

24.903 Week #12 – 2022-04-25 and 2022-04-27

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1 Truth-conditions

Our first two sentences are:

- (1) According to Steph, the team is confident.
- (2) In *A Study in Scarlet*, Holmes meets Watson in a lab.

We developed an understanding of what these sentences mean:

- the “intensional operator” shifts the world against which its “preja-cent” is evaluated
- the resultant claim is “anchored” in an object in the actual world (Steph’s professed beliefs, the work of fiction called *A Study in Scarlet*)
- from the anchor, a set of worlds is “projected”: the set of worlds “com-patible with” (the content of) the anchor
- overall, the sentences are true if all of the worlds in the projected set make the prejacent true

Putting it all together:

- (1) is true in a world w iff the team is confident in all worlds that are compatible with Steph’s professed beliefs as they are in w
- (2) is true in a world w iff Holmes meets Watson in a lab in all worlds that are compatible with the content of *A Study in Scarlet* in w

2 Compositional derivation

There is an immediate problem when we try to derive the truth-conditions of our sentences compositionally: all three of our composition principles (Function Application, Predicate Modification, Abstraction) simply pass the

evaluation world down to the constituents of a complex node. There is no way for one sister (the intensional operator) to shift the evaluation point of its other sister (the prejacent).

So, we need a new composition principle.

We will work with one that is quite similar to the Abstraction principle. In essence, it abstracts over the evaluation world and gives us for a constituent (the prejacent in our cases) the proposition it expresses: a function from worlds to truth-values that maps any world to the truth-value the prejacent has in that world.

The principle will be triggered by a covert element called “ $\wedge$ ”, also known as “up”.

(3) INTENSIONALIZATION

If an expression α has two daughters, one of which is “ $\wedge$ ” and the other is an expression β of type t , then for any context c and world w :

$$\llbracket \alpha \rrbracket^{c,w} = \lambda w'. \llbracket \beta \rrbracket^{c,w'}$$

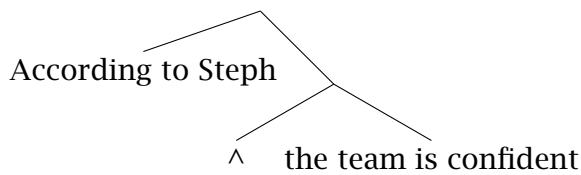
We will write lexical entries for our intensional operators that require their argument to be a proposition. To do this we introduce a type for worlds, namely s . And so, functions from worlds to truth-values (which is what the combination of $\wedge$ with a sentence will give us) will be of type $\langle s, t \rangle$.

(4) For any context c and world w ,

$$\llbracket \text{According to Steph} \rrbracket^{c,w} = \lambda p_{\langle s, t \rangle}.$$

$$\forall w' \text{ compatible with Steph's professed beliefs in } w: p(w') = 1.$$

An intensional operator can then only combine with its prejacent if there is an $\wedge$ attached to the prejacent:



Without going into the details of the internal composition of “according to Steph” and “the team is confident”, we can calculate the truth-conditions as follows:

For any c, w :

$\llbracket \text{According to Steph, } \wedge (\text{the team is confident}) \rrbracket^{c,w} = 1$

$\llbracket \text{According to Steph} \rrbracket^{c,w} (\llbracket \wedge (\text{the team is confident}) \rrbracket^{c,w}) = 1$ (by FA)

$\llbracket \text{According to Steph} \rrbracket^{c,w} (\lambda w'. \llbracket \text{the team is confident} \rrbracket^{c,w'}) = 1$ (by I)

$\forall w''$ compatible with Steph's professed beliefs in w :

$(\lambda w'. \llbracket \text{the team is confident} \rrbracket^{c,w'}) (w'') = 1$

$\forall w''$ compatible with Steph's professed beliefs in w :

$\llbracket \text{the team is confident} \rrbracket^{c,w''} = 1$

$\forall w''$ compatible with Steph's professed beliefs in w :

the team is confident in w'' .

These are the correct truth-conditions.

3 Conditionals

In many ways, conditionals are the archetypal construction of displacement: the consequent is evaluated not against the actual here and now but against the scenario conjured up by the antecedent. Consider a few conditional sentences:

- (5) a. If Kim left before 6am, she got there in time.
- b. If there's an earthquake tomorrow, this house will collapse.
- c. If there had been a massive snowstorm last night, Kai would have stayed home.

These represent the three main subtypes of conditionals (there are more): (5a) is an open conditional about the past, (5b) is an open conditional about the future, and (5c) is a counterfactual conditional. For the moment, the differences will be left aside. (See [Iatridou 2000](#) and [von Stechow & Iatridou 2020](#).)

The basic idea of how conditionals work is this: the *if*-clause whisks us away to a particular possible world (or maybe a set thereof) and the consequent clause is asserted to be true of that world (or those worlds). But what world(s) are we being taken to? The most obvious requirement is that the antecedent of the conditional needs to be true of the world(s). But there's more.

Given our discussion of how the semantics of other intensional operators anchors them in facts about the actual world (the actual content of the relevant body of fiction, for example, or the actual professed beliefs an individual in

the actual world), it shouldn't come as a surprise that conditionals are similarly anchored. So, look at the examples in (5): what in the actual world are they about?

Here's a first attempt of an answer: (5a) is about the local transportation system, the weather, the traffic, and so on. (5b) is about the sturdiness of this house, facts of geology, laws of physics, and so on. (5c) is about Kai's proclivities (such as avoiding traffic snarls), the local climate, and so on. Since the conditionals are anchored in real world facts, they are no mere flights of fancy and whether they are true depends on those facts. If today's traffic was particularly bad, it may be false that Kim's leaving before 6am would have got her there in time. If the architects went to great lengths to make the house earthquake-safe, (5b) may well be false. And if there was an attendance-mandatory faculty meeting, Kai may well have come in in spite of a massive snowstorm.

So, the outlines of the semantics of conditionals are clear: *if* takes us to worlds where the antecedent is true but that match the actual world in certain relevant features. And the consequent then is evaluated in those worlds.

We will formalize the analysis next week and delve into some details and consequences.

References

- von Fintel, Kai & Sabine Iatridou. 2020. Prolegomena to a theory of X-marking. <https://semanticsarchive.net/Archive/zdjYTJjY/fintel-iatridou-2020-x.pdf>.
- Iatridou, Sabine. 2000. The grammatical ingredients of counterfactuality. *Linguistic Inquiry* 31(2). 231-270. DOI: [10.1162/002438900554352](https://doi.org/10.1162/002438900554352).