

Adnominal Conditionals

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1. Introduction

Consider the last sentence of the short text in (1):

- (1) OK, let's begin. We have a lot riding on this job, so please be very careful and make no mistakes. If we succeed at what we are trying to do, the benefits will be enormous. But we all know the consequences if we fail.

This sentence does not, in its most natural interpretation, mean the same thing as (2), where the arrow represents the material conditional:

- (2) We fail \rightarrow we know the consequences

Nor will it help to replace the material conditional with a modalized or relevant conditional operator, or with any other conditional operator. This sentence does not condition our knowledge of the consequences on our failure. Rather, it asserts that we do actually now know the consequences. Which consequences? The ones which would result, if we were to fail.

Rather than analyzing this example as consisting of two clauses connected by *if*, I would like to suggest that the *if*-clause is an adnominal modifier, akin to a relative clause, and forms part of the noun phrase *the consequences if we fail*.

This paper will explore the properties of such adnominal *if*-clauses, and present a semantic analysis for them. Naturally, we will want to relate adnominal *if*-clauses to *if*-clauses of the more familiar sort; I will suggest that this is best accomplished if we analyze sentences in general as involving reference to (or quantification over) sets of events, roughly as in Davidson (1967).

2. Position and Intonation of Conditional Clauses

If conditional clauses really can appear adnominally, we should expect them to appear in certain environments unavailable to “ordinary” *if*-clauses. This does in fact turn out to be the case. Ordinary *if*-clauses occur most naturally either immediately before, or immediately after, their corresponding consequent clause:¹

- (3) a. If you bother him long enough, John will give you five dollars.
- b. John will give you five dollars, if you bother him long enough.

Ordinary *if*-clauses may also appear between the subject noun phrase of a sentence and the verb phrase, or after an auxiliary verb. In these cases, however, the *if*-clause is normally set off by parenthetical intonation, here represented by commas. If the *if*-clause is not set apart in this way, it usually sounds quite unnatural:

- (1) a. John, if you bother him long enough, will give you five dollars.
- b. *John if you bother him long enough will give you five dollars.
- (2) a. John will, if you bother him long enough, give you five dollars.
- b. *John will if you bother him long enough give you five dollars.

However, we find that in certain cases, an *if*-clause may appear at the end of the subject noun phrase without parenthetical intonation:

- (3) a. The fine if you park in a handicapped spot is higher than the fine if your meter expires.
- b. The price if you pay now is predictable; the price if you wait a year is not.
- c. The outcome if John gets his way is sure to be unpleasant for the rest of us.

Why isn't parenthetical intonation required for these examples? I would suggest that these examples represent a different construction from that illustrated in (4) and (5). Specifically, in (3) the *if*-clauses do not really appear *between* the noun phrase and the verb phrase at all, but rather are part of the noun phrase. Hence the rule that an *if*-clause which appears between a subject noun phrase and its verb phrase must be set off by parenthetical intonation does not apply.

Of course, one question which this raises is why the *if*-clause in (1)b cannot also form part of the subject noun phrase. We will return to this question in Section 7.

Note also that even examples like those in (6) require parenthetical intonation if the *if*-clause appears after an auxiliary verb, rather than at the end of a noun phrase:

- (4) a. The fine will, if you park in a handicapped spot, be higher than you want to pay.
- b. *The fine will if you park in a handicapped spot be higher than you want to pay.
- (5) a. The price can, if you pay now, be predicted; the price cannot, if you wait a year, be predicted.
- b. *The price can if you pay now be predicted; the price cannot if you wait a year be predicted.
- (6) a. The outcome will, if John gets his way, be unpleasant for the rest of us.

- b. *The outcome will if John gets his way be unpleasant for the rest of us.

This pattern is what we expect on the suggested analysis; since the *if*-clause is separated from the subject noun phrase by an intervening auxiliary verb, it cannot form part of that noun phrase, and therefore cannot be exempt from the rule requiring parenthetical intonation.

Because intonation correlates with the status of an *if*-clause as inside or outside the noun phrase in this way, we can use it as a guide to identifying adnominal *if*-clauses, as opposed to ordinary *if*-clauses in a post-noun-phrase position. This will be useful, because in some cases, even adnominal *if*-clauses do allow a paraphrase using an ordinary, adverbial *if*-clause.

As a final piece of evidence for the existence of adnominal *if*-clauses, we note that *if*-clauses may also appear adjacent to either or both conjuncts in a coordinate noun phrase, as in (7), or between a noun and its relative clause, as in (11):²

- (7) The location if it rains and the location if it doesn't rain are within five miles of each other.
- (8) The consequences if we fail that he mentioned are not nearly as bad as the consequences if we fail that he didn't mention.

Note that in (10), neither *if*-clause takes scope over the rest of the sentence, but only over its own conjunct noun phrase. There seems no alternative in this construction to regarding the *if*-clauses as forming part of the noun phrases.

3. Adnominal Conditionals and Concealed Questions

How can we analyze adnominal *if*-clauses semantically? One idea that seems natural after seeing examples like (9) is to claim that the noun phrase which contains the adnominal *if*-clause is rewritten at logical form as a “concealed question.” Then the *if* can be analyzed as the ordinary sentential connective *if*, giving a quite normal-looking interrogative complement to the verb, as in (9)b:

- (9) a. We all know the consequences if we fail.
b. We all know what the consequences will be if we fail.

Unfortunately, as attractive as this idea is for examples like (9), it is clearly inadequate for adnominal conditionals in general. This is easy enough to see simply by looking at some of our earlier examples, such as those in (6) or (10). These examples have no verb like *know* which could take an interrogative complement, so there does not seem to be any possibility of a concealed question analysis.

4. Adnominal Conditionals and Relational Nouns

Another possible line of analysis would be to claim adnominal conditionals are actually complement clauses to their nouns. In this case we would take the *if* as a kind of complement marker. The advantage of such an analysis is that it brings out the synonymy of pairs like those in (10) and (11), though it also has the disadvantage of not showing what, if anything, adnominal *if*-clauses have to do with ordinary *if*-clauses.

- (10) a. the consequences if we fail
b. the consequences of our failure
- (11) a. the fine if you park in a handicapped spot
b. the fine for parking in a handicapped spot

Semantically, we would take nouns like *consequence* or *fine* as relational, with one of the terms of the relation being an event or action, expressed by the *if*-clause or nominalization.

Unfortunately, while this idea also has plausibility for some of our examples, it is implausible for others. In (3)b, for instance, the *if*-clause certainly does not describe a service for which the price is imposed, or any other sort of event which might plausibly be a term of the *price* relation. So unlike the pairs in (10) and (11), the sentences in (12) are not equivalent:

- (12) a. the price if you pay now
b. the price for paying now

Note also that relational nouns may appear with *both* an overt complement and an adnominal *if*-clause:

- (13) the consequences of our failure if John is in charge

Or, consider the following scenario: The chairmanship of an important committee is going to be decided soon, and everyone is trying to guess who will be elected. John is known for his sexism, and has the deciding vote — but his credentials as a voting member of the committee are open to question. In this situation, the sentences in (14) seem appropriate:

- (14) a. The chair if John gets to vote is sure to be a man.
b. You can imagine the chair if John gets to vote.

Note that (14) does not require parenthetical intonation, and that (14)b is paraphrasable as “You can imagine the chair who will be elected if John gets to vote,” and not as “If John gets to vote, then you can imagine the chair.” But presumably we do not want to analyze *chair* as denoting a relation which holds between a person (the chair) and the events which lead to that person taking office (e.g. John's voting).

We may conclude that adnominal *if*-clauses do not, as a matter of general principle, appear

as arguments to relational nouns. Instead, they appear as some sort of adjunct or modifier within the noun phrase.

5. Adnominal Conditionals and Intensionality

In most of our examples, the adnominal *if*-clause appears inside the scope of some sort of intensional operator, such as a modal auxiliary verb or adjective, attitude verb, etc.:

- (15)
- a. We all *know* the consequences if we fail.
 - b. The outcome if John gets his way is *sure* to be unpleasant.
 - c. The chair if John gets to vote is *sure* to be a man.
 - d. You *can imagine* the chair if John gets to vote.

Could it be that adnominal *if*-clauses are required to appear in an intensional context, that they are a kind of “modal polarity item”?

Here again, the idea has some initial plausibility. Even in many of those examples which do not contain an overt intensional operator, a case could be made that there is some sort of implicit or hidden operator. The sentences in (16), for example, have a kind of “generic” flavor to them:

- (16)
- a. The fine if you park in a handicapped spot is higher than the fine if your meter expires.
 - b. The price if you pay now is quite high.

Moreover, it might be claimed that they lack existential import: if no one ever parks in a handicapped spot, in some sense there is no fine for doing so.

However, there are other examples in which it is clearer that an adnominal *if*-clause is positioned in an extensional context. Suppose again that John holds the deciding vote for the chairmanship of the committee. Bill and Mary are discussing the probable outcome of the election. Mary has some idea of John's intentions, and says “The chair if John gets to vote is sure to be a man.” Bill happens to know that John is not only planning to vote for a man, but specifically planning to vote for *him*, and says (17):

- (17) The chair if John gets to vote is sitting right here in front of you!

Presumably, *is sitting right here in front of you* does not create an intensional context, so we cannot claim that adnominal *if*-clauses are limited to such contexts.

Nonetheless, it certainly appears that adnominal *if*-clauses appear in intensional contexts with greater than chance frequency, even if they are not strictly limited to such contexts. Our analysis ought to make clear why such contexts are “natural” ones for adnominal *if*-clauses.

6. Adnominal Conditionals and Logical Form

In developing a semantics for adnominal *if*-clauses, we must face the question of just how closely we want to tie their semantics to their syntax. I assume that the syntactic structure of noun phrases containing an adnominal *if*-clause is essentially as in (18):

(18) [Det [N *if* S]]

But how seriously do we want to take this structure?

One would like to hope we will take the syntax very seriously, but the question is worth raising, because an analysis will always be possible in which we appeal to a level of representation at which the structure is very different. In particular, I think in this case there is a temptation to “resolve away” this structure, in favor of a logical representation in which the *if* is a sentential connective linking whole clauses.

For example, this was the basic strategy behind the idea which we rejected in Section 3, of treating the noun phrase as a concealed question. And although that idea did not generalize to a wide enough range of examples, there are other, similar approaches that might apply the same basic strategy more successfully.

For example, we might analyze noun phrases containing adnominal *if*-clauses as being structured, at the level of Logical Form, like free relative clauses. In this case, we would assign the noun phrase in (19) a representation essentially like the free relative in (19)b; we would assign the noun phrase in (20) a representation essentially like the free relative in (20)b, and so on:

(19) a. the consequences if we fail
b. what(ever) the consequences would be if we fail

(20) a. the chair if John gets to vote
b. who(ever) the chair would be if John gets to vote

Note that in these free relative clause constructions, the *if*-clause forms the antecedent of a larger conditional sentence, and is not a noun modifier any more at all. The *if* is the ordinary *if* which connects one clause to another. One may interpret it using whatever one's favorite theory of conditional sentences may be, and obtain an interpretation which is at least as sensible as what that theory assigns to other conditional sentences.

The main cost in giving such an analysis is syntactic, not semantic: we must give rules for converting noun phrases containing adnominal *if*-clauses into free relative clauses in the mapping from surface syntactic representation to Logical Form — and we must try to justify such rules in the context of some well-developed syntactic theory. What we gain in such a move is a unified semantics for *if*, that treats it as meaning the same thing in both its ordinary and adnominal uses.

If, on the other hand, we could give a unified analysis for *if* without invoking such rules,

there would be little reason to adopt them. Especially if there were no independent motivation for them — no way in which they made the syntactic theory run more smoothly, for example — we should prefer to read the interpretation off a structure more like what the syntax seems to give us automatically. I believe such an analysis is possible, if we adopt the right view as to the semantics of sentences.

7. The Semantics of Adnominal Conditionals

Rather than reconstructing noun phrases containing adnominal *if*-clauses as free relative clauses, therefore, we shall consider a semantics based on something more like the surface form. In constructing such an analysis, we take as our starting point the possible worlds semantics for counterfactual conditionals as developed by Stalnaker (1968) and Lewis (1973):

- (21) S_1 *if* S_2 is true in a world w iff for all those worlds w' closest to w such that S_2 is true in w' , S_1 is also true in w' .

The “closest” worlds to a given world w are the ones most similar to it, according to some metric of similarity, which we leave vague.

How can we adapt this for use with adnominal conditionals? We need a rule where S_1 is replaced with a noun, and where the entire construction is noun-like, rather than sentence-like, in its semantics.

Relative to a possible world, a noun denotes a set of individuals, so we can give a rule like (22):³

- (22) $[[N \text{ if } S]]^{M,w} = \{x \in U \mid \text{for all those worlds } w' \text{ closest to } w \text{ such that } S \text{ is true in } w', x \in [N]^{M,w}\}$

For example, *chair if John gets to vote* will denote, relative to a given world w , the set containing all those individuals who are chair in all the worlds in which John gets to vote, but which are otherwise as similar to w as possible. (Note that w itself may be such a world, if John gets to vote in w .) Assuming that John votes for the same person in all these most similar worlds, and assuming that we are pragmatically concerned here only with a single committee, this will presumably be a singleton set, and we may speak sensibly of “the” chair if John gets to vote.

A couple observations are in order: First, an individual x may be in the denotation of a phrase of the form $[N \text{ if } S]$ relative to w even if x does not exist in w — so long as x exists in those worlds most similar to w in which S is true. For example, *the consequences if we fail* may denote in w some group of “possible events” — here taken as a species of individual — which exist in those worlds nearest w in which we fail, but which, if we are lucky, do not exist in w itself. I suspect this is the reason why adnominal *if*-clauses so often appear in intensional contexts; they have a semantics which makes it very easy for them to denote non-existent objects, and extensional predicates can never be true of non-existent objects, by definition.

Second, because adnominal *if*-clauses exploit variation in denotation from world to world, it would make little sense to combine one with a rigid designator. Hence the use of an adnominal *if*-clause presupposes that its noun is not a rigid designator. I suspect that this is the reason why (1)b is bad (though we might also write this off to a syntactic difference between common nouns and proper names); *John* denotes the same individual in all possible worlds, and certainly not a different individual in worlds where you bother him and worlds where you don't.

Note also that (22) calls for universal quantification over (closest) worlds. This may just be a default. It is a familiar fact about ordinary *if*-clauses that the exact type of quantification may be indicated adverbially, and that a variety of entities other than worlds may be quantified over:

- (23) a. If John gets to vote, the consequences are *usually* regrettable.
b. *Occasionally*, if you park in the wrong place, you must pay a fine.
c. If it rains, one *rarely* must deal with sunstroke.

It appears that the same points hold for adnominal *if*-clauses, except that the type of quantification is given adjectivally rather than adverbially:

- (24) a. the *usual* consequences if John gets to vote
b. an *occasional* fine if you park in the wrong place
c. a *rare* problem if it rains

Perhaps examples like these would be better dealt with in the manner of Stump (1981), however; I leave this issue open.⁴

8. Adnominal Conditionals and Ordinary Conditionals

The rule for adnominal conditionals in (22) is similar to the rule for ordinary conditionals in (21) — but not so similar that one can really feel comfortable claiming that we have given a “unified analysis.” If we keep these two rules we are still in effect admitting that there are two distinct *if* operators, with related, but not identical, semantics. It would be preferable to give an analysis that really did treat both cases identically.

We can obtain such a unification if we adopt the view that sentences, at some level, are predicates of eventualities (that is, of events, states and processes). For example, we might interpret the sentence in (25)a as corresponding at some level to the lambda-term in (25)b:

- (25) a. John arrived on Tuesday.
b. $\lambda e[\mathbf{arrive}(j, e) \ \& \ \mathbf{on}(e, t)]$

If desired, we may view (25)b as corresponding to a prefinal stage in the semantic derivation for (25)a, and complete the derivation by applying this lambda-term to a free variable and then binding it with an existential quantifier; this is the technique of Parsons (1990), and gives the standard Davidsonian logical forms. More simply, we may just regard a sentence as true if its

denotation is non-empty, and false if it is empty.⁵

Once we adopt the view of sentences as predicates of eventualities, they begin to look surprisingly similar to common nouns and other predicates of individuals. This makes it possible to revise the semantics for ordinary *if*-clauses, to bring it more into line with semantics for adnominal *if*-clauses. Specifically, let us now assume that ordinary *if* links one event predicate to another, to yield a third, complex event predicate. In this case, we can give a rule like (26), to replace (21):⁶

$$(26) \quad \llbracket S_1 \text{ if } S_2 \rrbracket^{M,w} = \{x \in U \mid \text{for all those worlds } w' \text{ closest to } w \text{ such that there exists some } y \in \llbracket S_2 \rrbracket^{M,w'}, \text{ it holds that } x \in \llbracket S_1 \rrbracket^{M,w} \}$$

For example, what eventualities will be denoted in a given world w by the sentence *Bill would become chair, if John voted?* Look in the nearest worlds to w in which there is an event of John voting; if in all those worlds there is also an event of Bill becoming chair, these events of Bill becoming chair will be the ones denoted by the sentence as a whole in w . If there are no such events, the sentence will denote the empty set. The sentence is true in the former case, false in the latter.

Now let us return to our rule for adnominal conditionals, in (22). Given our assumptions so far, this is equivalent to (27):

$$(27) \quad \llbracket N \text{ if } S \rrbracket^{M,w} = \{x \in U \mid \text{for all those worlds } w' \text{ closest to } w \text{ such that there exists some } y \in \llbracket S \rrbracket^{M,w'}, \text{ it holds that } x \in \llbracket N \rrbracket^{M,w} \}$$

But this differs from (26) only in the syntactic category labels; the semantics is identical. We can collapse both rules into a single one:

$$(28) \quad \llbracket X \text{ if } S \rrbracket^{M,w} = \{x \in U \mid \text{for all those worlds } w' \text{ closest to } w \text{ such that there exists some } y \in \llbracket S \rrbracket^{M,w'}, \text{ it holds that } x \in \llbracket X \rrbracket^{M,w} \}$$

This gives us a unified definition for *if*, which can handle both adnominal and ordinary conditionals, without syntactically unpacking noun phrases into sentences, simply because they contain an *if*-clause.

9. Event Logic and Sentential Connectives

Our analysis treats *if*, when it links two clauses, as linking two predicates of eventualities. But either or both of the clauses linked by *if* may itself be a complex clause, built up from smaller clauses by conjunction, disjunction, or negation:

- (29)
- a. Things will be bad, if we fail and no one bothers to help us.
 - b. You must pay a fine, if you park in a handicapped spot or your meter expires.
 - c. I will not remain on this committee, if John gets to vote.

In order to account for examples like these in an analysis like that presented here, we must allow sentences formed via conjunction, disjunction, or negation to function as predicates of eventualities. In effect, we must reconstruct propositional logic at the level of eventuality predicates.

This is not too difficult, though it is a large enough step that I suspect some people will hesitate at it. But I would point out that the truth functional connectives are not the only sentential connectives in English or in any other natural language; they belong to a larger class which includes such items as *before*, *after*, *because*, and many others. Many of these other connectives, like *if*, have adnominal uses; and most of them can be analyzed relatively straightforwardly in terms of relations among events. It would be nice to treat this entire class in a uniform way, and have the truth-functionality of *and*, *or*, etc. fall out as a consequence, rather than being stipulated directly in a truth table or its equivalent.

There is, moreover, independent evidence that sentential conjunction, at least, should be interpreted as an operation on eventuality predicates; see Lasersohn (1992, 1995) for extended arguments to this effect. We do not review these arguments here but simply suggest the rule in (30), where ‘ $e+e'$ ’ represents the “group,” or plurality, whose members are e and e' :

$$(30) \quad x \in \llbracket S_1 \text{ and } S_2 \rrbracket^{M,w} \text{ iff } \exists e, e': x = e+e' \ \& \ e \in \llbracket S_1 \rrbracket^{M,w} \ \& \ e' \in \llbracket S_2 \rrbracket^{M,w}$$

Assuming that if $e+e'$ exists iff e and e' exist, this rule gives the result that S_1 and S_2 is true iff S_1 is true and S_2 is true; the standard truth table falls out naturally.

For disjunction, we use the simple rule in (31):

$$(31) \quad e \in \llbracket S_1 \text{ or } S_2 \rrbracket^{M,w} \text{ iff } e \in \llbracket S_1 \rrbracket^{M,w} \text{ or } e \in \llbracket S_2 \rrbracket^{M,w}$$

It should be easy to verify that this also gives the effect of the standard truth table.

The case of negation is slightly complicated. If a sentence like *John is standing* is false — that is, if its denotation is empty — the analysis requires us to find some eventuality of which the sentence *John is not standing* is true. What is this eventuality? Perhaps it is just a state of John not standing. It certainly seems true that if John is sitting, for instance, then he is in a state of not standing. In the long run, I think something like this is probably necessary. But for our purposes here, we can keep the analysis simpler, and avoid a commitment to negative states, if we simply assume that if there is no eventuality of John standing, then *John is not standing* is true of every eventuality:

$$(32) \quad e \in \llbracket \text{not } S \rrbracket^{M,w} \text{ iff } \llbracket S \rrbracket^{M,w} = \emptyset$$

This again gives a result like that of the standard truth table: *not* S is true iff S is false. It is perhaps worth noting that although S is true iff *not not* S is true, S and *not not* S will not normally have the same denotation.

10. Conclusion

We have explored some of the properties of adnominal *if*-clauses, and given a semantic analysis based on the modal treatment of ordinary *if*-clauses advocated by Stalnaker and Lewis. This was done without assigning logical forms in which *if* always links whole sentences; interpretation was read from structures closer to what can be justified on syntactic grounds.

A unified semantic analysis of adnominal and ordinary *if*-clauses may be obtained if sentences are treated as predicates of eventualities; this allows us to treat ordinary *if*-clauses on the model of adnominal *if*-clauses. Such an analysis requires an eventuality-based interpretation of the other sentential connectives as well, providing independent support for the eventuality-based approach to conjunction advocated in Laserson (1992, 1995).

Endnotes

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¹Ordinary *if*-clauses and adnominal *if*-clauses should both be distinguished from *if*-clauses of the kind illustrated in (i):

- (i) I don't know if John is awake.

The *if* here is similar to *whether*; this is not a conditional construction.

²Thanks to Chris Barker and Anita Mittwoch for these examples.

³I assume that interpretation is relative to a model $M = \langle U, W, F \rangle$, where U is a set of possible individuals, W is a set of possible worlds, and F is a function assigning denotations in the usual way. We allow that a given individual may “exist” at more than one world, and at some worlds but not others.

⁴It is perhaps worth considering whether adnominal *if*-clauses involve universal quantification over worlds even as a default — after all, John might vote for a different person in each of the nearest possible worlds. But I think it is precisely for this reason that universal quantification is called for. Suppose that in one of the closest worlds he votes for Bill, and in another equally close world he votes for Fred. In this case we do not want either of (i) or (ii) to be true:

- (i) The chair if John gets to vote will be Bill.
(ii) The chair if John gets to vote will be Fred.

We can obtain the correct results here if we require universal quantification.

Note that even with universal quantification, we can obtain a kind of “non-specific” reading in sentences like (iii), because the adjective *sure* adds an extra layer of modalization.

(iii) The chair if John gets to vote is sure to be a man.

We assume that the logical structure here is something like **sure**(φ), and is true relative to a world w iff φ is true relative to all those worlds w' which are compatible with what we are sure of in w . Now from each of these “sureness” worlds, we look at all the closest worlds in which John gets to vote. This might be a different set with respect to each sureness world, yielding a different person as chair. Hence (iii) will not entail that there is a particular man who is sure to be chair if John gets to vote. Thanks to Mats Rooth for raising this issue.

⁵Another alternative is to claim that statements make demonstrative reference to an eventuality rather than existentially quantifying over them, as in Austin (1950) or Barwise and Perry (1983); in this case we simply apply the lambda term in (25)b to whatever eventuality is demonstratively referred to in an utterance of (25)a. Combined with the rules we give below, however, this technique requires us to make sense of the idea of making demonstrative reference to events which take place only in other possible worlds — an idea that for some reason seems more objectionable than existentially quantifying over such events.

⁶We assume that events are a species of individual, hence elements of U in our model.

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