A proof is here intendend as an object which is intrisically rooted in interaction: the construction of a proof results from the interaction between the actions of two different individuals. Thus, when a speaker produces an utterance, his action can consist in both a positive action (the contribution he makes to the discourse) and a negative action that corresponds to the reactions the speaker expects regarding his move. These negative actions are the possible refutations on which one might ask the speaker to elaborate in order to prove or back up his assertion. They represent as many openings for the rest of the conversation, openings on which the speaker allows other participants to anchor their reactions.

To illustrate the ludics approach and the way the speakers' interaction is represented, the example (1) (adapted from Lecomte & Quatrini (2010) and taken from A. Dumas' *Count of Monte Cristo*) is given a simplified and macroscopic treatment. Positive and negative actions are not represented at this stage, but are bundled behind the utterances of each participant. The point of this illustration is to introduce the way a dialogue is represented in the ludics approach.

(1) a. *E:* I was to be captain of the *Pharaoh*; I was to marry a nice girl.
b. *F:* Did someone had an interest in you not becoming captain?
c. *E:* Only one man: Danglars.
d. *F:* Now, tell me about the girl you were supposed to marry.

The two trees on Fig. 1 represent the viewpoints (called *designs*) of the two participants to the discourse: E is on the left and F on the right. The presence of a horizontal line indicates an interaction from the corresponding speaker and the corresponding utterance is indicated next to the line.

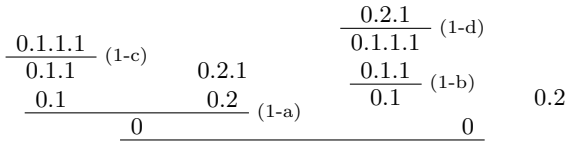

Fig. 1. Ludic representation of the dialogue in (1)

E's first assertion opens up two locations from which to continue the dialog after the initial situation (which receives the index 0). Each further location receives an address formed by adding an integer to the address of the location it attaches to. Thus after *E*'s first utterance, *F* can choose to attach its contribution either on the first part of the utterance (relative to the captainship, located at 0.1) or to the second part (relative to the girl and located at 0.2). As it happens, *F* elects to go on the first location offered and asks a question about the captainship (0.1.1) to which *E* answers in 0.1.1.1 by uttering (1-c). After that, *F* chooses to go on the second location offered by *E*'s first assertion, which is still open, and asks about the girl in 0.2.1 (1-d). Instead of asking about the girl, *F* could have been satisfied with the exchange and played a special move, called the *daimon* (noted †), that would have terminated the conversation (this move usually corresponds to answers such as "*ok*", "*thanks*" etc.)

2 Accessing various contents in the discourse

This section summarizes several observations about the way different types of semantic material can be accessed in the discourse. In the next section we will evaluate the way the ludics framework can cope with these empirical facts. Presupposition is mainly discussed, but many of the following observations also apply to conventional implicatures (à la Potts (2005)) and related types of contents.

These observations can be roughly divided into two classes: the ones that deal with the question of *projection* and those that deal with *attachment*.

2.1 Projective meaning

The term of projective meaning has been recently used by Simons et al. (2010) to refer to any content that "survives" its embedding in a linguistic context that usually affects the truth-conditions (represented by a "family" of test sentences). The term of projection has been in use since Langendoen & Savin (1971) and has long been reserved to the case of presuppositions (see e.g. Karttunen & Peters (1979)). Examples of presupposition projection are given in (2):

(2) a. Harry knows Mary is sick.
b. Harry doesn't know that Mary is sick.
c. Does Harry know that Mary is sick?
d. Harry might know that Mary is sick.

Each sentence in (2) entails that Mary is sick, even though the last three involve contexts that usually do not preserve truth (namely negation, interrogation and the embedding under a possibility operator).

However, projective material does not *always* project, and many contexts that block projection have been identified. The most obvious one is a structure as in (3-a) where the projective content itself is placed in the antecedent of a conditional sentence.

(3) a. If Mary is sick, then Harry knows about it.
b. $\not\rightsquigarrow$ Mary is sick.

Various proposals have been made to account for this (see Karttunen & Peters (1979), Gazdar (1979), Heim (1983), Schlenker (2008) among many others). Here we will focus on the recent proposal by Simons et al. (2010) that associates the projective nature of discourse material to its relation to the question under discussion. The basic tenet of their proposal is that a given meaning will project out of a non-veridical if and only if this material is not at issue regarding the question under discussion (QUD). The notion of QUD is taken from Roberts (1996) and corresponds to the possibly implicit and reconstructed question to which an utterance is supposed to answer. A proposition p will be considered as *being at-issue* if and only if the speaker intends to address the QUD by asking whether p is the case or not. An intention to address the QUD by asking whether p is felicitous only if:

– $?p$ is relevant to the QUD (i.e. it contributes to answering the question)
– the speaker can expect the addressee to recognize his intention in doing so.

This entails that depending on the discourse context the same content can project or not depending on whether it is at issue (something that previous accounts on projection had trouble managing).

To illustrate this, let's consider the status of the prejacent of the adverb *only*. In a sentence like (4-a) the prejacent is usually considered to be presupposed, and thus to be projective material: out of the blue it seems that either (4-a) or (4-b) entail the truth of (4-c).

(4) a. Mary has only French students in her class.
b. Does Mary have only French students in her class?
c. $\rightsquigarrow$ Mary has French students in her class.

However, depending on the discourse configuration the second entailment might not hold. If, for example, (4-b) is asked in a richer context such as (5), it is perfectly acceptable to answer it with (5-b) which contradicts the purported presupposition without giving rise to a degraded judgment.

(5) [Mary is a fresh new French literature teacher].
a. Teaching French literature gets easier as the number of your French students increases. It's the easiest if all your students are French. I'm curious to know how easy it will be for Mary. Does she have only French students in her class?
b. No, all of them are foreign, she's going to have a very hard time.

The context in (5) is set up in such a way that having French students actually matters to solving the question, and thus is at issue. The prediction is thus that this content will not project. This prediction is correctly borne out as (5-b) shows by negating this content.

2.2 Discourse attachment

Another feature that has been said to characterize presupposition relates to the notion of *attachment*.

Ducrot (1972) observed that it is not possible to continue a discourse by appealing on presupposed material alone. This explains the infelicity of (6): the second discourse segment tries to establish a relation of consequence built only from the presupposed material of the first segment and not from its main content.

(6) #Harry stopped smoking, so I guess he did not care about his health.

More recently, Jayez (2010) proposed that a presupposition can actually be used to establish a discourse relation as long as it is used alongside the main content of the utterance. This can be seen in (7) where the second conjunct uses information that is both presupposed and at the level of the main content.

(7) Harry suddenly stopped smoking, so I guess that it was his wife who did not like it.

This property of attachment is related to the question of projection: if a given meaning m can be used to establish a subsequent discourse relation, it entails that this material is projective. In this regard, Jayez's proposal goes beyond an observation on attachment and actually equates the projection behaviour of a given content and the possibility to build a discourse relation on this content: projected material cannot be used as the sole source for establishing a discourse relation.

3 Attachment: the case of presupposition

The example given in (1) to illustrate the way to represent a dialogue in ludics might give the impression that any content conveyed by an utterance is offered as a location on which an addressee is allowed to react: he may ask for an elaboration, provide an answer to a question etc. Specifically, in (1) the first assertion opens up two locations that remain open in the discourse (and each of those gets used in the end). However, as shown in the previous section, all conveyed material is not equal regarding the question of attachment, which means that some parts of meaning must not be open for attachment. The apparent flexible approach of ludics could then be too permissive and allow an access to material that should remain dialogically inert.

In this section the ludics approach to presupposition is first presented and then evaluated with regards to the observations made above.

3.1 Presupposition

As just stated, the presentation sketched about the dialogue (1) gives the impression that in the ludics approach, any conveyed content is accessible for discursive attachment, e.g. for a possible refutation or a request for giving proof,

which would be undesirable. Luckily enough, this is not the case, as we intend to show.

Presupposition is covered in ludics by considering that a speaker that uses a presupposition trigger does not "open" a slot on which to react on the presupposed content (cf. Lecomte & Quatrini (2011)). To illustrate this, let's consider (8) that involves the presupposition trigger *still*. In this case the presupposition is that B was smoking before.

(8) a. *A:* Are you still smoking?
b. *B:* Yes.

We represent the viewpoint of A in the dialogue on Fig. 2.

$$\dfrac{\dfrac{\vdash 0.0.0.0 \qquad \vdash 0.0.0.1}{0.0.0 \vdash}\,(-, 0.0.0, \{\{0\}, \{1\}\})}{\vdash \langle\rangle}\,(+, \langle\rangle, \{0\}); (-, 0, \{\{0\}\}); (+, 0.0, \{0\})$$

Fig. 2. A's treatment of presupposition in (8)

On Fig. 2, the contributions of the participants are more detailed than on Fig. 1: positive and negative actions are made explicit, and thus the result of a discourse move corresponds to a sequence of several actions. In the case of a question, the interrogative form is represented by one positive action for the act of asking the question, and a negative action that stands for the expectations of the speaker regarding his question. In the case of questions, these correspond to the set of possible and compatible answers for his question. This set is not necessarily limited to congruent answers to the question: indirect answers also belong to this set.

In (8-a), the presupposition triggered by *still* is treated as a hidden question that the speaker settles by himself. Therefore, for (8-a) we have:

- A first question that changes the initial state $\langle\rangle$ to the one indexed by 0, and for which a single answer (0.0) is expected. This corresponds to the question *Did you smoke before?*, that is not explicitly asked to the addressee and considered settled by the speaker who will only consider the address 0.0.
- These two actions are represented by the first two moves of the speaker: the question is represented by two moves:
  1. One positive move $(+, \langle\rangle, \{0\})$ that indicates the address to which the question attaches ($\langle\rangle$) and the index of the move added (0).
  2. One negative move $(-, 0, \{\{0\}\})$ that represents the expectations of the speaker regarding his previous question (i.e. the moves based on the address 0). In the case at hand only the singleton set $\{0\}$ is considered. This means that the speaker only expects continuations that go on from the address 0.0, namely continuations that take for granted that B used to smoke.

– Afterwards, the speaker asks its question regarding the present state of the addressee (a rough paraphrase of which would be *Are you currently smoking?*): this is another positive move $(+, 0.0, \{0\})$ that attaches to the location 0.0 constructed with the two previous moves.
– After this second question, the speaker expects either a positive (represented by 0) or a negative answer (represented by 1), i.e., it opens up two branches with a negative move $(-, 0.0.0, \{\{0\}, \{1\}\})$.

3.2 Attachment to the presupposition and projection

In the treatment of presupposition shown above, the speaker bundles its first three actions in one move, and only offers the addressee two locations on which to react: 0.0.0.0 and 0.0.0.1. This means that the speaker does not offer the addressee the chance to answer the question that corresponds to the presupposition and thus that the speaker forces the addressee to accept the answer he has elected for the presupposition. If the addressee wants to give an answer that complies with the open question, he then has to attach to loci that entail that he smoked before.

This corresponds to some of the observations made above regarding the impossibility to attach to presupposed material alone.

First, this mirrors Jayez (2010)'s hypothesis according to which discursive attachment can bear on presupposed material only if that same attachment also takes into account the main content of the utterance it attaches to. The previously described system embodies this hypothesis. At the time the addressee is expected to answer, the only loci open for his reply pertain to the last question. This means that he necessarily has to react on this last question (which is the main content of the speaker). And since these loci are all branchings that integrate the presupposition in their structure, the addressee might also elect to react on the presupposition as well as the main content if he chooses so. But unlike the main content, the addressee is also at liberty to ignore the presupposition if he so wishes.

Second, the system presented above can also be linked to the proposal made by Simons et al. (2010). In (8), the QUD is made explicit by the last action of the speaker: he asks a question and expects answers. All these answers entail the presupposition (each accessible locus stems from the same answer to the presupposition), and so this entails that the presupposition is *projected*: it survives the embedding under the question operator precisely because it does not address the QUD. If the question addressed the QUD, as in (5), the offered loci would not all have the information that Mary has French students in their structure, and the content would not be projected.

The system also works for the embedding of presupposition triggers under operators different from questions. The gist of the explanation is to consider that any discourse move by a speaker corresponds to positive and negative actions. So far these two sets of actions have been illustrated by questions, but this is by far not the only way to construe these actions. From a more general point of view, these actions are part of the general design the speaker has in mind:

he makes certain discourse moves and expects some reactions to these moves. In the case of questions these reactions will be answers, but when the speaker asserts something, the expected reactions will be geared towards the refutation or challenging of his assertion. Either way the speaker opens up loci on which the addressee is expected to react. Via this principle of forcing choices on its addressee, the speaker is able to lead its addressee to accept some propositions on which he doesn't give him access.

Nevertheless this is only an option for the speaker: he might have a design that is more complex than the one presented on Fig. 2, and in particular he might conceivably open up loci for which there some proposition is taken for granted as well as ones that do not have such requirements. In those cases the addressee might react without taking the presupposition into account. These would correspond to cases of non projection of the presupposition. This possibility of the speaker precisely corresponds to cases for which the question behind the presupposition is not considered settled, i.e. for which it is said to be *at issue*. Therefore, in this sense the ludics framework integrates the Simons et al. (2010) postulate about the projection of presupposition: material project iff. it is not at issue.

This line of analysis can also be applied to the treatment of the *proviso problem* as defined by Geurts (1996). The sentences in (9) illustrate this problem.

(9) a. If John comes, he will bring his diving gear.
b. If John is a diver, he will bring his diving gear.

The sentence (9-b) does not presuppose that John possesses diving gear. Rather the presupposition seems to be a version weakened by the antecedent: "*if John is a diver, he possesses diving gear*". This contrasts with (9-a) where it seems intuitive enough to assume that John has some diving gear, even though the structure of the sentence is similar to (9-b). At any rate the presupposition does not seem to be "*If John comes then he possesses diving gear.*"

A possible treatment for (9-a) is given in Fig. 3.

$$\dfrac{\dfrac{\vdash 0.0.0.0.0.0 \qquad \vdash 0.0.0.0.0.1}{\vdash 0.0} \qquad \dfrac{\vdash 0.1.0.0.0.0 \qquad \vdash 0.1.0.0.0.1}{\vdash 0.1}}{\vdash \langle\rangle}$$

Fig. 3. A structure for (9-a)

In the proposed structure, the speaker follows the following steps:

– A first question relative to the truth of the antecedent is asked. The answer to this question is not known by the speaker, so he expects both a positive and a negative answer (loci 0.0 for "*John does not come*" and 0.1 for "*John comes*").

– The next steps involve the treatment of the presupposition: from each of the previous loci, the speaker presupposes that John has diving gear. This means that he sets up a covert question for which he considers only one possible answer (which creates loci 0.0.0.0 and 0.1.0.0). As before, this step is not accessible.
– The speaker then considers the consequent of the conditional and opens up two possible locations for the addressee interaction on each preceding address (one that corresponds to John bringing his diving gear the other to him not bringing it). In the end four possible slots for interaction are open. They correspond to the combinations of John coming or not and bringing his gear or not.

The case of (9-b) is dealt with in Fig. 4.

$$\dfrac{\dfrac{\vdash 0.0 \qquad \dfrac{\vdash 0.1.0.0.0.0 \qquad \vdash 0.1.0.0.0.1}{\vdash 0.1.0.0}}{\vdash \langle\rangle}}$$

Fig. 4. A structure for (9-b)

There, the presupposition is not treated in the same manner.

– The speaker starts in the same manner by dealing with the question of the truth of the antecedent.
– However in this case, only the positive answer will entail that John has some diving gear: if he is not a diver the entailment is less licit and not called for by the structure of the sentence (unlike in (9-a) where the antecedent was neutral regarding this proposition). This is represented by having this information treated only on the positive branch after the first question and this creates the location 0.1.0.0. The negative branch (0.0) does not undergo this treatment.
– On the positive branch, the speaker then proceeds on opening slots related to John bringing the gear or not.
– In the end only three slots are open: one where John is not a diver, the other two where he is, and brings his gear or not. The situation where John is not a diver but brings his gear is not considered.

The representations proposed above suppose that conditional sentences receive a treatment that reflects the way questions are interpreted. The first step of the speaker is to consider the possibilities related to the truth of the antecedent of the conditional. This is equivalent to asking a question about the antecedent and then proceeding to evaluate the consequent. In ludics terms this means creating two branches that correspond to both possibilities.

4 The monadic *but*

As a last note about presupposition we can look at the case of refutation of a presupposition, or in other terms the denial of a presupposed content. In the dialogue (8), if B wants to object that he did not smoke before, or if he merely wants to point out a consequence of his having smoked before, his contribution will diverge with the question opened by A. This means that B will force A to retract his query and replace it with a more fine-grained one, i.e. one that makes its presupposition explicit and leaves room for refutation or the construction of an attachment on the presupposed material alone. Yet, even though such a move is possible for B, it is not free, and it requires B to use specific linguistic means to achieve it.

For a refutation, one of those means is to use the so-called "monadic" *but* Zeevat (2011), i.e. a use of the connective without an explicit left argument. The traditional descriptions of *but* usually focus on its use inside one and the same discourse move as a true conjunctive element (e.g. see Lakoff (1971) and the numerous works that borrow from her classification). However, one its monadic uses are very frequent, and even more so in languages like French, Spanish or Italian. Zeevat (2011) links this use to the origin of *but* as a marker of objection to some part of a previous utterance. The monadic *but* is illustrated in the following dialogue where *but* marks that the addressee refuses the presupposition of the speaker.

(10) a. I regret that Mary cannot come.
b. But she is already there!

In the dialogue (8), the monadic *but* can also be used to refute the speaker's presupposition:

(11) a. *A:* Are you still smoking?
b. *B:* # (But) I never smoked.

Without the use of *but*, *B*'s reply is far less acceptable and if not *but*, at least some other overt mark of refutation is needed (intonation might be used, in which case we would analyse it as another form of specific marking).

In the ludics framework we can then analyse the monadic *but* as a mark of non-convergence between the speaker and addressee designs. In more formal terms, the monadic *but* marks that the design of the addressee is not orthogonal to the design of the speaker, i.e. that the two designs taken together cannot reduce to the paralogical *daimon* which corresponds to a felicitous exchange that satisfies both parties' designs[1]. By using the monadic *but*, the addressee then requests the speaker to give him access to loci the speaker did not open up before so that their designs can be convergent and reduce to the daimon.

[1] Space prevents us to give a full explanation on the notions behind the daimon and the convergence between two speakers designs. Here again the reader is referred to the works of Lecomte & Quatrini.

It is worth remarking that the monadic use of *but* is versatile and powerful enough to be able to target assumptions of any kind. For example, in (12) the addressee targets A's assertion by contending that John does not meet a typical property of divers.

(12) a. A: John is a professional diver.
b. B: But he doesn't even have diving gear!

And in (13), the addressee (coyly) contends the coercion presupposition (cf. Asher (2011)) that enables to understand *cigarette* as the event of smoking the cigarette rather than the physical object.

(13) a. A: Nicholas rushed his cigarette.
b. B: But you can't rush an inanimate object!

In the ludics approach this kind of presupposition can be treated in the same manner as usual presuppositions: it is possible to have as fine-grained a description of the proof tree as necessary. Thus the way lexical information is taken in consideration and later combined with other information can be integrated in the proof tree as well.

5 Conclusion

In this work we looked at the way a ludics inspired approach to the interpretation of a natural language discourse handles the issues raised by the question of the attachment to and projection of presuppositions. We have shown that this framework manages to capture some insights of recent theories on presupposition projection, and allows a fine-grained representation of the contribution of discourse participants. The case of conditional sentences and the proviso problem have also been briefly addressed and treated in a similar way. The monadic use of *but* was then characterized as a marker of non-convergence between the designs of the speakers.

The presentation and the use we have made of ludics remains essentially representational. We have not given a principled way to compositionally build a discourse representation based on a set of linguistic items. Nevertheless, we think that this representational format and the proof-theoretic motivation behind it is interesting enough to try and apply it to various discourse phenomenon as we have just done for the case of presupposition.

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