

The grammar of discourse: The case of *then*

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This paper investigates *then* within conditional structures and across discourse. It provides a unified analysis and argues that the notion of *explanatory claim* is the key insight in both cases. I build on [4] and [2] to provide an analysis in which *discourse reference* is at the heart of the interpretation.

Then in conditionals: It has already been claimed that *then* carries a meaning that explains its infelicity in some conditionals, (1). [4] proposes that *then* in the conditional *if p, then q* triggers the presupposition that there are $\neg p$ alternatives in which *q* is not true; [2] builds on [4] and proposes that *then* triggers a conventional implicature that *only* the *p* worlds are *q* worlds.

- (1) a. Well, if you finished your homework, then you can go play outside.
b. Even if Smith is dead, (#then) the Sheriff wants him.
c. Whether Smith is dead or alive, (#then) the Sheriff wants him. (unconditional)
d. If you are hungry, (#then) there is pizza in the fridge. (biscuit conditional)

[4] and [2] do not consider examples like (2) and (3), making wrong predictions in these cases:

- (2) I'm certainly taking a job, but so far all the opportunities require me to start working at 7:00 a.m. Yes, as incredible as it sounds, if I take the Taco Bell job, then I also start at 7:00 a.m.
(3) If Jim had asked Jack for help, then there would (have to) have been no quarrel yesterday.

The speaker in (2) does not presuppose an alternative to taking the job at Taco Bell in which he does not start at 7:00 am (contra [4]). The backtracker in (3) does not convey that only the situations in which Jim asked Jack for help are situations in which there was no quarrel (contra [2]).

Then across discourse: Intuitively, *then* needs an “antecedent”. It can be provided by an *if*-clause, but it can also be found in the preceding discourse in various forms:

- (4) A: I'm cold. (6) A: He must confess! Cut off his fingers!
B: Then put on a sweater! B: Then you really are a sadist.
(5) A: What does “lambda” mean? (7) A: He was cranky this morning.
B: Then you didn't understand the lecture. B: Then you told him?

The presence of *then* does not change the truth-conditions of the embedded clause (the meanings of declaratives, questions or imperatives remain the same). **Explanatory intuition:** the presence of *then* signals that (discursively) what follows *then* is explained by what precedes it (the antecedent). E.g. I suggest that you put on a sweater because you don't want to be cold; I know that you didn't understand the lecture because you ask a question you should know the answer to by now; I know you are a sadist because only sadist order torture. The antecedent of *then* is sometimes provided by the content proposition of the previous discourse move, (4) and (7), but sometimes by the fact that the previous discourse move itself took place, (5) and (6). **“In conditionals” vs. “across discourse”:** Differences between the two cases are independent of *then*, which can receive a unified analysis. Suppose a child says she finished her homework. The reply in (8) is not identical to (1a):

- (8) Well, then you can go play outside.

Faced with (1a), the child could complain *Don't you believe me?*, but not in the case of (8). This shows that *then*-clauses (e.g. (8)) are not elided *if*-conditionals. Contrary to *then*-clauses, conditionals like (1a) assume that the context set includes both antecedent- and non-antecedent worlds.

Proposal. The contribution of *then* is not backgrounded (i.e. presupposed), and it lacks speaker oriented meaning (i.e. not a conventional implicature). Following the paraphrases provided above, I characterize *then* as a discourse marker: *then* signals that the utterance of the embedded clause is motivated by information gained from the previous discourse move (where a discourse move M_i is defined as the utterance of a sentence structure syntactically headed by a force operator, i.e. $[A[S]]$, $[Q[S]]$ or $[Imp[S]]$). The utterance of a *then*-clause leads the hearer to reconstruct (i) what the speaker learned from the previous discourse move and (ii) what (modal) relation it bears to the information gained from the clause embedded under *then*. I use [3]'s *commitment slates* to model a participant B's public commitments and define the information gained from a discourse move M_i :

- (9) **Information gain:** $I_{B, M_i} = \{p : p \in \text{cos}_{B, M_i} \ \& \ p \notin \text{cos}_{B, M_{i-1}}\}$, where M_{i-1} is the move immediately preceding M_i and cos_{B, M_i} is B's commitment slate after M_i .

Then establishes a modal relation between the information gained from the discourse move that precedes it and the discourse move corresponding to the embedded clause. It is reminiscent of a conditional, but operating at the level of discourse, where the antecedent “explains” the consequent:

- (10) Let g be an assignment function, P and MB Kratzer-style conversational backgrounds, $s_{@}$ the utterance situation, and $\text{MAX}_{P(s_{@})}(X)$ the P -best situations in a set of propositions X ,
- $\llbracket [\text{CP Then } [M_{i+1}]] \rrbracket^g(s_{@}) = \llbracket [M_{i+1}] \rrbracket(s_{@})$, defined only if
- i. $\forall s \in \text{MAX}_{P(s_{@})}([\cap \text{MB}(s_{@})] \cap g(i))$, $g(i+1)(s) = 1$
- Where for any discourse move M_j , $g(j) \in I_{A, M_j}$ and A utters the *then*-clause.

According to (10), *then* does not change the truth-conditions of the embedded clause. It refers to discourse moves and imposes felicity-conditions on the relation between two propositions identified by the assignment g (roughly: a Kratzer-style conditional relation). *Then* requires a (discourse) *antecedent* and *consequent*: the antecedent proposition is information gained by the speaker from the preceding discourse move (not necessarily the semantic content), and the consequent is extracted from the discourse move embedded under *then* (again, not necessarily the semantic content). With a contextually-determined modal flavor, *then* requires that in the best situations in which the antecedent is true, the consequent also be true. The utterance of a *then*-clause is only felicitous if we can recover the salient propositions standing in a modal relation that comply with the constraints imposed by *then*. **Consequences of the proposal: (I) Two case studies: a. Then-Imperative.**

- (11) A: I'm cold. $[M_1]$ cos_{B, M_2} {A is cold; A wants to be warmer; A putting on a
B: Then put on a sweater. $[M_2]$ sweater makes him warmer}

- (12) $I_{B, M_1} = \{A \text{ is cold; A wants to be warmer}\}$; $I_{B, M_2} = \{A \text{ putting on a sweater makes him warmer}\}$

By uttering the *then*-clause, B *implicitly committed* to the fact that A wanted to be warmer (not just to that A is cold), and stated that the best situation in which A is warmer are situations in which A puts on a sweater (bouletic modality). **b. Then in conditionals:**

- (13) If there is light in John's room, then he is home.

Under a restrictor analysis, the epistemic conditional in (13), minus *then*, states that given what the speaker knows, the consequent is true in the best situations in which the antecedent is true (i.e. information about a knowledge state). The presence of *then* adds that it is *because* the antecedent is true (or assumed to be true), that the consequent is true: *then* signals that the utterance of the consequent is motivated by the speaker learning the antecedent (it conveys (counterfactual) *discourse causation* between discourse moves) and that antecedent and consequent stand in a modal relation (epistemic-modality in (13)). In most scenarios, upon the utterance of (13), g identifies the content proposition of the *if*-clause as the antecedent for *then* (discursively, the antecedent restricts the domain of quantification), and the content proposition of the assertion embedded under *then* as the consequent. As is the case “across discourse”, the presence of *then* in a conditional *if p, then q* signals an *explanatory claim*: that *q because of p*. *Explanatory claims* can be causal (depending on the discourse context), but even in that case, they do not require that antecedent and consequent stand as cause to effect ([1] a.o.). **(II) The impossibility of then:** This analysis explains why *then* is not possible in (1b-1d): the antecedent of (1b-1c) exhaustifies the domain of quantification and the conditional conveys that the antecedent and the consequent are orthogonal: the consequent is true no-matter what. Hence, the antecedent does not provide any explanation for why the consequent is true, and *then* is infelicitous. In the case of (1d) (a *biscuit-conditional*), there is no possible modal dependency between antecedent and consequent, and so *then* is also banned. In addition, the present proposal correctly predicts that *then*-clauses are not good out of the blue, and that imperatives and questions are not good antecedents unless the antecedent is the information gained from the act of suggesting/ordering or questioning itself. **Conclusion.** Understanding *then* requires a grammar that operates at the level of discourse.

[1] Beebe. 2004. Causing and nothingness. [2] von Stechow. 1994. Restrictions on quantifier domains. [3] Gunlogson. 2008. A question of commitment. [4] Iatridou. 1994. On the contribution of conditional *then*. [5] Lewis. 1973. Causation.