Features of Argumentation

Contradictory Inferences and Defaultness

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1 Argumentation

Goals and features

- To treat aspects of discourse coherence that:
  - are not based on truth-conditions
  - relate to the *purpose* of the speaker when making a discourse move
  - involve several agents (possibly virtual)
- A successful interpretation of argumentation has been given in a *Bayesian* approach to discourse interpretation (Merin, 1999).
  - Agents attribute probabilities to propositions.
  - A discourse move affects the probability function.
  - A argues in favor B iff. asserting A raises the probability of B.

An example

(1) John was on time. Do not scold him.

(2) a. John was nearly on time. Do not scold him.
b. ⇝John was not on time.

(3) a. John was barely on time. # Do not scold him.
b. ⇝John was on time.

- The first segment of (1) is an *argument* for the second.
- Even though (2-a) conveys (2-b) it remains an argument for the same conclusion as (1).
- Surprisingly, (3-a) is *not* an argument for this conclusion, even though it entails (3-b).

⇒ Argumentation is not just a matter of truth conditions, but also about the way things are presented.

Argumentation is not self-sufficient

Recent works acknowledge the usefulness of argumentation whilst placing it in a larger context.

(Blutner, submitted)
The insights and results of Argumentation theory should be placed in the larger context of Gricean-like approaches.

(Jasinskaja, submitted)
An argumentative treatment of adversative particles does not cover *correction* cases, but is necessary for other cases.
Adversatives involve a general schemata of use that calls upon the relevant dimension to yield the correct interpretation.

In this talk

- What is the empirical extent of argumentation phenomena?

  ⇒ The example of *but*

- Is argumentation sensitive to some inferences?

  ⇒ Not to quantity implicatures.

- Can argumentation be reduced to some specific type of inference?

  ⇒ close to relevance-implicatures, but not "true" inferences

- Can there be argumentative effects that are independent from the context?

  ⇒ a preliminary experiment.

2 An example: *but*

- One of the most proeminent "argumentative" markers (Anscombre & Ducrot, 1977; Winterstein, 2011).
- For a sentence "p *but* q" to be felicitous, there must exist an r s.t.
  - p argues for r
  - q argues against r, i.e. for $\neg r$
  - q must be a better argument for $\neg r$ than p is for r

  (4) a. This ring is nice but expensive.
  b. r = We should buy the ring.

- In probabilistic terms (Merin, 1999):
  - p must raise the probability of r
  - q must lower the probability of r

The contrastive cases

- A classic problem with the argumentative approach: what is r in (5)?

  (5) Lemmy plays the bass, but Ritchie the guitar.

- Contrastive approaches (Sæbø, 2003; Umbach, 2005): *but* requires contrastive elements in each conjunct (e.g. *Lemmy/Ritchie* and *bass/guitar*), denials of expectations come as extra implicatures.

Argumentative answer:

1. In (5) the goal is "*Lemmy is not the only one to play the bass*".
2. What count as *contrastive pairs* is not clear. In (6), one has to consider that $\langle p, q\rangle$ and $\langle p, \neg q\rangle$ are both constrastive which is ruled out by most definitions of contrastiveness.

   (6) a. Lemmy plays the bass, but not Ritchie.
   b. Lemmy plays the bass, but Ritchie too.

Argumentation vs. other inferential approaches

- There are other attempts at characterizing *but* in inferential terms: (Blakemore, 1989, 2002; Benndorf & Koenig, 1998), i.e. by postulating a third pivotal element in its interpretation: either a contradicted assumption or a specific implicature.
- These approaches have to explain why proper contexts cannot be reconstructed when trying to evaluate the sentences in (7):

  (7)
  a. #Arnold is tall, but he's taller than his brother.
  b. #Lemmy solved all the problems, but Ritchie some of them.

- Argumentation offers a principled way to explain the cases of (7):
  - In (7-a) *being tall* and *being taller* are not argumentatively opposed by default.
  - In (7-b) the first conjunct does not (by default) offer goals that are contradicted by the second.

Abducing a goal

A two-step process in the case of *but*:

1. The first conjunct opens a set of potential goals, some of them being argumentatively contradictory:
   - any strengthening of a content p is a potential goal, e.g. for q independent from p, both $p \wedge q$ and $p \wedge \neg q$ are potential goals.
2. Among those, only the ones for which the second conjunct is a counter-argument are retained.

- These operations are *abduction*, i.e. they correspond to the construction of an appropriate context to warrant a certain observation (when the goal is not made explicit).
- This kind of operation is plausible from a cognitive point of view (see Oaksford (2009); Oaksford & Chater (2010); Tenenbaum et al. (2011) about Bayesian reasoning).

Taking stock

- The semantics of *but* considered here are inferential: to interpret *but* it is necessary to abduce the proper argumentative goal.
- Argumentation offers a principled way to account for some reconstructions more than other (i.e. it's not just "world knowledge").

⇒ Is the goal an inference like any other? An answer in two steps:

1. It can contradict other inferences, namely quantity implicatures.
2. It is difficult to characterize it in pure truth-conditional terms.

Some but not all...

(8) [Lemmy played some of the solos]$_A$, but [not all]$_B$.

- By itself, A conveys a quantity implicature B' that matches the content of B (e.g. Geurts (2010))
- To license the use of *but* there must be a proposition r such that
  - $A \underset{arg}{\rightsquigarrow} r$
  - $B \underset{arg}{\rightsquigarrow} \neg r$

⇒ How to handle the fact that the first conjunct can convey a quantity implicature to which it is opposed?

Inferential answers

- For a theory like Relevance Theory quantity implicatures are placed at the same level as the assumption necessary for the interpretation of *but*.

  ⇒ the first conjunct must convey two contradictory assumptions, placed at the same level (this is not good)[1].

- Benndorf & Koenig (1998): argumentative goals are a specific kind of implicature, i.e. *R*-implicatures (Horn, 1984):

  ⇒ the first conjunct must convey two contradictory implicatures, albeit of different type (this is not an orthodox Gricean situation given the nature of conversational implicatures and their defeasible character).

Independence

- If the argumentative goal is to be treated as a kind of inference, it needs to be kept apart from quantity implicatures.

Independence Hypothesis

- Argumentation is only computed with the main content of the utterance, i.e. it ignores Q-implicatures.

⇒ an utterance can argue in a direction opposite to a content it conveys via other means (e.g. *almost*)

- *But* is only sensitive to argumentation goals.
- Thus, *but* can introduce a conjunct that is redundant with a Q-implicature, as long as that content is in argumentative opposition with its host.

[1] Blakemore (2002, p.113) discusses such cases and ends up saying that it is sufficient that the assumption needed by *but* is manifest, not necessarily conveyed. This leads to a certain number of problems, especially on cases like (7).

Some predictions

The independence hypothesis allows the following combinations:

	Impl.	¬ Impl
Arg. Opp.	(9)	(11)
¬ Arg. Opp.	(10-b)	(12)

(9) Lemmy played some of the solos, but not all.

(10) a. Is Lemmy a whisky connoisseur?
b. Oh yes: he drinks single malt scotch, (and/?but) nothing else.

(11) At least some students failed the test, but not all.

(12) I want to sample the Dalmore Astrum whisky, (and/?but) that'll be enough.

A possible problem

(13) a. [Lemmy plays the bass $]_A$, but [Ritchie the guitar$]_B$.
b. Lemmy plays the bass, but [Ritchie plays the guitar (and not the bass)$]_{B'}$.

- Intuitively, *but* needs to "see" the implicature on the right, i.e. (13-a) must be understood as (13-b) for the opposition to work.
- The probabilistic approach to *but* preserves the independence:
  - B raises the probability of B' which entails r="*Lemmy is the only one to play the bass*", i.e. B is an argument for r.
  - $\neg r$ is one of the possible goals of A

$\Rightarrow$ The set of goals are not based on the presence of a Q-implicature (but their abduction favors the implicature).

3 Argumentation in multi-layered semantics

- **Goal:** to try and represent argumentation goals in layered semantics, i.e. as a specific type of inference, distinct from other types of inferences.
- An existing proposal: Spenader & Maier (2009) describe CONTRAST in LDRT (Geurts & Maier, 2003, to appear), a multi-layered extension of classical DRT (Kamp & Reyle, 1993).
- The observations of this section can be adapted to other multi-layered proposals: Karttunen & Peters (1979); Potts (2005)...

A crash course in LDRT

- Basically, LDRT is DRT equipped with a set of labels related to layers of meaning, e.g. classical fregean "asserted" meaning, presupposed meaning, conversationally implicated meaning etc.
- Layers "communicate" via discourse referents.
- Example:

(14) a. The porridge is warm.
b. $[x_p : \text{porridge}_p(x), \text{warm}_a(x), \neg_i[: \text{hot}_i(x)]]$

c. Layers:

a: the asserted layer
p: the presupposed layer
i: (conversationally) implicated layer

Contrast in LDRT (Spenader & Maier, 2009)

- Contrast and denial are the same operation: *but* contradicts a condition introduced on an inferred layer (the *tertium comparationis*: *TC*).
- Denial is handled with the specific operation of *downdating*:
  - Add the content of the corrective material
  - Delete all the previous contents not compatible with the corrective material.
- Example: indirect contrast (Spenader & Maier, 2009, p. 1720)

(15) *Yan:* I was hungry, but the restaurants were all closed.

$$\rightsquigarrow \left[x_k : \begin{array}{l}\text{yan}_k(x), \text{eat?}_a(x), \\ \text{hungry}_a(x), \textit{ate}_{\textit{inf}}\textit{(x)}\text{ate}_{inf}(x)\end{array}\right] \downarrow \left[x_k, Y_k : \begin{array}{l}\text{yan}_k(x), \text{restaurants}_k(Y), \\ \text{closed}_a(Y), \neg_{inf}\text{ate}_{inf}(x)\end{array}\right]$$

$$\rightsquigarrow \left[x_k, Y_k : \begin{array}{l}\text{yan}_k(x), \text{eat?}_a(x), \text{restaurants}_k(Y), \\ \text{hungry}_a(x), \text{closed}_a(Y), \neg_{inf}\text{ate}_{inf}(x)\end{array}\right]$$

Some remarks

- The treatment of *but* is clearly inferential, which is consistent with the argumentative approach.
- The first conjunct gives the *issue* that is debated: this mirror the observations about the abduction process which depends on the goals activated by the first conjunct.
- Argumentation can be confined to a level that does not communicate with the level of Q-implicatures. Which level?
  - B&K: on the level of R-implicatures: this is not coherent with the definition of conversational implicatures.
  - S&M: on the level of particularized inferences. This is debatable, see infra.
- The semantics for *but* imply the existence of a *TC* ($\sim$ goal) but nothing is said about the way it is found. Thus, the case of (10-b) is handled correctly as long as it is ensured that no proper *TC* can be found.

Technical details

- Accounting for direct contrast implies that an *asserted* content deletes a content *inferred* from the first conjunct.

$\Rightarrow$ Need to properly define what an inconsistent LDRS is:

  - The case of irony requires an inferred content that is the negation of the main content (Geurts & Maier, to appear) $\Rightarrow$ inconsistent layers are possible and needed.
- **Possible Answer:** the downdate operation is crucial. It can be defined as the deletion of everything that is inconsistent inside the same layer, plus anything that is inconsistent with the asserted layer. If not downdating, an inconsistency between the asserted and inferred layer remains possible.

Potential problems

- LDRS does not allow for graded values of truth, so the TC is necessarily wiped out and replaced by its negation after the assertion of the second conjunct. This might not be a good thing.

  (16) a. Should we hire John?
  b. Well. He is the only one with the proper qualifications, but he has anger issues, so I really don't know.
  c. $\not\rightsquigarrow$We should not hire John.

- *But* should entail that $r =$"*We should not hire John*" stays on the inferred layer. This is problematic for two reasons:

  1. To delete it requires a further downdate (and an appropriate marker)
  2. The consequence relation marked by *so* should not be possible.

- The probabilistic approach naturally integrates this: the probability of the goal fluctuates and is only equal to 1 in cases of direct contrast.

- A *graded* measure of the argumentative relation is independently necessary, cf. *too* (Winterstein, 2010; Winterstein & Zeevat, 2011).

Taking stock

- A layered semantics approach offers many advantages to manage the (non)-interaction between the content necessary for interpreting *but* and other layers of meaning.

- However it fails to do justice to the specific nature of this element:
  - The goal/TC cannot be treated as a content considered to be "true" at some level.
  - A probabilistic treatment appears more appropriate.

- The question of the way the goal is found out remains open.

4 The effect of context

- Most, if not all, authors agree that the use of *but* requires the determination of a pivotal element: the argumentative goal, the TC, the *quaestio*...

- The context of utterance is often cited as one of the main elements that guide this determination:
  - S&M "contrast is limited to denials of implications based on context and world-knowledge."

- Without a minimal context, many theories consider that the goal/TC cannot be built.

- In other terms, out of the blue a minimal context is abduced.

All contexts are not equal

- Oddly enough, some contexts appear easier to abduce than others:

  (17) a. #Paul is moving but fast.
  b. Paul is moving but slowly.
  c. #Arnold is tall, but he's taller than Bruce.

d. Arnold is tall, but he's shorter than Bruce.

- The degraded versions can conceivably be "saved" in the proper context:

(18) A: We're looking for someone to play Bruce's sidekick in the movie. He should not look too ridiculous next to Bruce, but he should not make Bruce look ridiculous either.
B: Arnold is tall, but he's taller than Bruce.

- A good theory should be able to predict something about this.

Is context that powerful?

Pilot experiment (French)

- Test items: gradable expressions, combined with an expression of low/high degree introduced by *but*.

(19) The truck is moving, but (slowly/quickly).

- Out of the blue, (19) looks better if *but* introduces a low degree.
- The various test items were presented under three different forms:
  1. Without context
  2. In a context that favors a high interpretation of the gradable expression.
  3. In a context that favors a low interpretation of the gradable expression.
- **Goal:** Test whether context 3 has the expected effect.

The experiment

- Online judgment task experiment (hosted on the `IbexFarm`).
- 40 native speakers of French.
- Items were presented in a random manner, distributed according to a latin square and interspersed with filler items.
- Subjects had to rate the naturality of the sentences presented on screen on a scale from 1 ("Bad") to 10 ("Natural").
- The scores of the target sentences without the connective *but* were also measured.

Preliminary Results

Ctxt/Continuation	*But*+low degree	*But*+high degree
No context	7.91	3.29
High interpretation	7.32	2.82
Low interpretation	4.41	*3.5*

- Out of the blue, *but* appears much better if it introduces a low degree
- i.e. it appears that contexts that favor a high interpretation are more easily abduced.
- As expected, the contexts that favor a low interpretation for the gradable predicate degrade the use of *but* to introduce a low degree.
- However, contexts that supposedly favor a low interpretation do not have the expected effect.

Discussion

Why does a "favorable" context not improve (20)?

(20) The truck is moving but quickly.

- Contexts not properly set up? A second wave of experiments might shed more light on this aspect.
- A strong default character of the abduction process?
  - Either the context is compatible with the abduction and can precise it, or it is not and the sentence is degraded.
  - The context alone cannot furnish the necessary content.
- A point in favor: the feeling of many speakers that supplementary markers should be used in (20), i.e. that the information should be presented in the proper way.

(21) a. The truck is moving, but very quickly.
b. The truck is moving, but too quickly.

Further experiments

1. A new judgment task experiment, including supplementary markers.
2. A self-paced reading experiment that aims at measuring the time course of the degradation in low-degree contexts.
   - If the abduction is strongly constrained by the lexical materiel, then it might be expected that the degradation occurs at a later stage.
   - The two-step process would begin by activating goals triggered by the lexical elements and then check the compatibility with the context. The incompatibility would only occur at this later stage.
   - This issue can be compared both with:
     - Investigations on discourse anomalies such as Stewart et al. (2009).
     - Numerous investigations on the default character of quantity implicatures Breheny et al. (2005); Noveck & Sperber (2007); Katsos (2009); Geurts (2010); Chemla & Spector (2011)...

Some conclusions

1. Argumentative contents cannot be compared to implicature-like inferences:
   - They can be opposed to implicated contents
   - They cannot be considered to be properly "conveyed" in the same sense as implicatures.
2. Even though they appear context-sensitive in some way, argumentation inferences also exhibit a degree of defaultism that cannot always be overridden by context.

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