5.1.3. Examples

Since the order of the two components of a conditional matters, the chief problem in analyzing English conditionals lies in identifying the antecedent and consequent. The key to this is the rule of thumb that the arrow runs from the subordinate clause (the *if*-clause) to the main clause.

After providing symbolic analyses of the following examples, we will restate them with all arrows running rightwards. This avoids the problematic English notation for leftwards conditionals, and it will be necessary, in any case, to restate conditionals with rightwards arrows in order to apply the logical principles we will be going on to study.

John drove, and Sam rode along if it was raining
John drove ∧ *Sam rode along with John if it was raining*
John drove ∧ (*Sam rode along with John* ← *it was raining*)

J ∧ (S ← R)
J ∧ (R → S)
`both` J `and` `if` R `then` S

If it was raining, John drove and Sam rode along
It was raining → *John drove and Sam rode along*
It was raining → (*John drove* ∧ *Sam rode along with John*)

R → (J ∧ S)
`if` R `then` `both` J `and` S

[J: *John drove*; S: *Sam rode along with John*; R: *it was raining*]

Notice that these two sentences are not equivalent. If the first were stated in English with the *if*-clause to the left of main clause it modifies, we would have *John drove, and, if it was raining, Sam rode along*. On the other hand, it is not easy to capture the content of the second sentence unambiguously with an *if* that follows the one it modifies. Indeed, that may be one reason that *if*-clauses are so often moved to the front. One way of getting the same effect with an *if*-clause at the end is to restate the consequent so it has a single main verb—for example, as *John drove with Sam riding along if it was raining*. This is still somewhat ambiguous, but the desired interpretation can be insured with a long enough pause before *if* or analogous punctuation, such as *John drove with Sam*

riding along—if it was raining.

In the next example, we tackle a conditional concerning the future. We will be forced to make a shift in tense when we state the subordinate clauses as independent components.

If I'm in town, I'll call if I get a chance
I'll be in town → *I'll call if I get a chance*
I'll be in town → (*I'll call* ← *I'll get a chance to call*)

$$T \rightarrow (C \leftarrow G)$$
$$T \rightarrow (G \rightarrow C)$$
`if` T `then if` G `then` C

[T: *I'll be in town*; G: *I'll get a chance to call*; C: *I'll call*]

One of the uses of the simple present tense in English is to state the antecedents of indicative conditionals concerning the future. But once it is out of that grammatical context, a sentence in simple present tense does not speak of the future. In fact, some sentences in simple present tense have very few natural uses at all. For example, while *If the meeting gets out early, I'll call* is unexceptional, the sentence *The meeting gets out early* would normally appear only either as part of certain style of narrative (e.g., *The meeting gets out early. Sam calls. They go out to dinner.*) or as a statement of a regularity (i.e., the sort of thing that might be stated more explicitly as *The meeting always gets out early*).

The word *if* is, by far, the most common way of expressing a conditional in English but occasionally other expressions are used, the most common of which is *provided (that)*. So the example above might have been expressed instead as *If I'm in town, I'll call provided I get a chance* or *If I'm in town, I'll call provided that I get a chance*.

Sometimes we wish to commit ourselves to different things when a condition is true and when it is false. One way of doing this is with the form $(\varphi \rightarrow \psi) \wedge (\overline{\varphi} \rightarrow \chi)$, which we will refer to as a ***branching conditional*** (after the name of an analogous conditional *command* used in computer programming languages). A sentence of this form asserts one thing, ψ, if φ is true and something else, χ, if φ is false. In English, the term *otherwise* is often used to express the condition in the second conjunct, as in

the following sentence:

If they arrive early, we'll go out to dinner; otherwise, we'll have a late supper

If they arrive early, we'll go out to dinner ∧ *if they don't arrive early, we'll have a late supper*

(*they'll arrive early* → *we'll go out to dinner*) ∧ (*they won't arrive early* → *we'll have a late supper*)

(*they'll arrive early* → *we'll go out to dinner*) ∧ (¬ *they'll arrive early* → *we'll have a late supper*)

(E → D) ∧ (¬ E → L)

`both if` E `then` D `and if not` E `then` L

[D: *we'll go out to dinner*; E: *they'll arrive early*; L: *we'll have a late supper*]

In this use of the term *otherwise* probably means something like *if that is not the case* and, in principle, the reference of *that* might be the consequent rather than the antecedent of the conditional that precedes it. That is, it might be possible to understand the example above to have the form (E → D) ∧ (¬ D → L). This alternative form is entailed by the form above (since E → D ⇒ ¬ D → ¬ E and ¬ D → ¬ E, ¬ E → L ⇒ ¬ D → L) but it is a slightly weaker claim since it does not rule out the possibility that E and L are false when D is true; that is, it does not rule out the possibility of going out to dinner instead of having a late supper even in a possible world where they do not arrive early.

Glen Helman 25 Aug 2005