



Andrea Iacona

Logical Form, Conditionals, Pseudo-Conditionals

Abstract. This paper raises some questions about the formalization of sentences containing ‘if’ or similar expressions. In particular, it focuses on three kinds of sentences that resemble conditionals in some respects but exhibit distinctive logical features that deserve separate consideration: whether-or-not sentences, biscuit conditionals, and concessive conditionals. As will be suggested, the examples discussed show in different ways that an adequate formalization of a sentence must take into account the content expressed by the sentence. This upshot is arguably what one should expect on the view that logical form is determined by truth conditions.

Keywords: logical form; conditionals; biscuit; concessive; formalization

1. Preamble

In my book *Logical Form* (Iacona, 2018) I argue that, contrary to what is usually taken for granted, two distinct notions of logical form are needed to fulfil two main theoretical roles traditionally associated with the term ‘logical form’: while for the purposes of semantics it may be fruitful to focus on intrinsic properties of sentences — such as syntactic structure or linguistic meaning — for the purposes of logic we need formal representations individuated in terms of truth conditions. By ‘truth conditions’ I mean the content expressed by a sentence as uttered in a context, that is, what is said by uttering the sentence in that context. I call *truth-conditional view* the view that, in the sense of ‘logical form’ that matters to logic, logical form is determined by truth conditions.

The truth-conditional view rests on the idea that adequate formalization essentially involves understanding what is said, so it may require a substantive work of analysis that goes beyond simple observation of

syntactic structure or linguistic meaning. This idea was clearly present in the seminal works of Frege, Russell, and the early Wittgenstein, although it does not enjoy wide popularity nowadays. Take for example the theory of definite descriptions advocated by Russell in *On Denoting* (1905). In that article, Russell's aim is to elucidate the truth conditions of certain sentences by providing a logically perspicuous paraphrase of those sentences. The paraphrase he favours is markedly revisionary, and is not based on purely linguistic arguments. But it makes perfect sense insofar as one thinks, as he did, that natural language is not a reliable guide to logical form. The truth-conditional view, in the same spirit, holds that paraphrase plays a key role in the elucidation of logical form. Understanding what a sentence says implies being able to provide a paraphrase of the sentence that expresses its truth conditions in a perspicuous way, and so can be used as a guide for a suitable representation of the sentence in a formal language.

In what follows I will show how this feature of the truth-conditional view emerges in connection with the study of conditionals. The term 'conditional' is commonly used to refer to a complex sentence in which two simpler sentences — the *main clause* and the *if-clause* — are held together by the word 'if'. I will call *if-sentence* a conditional so understood, and I will restrict attention to sentences in the indicative mood, that is, indicative conditionals.

As is well-known, there is no universally accepted analysis of 'if'. The material interpretation of if-sentences is notoriously controversial, and several attempts have been made to provide a coherent non-material interpretation of them, providing alternative definitions of their truth conditions or assertibility conditions. The issues that will be addressed, however, are to a large extent orthogonal to some main differences between extant theories of conditionals. All that need be granted here is that we have a suitable formal language \mathbf{L} that includes a symbol $>$ for the conditional. The use of this symbol is compatible with several non-material accounts of conditionals. In particular, it is compatible with at least three well-known theories that rely on the Ramsey Test, the idea that in order to assess $\alpha > \beta$ one must check whether β holds on the supposition that α holds. The first is Adams' probabilistic theory (Adams, 1965), which defines the assertibility conditions of $\alpha > \beta$ in terms of $P(\beta|\alpha)$, the conditional probability of β given α . The second is the possible-world theory advocated by Stalnaker (1968) and Lewis (1973), according to which $\alpha > \beta$ is true in a world if and only if β

holds in the closest world, or worlds, in which α holds. The third is the belief revision theory elaborated by Gärdenfors (1988) and others, according to which $\alpha > \beta$ is true relative to a belief state K if and only if $\beta \in f(K, \alpha)$, where f is a function that takes belief states and sentences as arguments and yields revised belief states as values.

Formalization will be understood as a theoretical operation that takes us from a natural language to \mathbf{L} : to formalize a set of sentences of a natural language is to pair each sentence in the set with a formula of \mathbf{L} . A formalization of a sentence s is adequate insofar as it provides a perspicuous representation of the truth conditions of s , given the expressive resources of \mathbf{L} . Accordingly, I will say that a sentence s has logical form $\alpha > \beta$ when s is adequately formalized in \mathbf{L} as $\alpha > \beta$. Typically, when s is an if-sentence, s has logical form $\alpha > \beta$. In other words, a standard if-sentence is an if-sentence that is plausibly represented in \mathbf{L} as $\alpha > \beta$.

However, being an if-sentence and having the form $\alpha > \beta$ are distinct properties which cannot be regarded as extensionally equivalent. We must leave room for the possibility that an if-sentence does not have the form $\alpha > \beta$, or that a sentence has the form $\alpha > \beta$ without being an if-sentence. On the assumption that logical form, as distinct from surface grammar, reveals the real logical properties of sentences, being an if-sentence may be equated with being *superficially* a conditional, while having the form $\alpha > \beta$ may be equated with being *really* a conditional.

The distinction between surface grammar and logical form emerges with clarity in connection with the three kinds of sentences discussed in Sections 2–4, that is, whether-or-not sentences, biscuit conditionals, and concessive conditionals. As will be suggested, these sentences are *pseudo-conditionals* rather than real conditionals. A pseudo-conditional fails to be a real conditional roughly in the same sense in which according to Russell definite descriptions fail to be real singular terms.

As a last preliminary remark it should be added that the role of content in formalization can also arise when an if-sentence *is* really a conditional. There are cases in which an if-sentence s clearly has the form $\alpha > \beta$ but a substantive question can be raised about the choice of the formulas α and β to be assigned to the constituents of s . Two examples will illustrate this kind of cases: one concerns context-sensitive expressions, the other is about negation.

Imagine that a visitor of the Vatican Museums utters the following sentence while standing in front of Raphael's famous fresco *The School*

of Athens:

(1) If he is a philosopher, he is a philosopher.

At least two situations are possible. One is that in which the visitor keeps pointing at Plato throughout the utterance, so that both occurrences of ‘he’ refers to Plato. The other is that in which the visitor points at Plato when uttering ‘he’ the first time and at Aristotle when uttering ‘he’ the second time. Intuitively, the statement made in the first case is trivially true, while the statement made in the second case expresses a non-trivial connection between Plato’s profession and Aristotle’s profession. The intuitive difference between the two cases is revealed by the following paraphrases of (1):

(2) If Plato is a philosopher, Plato is a philosopher.

(3) If Plato is a philosopher, Aristotle is a philosopher.

A plausible way to capture this difference through formalization is to say that in the first case (1) has the form $\alpha > \alpha$, as is made explicit in (2), while in the second case (1) has the form $\alpha > \beta$, where $\beta \neq \alpha$, as is made explicit in (3). This formalization is based on content, because the only difference between the two cases is a difference of content: the sentence uttered is the same. Note, instead, that if one assumed that adequate formalization is based on intrinsic features of (1), such as syntactic structure or linguistic meaning, one would have to say that logical form is insensitive to the intuitive distinction just drawn, because on that assumption it would turn out that (1) has the form $\alpha > \alpha$. This is precisely the kind of variation that I discussed at length in *Logical Form*, even though that discussion did not directly involve conditionals (see [Iacona, 2018](#), chapters 4–6).

The second example, drawn from ([Gomes, 2019](#)), concerns Contraposition, the principle according to which $\alpha > \beta$ entails $\neg\beta > \neg\alpha$. Consider the following sentence:

(4) If I do not do heavy exercise, my pulse does not go above 100.

Let it be granted that (4) has the form $\alpha > \beta$. Does (4) entail the contraposed conditional, that is, a sentence of the form $\neg\beta > \neg\alpha$? In order to answer this question it should be made clear what the contraposed conditional is. One may be tempted to say, based on purely syntactic considerations, that it is the following:

(5) If my pulse goes above 100, I do heavy exercise.

Apparently (5) does not follow from (4), and this might be taken to suggest that (4) and (5) provide a counterexample to Contraposition.¹

However, it is far from obvious that (4) and (5) should be formalized respectively as $\alpha > \beta$ and $\neg\beta > \neg\alpha$. (4) seems to imply the following temporal relation: if I do not do heavy exercise at t , my pulse does not go above 100 at t' , where $t < t'$. But in (5) this relation is inverted: (5) wrongly suggests that if my pulse goes above 100 at t , then I do heavy exercise at t' . In order to preserve the temporal relation implied by (4), the contraposed of (4) should say that my pulse going above 100 at t' indicates heavy exercise at t . This can be obtained by changing the verb form in the main clause:

(6) If my pulse goes above 100, I have done heavy exercise.

In other words, assuming that (4) is formalized as $\alpha > \beta$, it is plausible that the sentence to be represented as $\neg\beta > \neg\alpha$ is (6) rather than (5). Although (5) is obtained by (4) by a simpler syntactic transformation, which may suggest that (5) is the contraposed of (4), (6) seems to capture better than (5) the real contraposed of (4), where ‘the real contraposed of (4)’ indicates the conditional whose logical form stands in the relation of Contraposition with the logical form of (4). Since (6) is arguably as compelling as (4), this second formalization yields no counterexample to Contraposition.

The two examples considered show in different ways that, when an if-sentence is represented in a formal language as $\alpha > \beta$, considerations about its content may be relevant to the choice of the formulas α and β to be assigned to its constituents. This is certainly interesting. But the three cases to be discussed are even more interesting, because they show that considerations about the content of a sentence may play a crucial role in the individuation of the very structure of the formula that displays the logical form of the sentence. In these cases, the crucial question to be addressed is whether a given sentence is really a conditional or just superficially a conditional.

¹ As in (McCawley, 1993, pp. 82–83). Here I follow Gomes’s discussion of this example.

2. Whether-or-not sentences

Let us start with whether-or-not sentences, the sentences in which a main clause is combined with a subordinate clause that contains ‘whether or not’, ‘regardless of whether’, ‘no matter if’, or similar expressions. Here is an example:

(7) Whether or not you like it, my plan is to go out tonight.

In analogy with if-sentences, the subordinate clause of a whether-or-not sentence may be called *whether-or-not clause*. In (7), the whether-or-not clause is ‘whether or not you like it’. By means of this expression, the speaker’s intention to go out is said to be independent of the hearer’s preferences or dispositions.

From the logical point of view, whether-or-not sentences seem to differ from standard if-sentences. For example, it is quite natural to expect that (7) is unlike the following sentence in some important respects:

(8) If I finish by 7 pm, my plan is to go out tonight.

At least two observations must be taken into account in order to see the difference between whether-or-not sentences and standard if-sentences.

Observation W1. Normally, when one assertively utters a whether-or-not sentence, one implies that its main clause is true. For example, (7) seems to entail the following sentence:

(9) My plan is to go out tonight.

In this respect, a whether-or-not sentence differs from a standard if-sentence. Clearly, (8) does not entail (9), as it leaves room for the possibility that (9) is false when its if-clause is false.

Observation W2. A whether-or-not sentence is intuitively stronger than its main clause: one can assertively utter the latter without thereby being committed to accept the former. For example, one can assertively utter (9) without thereby being committed to accept (7). While (7) says that (9) holds in a range of hypothetical situations, as it holds both on the supposition that you like my plan and on the supposition that you do not like it, (9) only concerns the actual circumstances. It might be the case that I actually want go out and you like it but I would be willing to change my plan in case you did not like it.²

² I owe this formulation of Observation W2 to Enzo Crupi.

Observations W1 and W2 only concern the logical profile of whether-or-not sentences — their truth conditions — so they are not intended to provide a complete characterization of whether-or-not sentences. In particular, they do not involve syntactic or semantic considerations that may be relevant for a compositional theory of meaning, and they do not take into account the pragmatics of whether-or-not sentences. However, as long as one’s theoretical priority is to capture the distinctive logical features of whether-or-not sentences, W1 and W2 are crucially relevant to the following question: is there a formula $\alpha\omega\beta$ of \mathbf{L} that adequately formalizes a whether-or-not sentence s , where α represents the whether-or-not clause of s and β represents the main clause of s ?

There seems to be a straightforward answer to this question. Consider again our example. (7) says that (9) holds both in case you like my going out and in case you do not like it. So it can be paraphrased by conjoining two distinct if-sentences:

- (10) If you like it, my plan is to go out tonight.
- (11) If you do not like it, my plan is to go out tonight.

On the assumption that this paraphrase is correct, and that (10) and (11) are adequately formalized as $\alpha > \beta$ and $\neg\alpha > \beta$ respectively, it seems that the logical form of a whether-or-not sentence can be understood as follows:

DEFINITION 1. $\alpha\omega\beta \stackrel{\text{df}}{=} (\alpha > \beta) \wedge (\neg\alpha > \beta)$

According to this analysis, (7) is a conjunction of conditionals, in spite of the fact that its surface structure may suggest otherwise.

Note, in particular, that the surface structure of (7) might suggest the following paraphrase, which is misleading from a logical point of view:

- (12) If you like it or you do not like it, my plan is to go out tonight.

Assuming that $(\alpha \vee \neg\alpha) > \beta$ is logically equivalent to β , as in most non-material accounts of conditionals, if (7) were equivalent to (12), it would be equivalent to (9), contrary to observation W2. To put it another way, assuming that $(\alpha \vee \neg\alpha) > \beta$ is logically equivalent to $(\gamma \vee \neg\gamma) > \beta$ for any γ , if (7) were correctly represented as $(\alpha \vee \neg\alpha) > \beta$, then (7) would be logically equivalent to the following sentence:

- (13) Whether I die before 7 pm or not, my plan is to go out tonight.

But this would be counterintuitive. One can reasonably assert (7) without thereby being committed to accept (13).³

Definition 1, by contrast, provides a simple and impeccable explanation of observations W1 and W2. W1 is explained because β logically follows from $(\alpha > \beta) \wedge (\neg\alpha > \beta)$, and W2 is explained because $(\alpha > \beta) \wedge (\neg\alpha > \beta)$ does not logically follow from β . Both logical facts hold on most non-material accounts of conditionals, and surely they hold on the three accounts of conditionals mentioned in Section 1.

3. Biscuit conditionals

The second kind of sentences to be considered are biscuit conditionals. Perhaps the best way to introduce biscuit conditionals is to use the very example to which they owe their name, an example due to Austin:

(14) There are biscuits on the sideboard if you want them. (Austin, 1961, p. 210).

A similar example, related to those discussed in the previous section, is the following:

(15) My plan is to go out tonight if you are interested.

Although (14) and (15) could in principle be interpreted as standard if-sentences, the most plausible reading of them is one in which the content expressed is definitely not like that of a standard if-sentence. The following two observations show some distinctive features of biscuit conditionals.

Observation B1. Normally, when one assertively utters a biscuit conditional, one implies that its main clause is true. For example, (15) seems to entail (9). By contrast, the same does not happen with (8), as we saw in Section 2. As in the case of whether-or-not sentences, this is a key difference with respect to standard if-sentences.

Observation B2. A biscuit conditional, intuitively, is no stronger than its main clause: as long as one assertively utters the latter, it is plausible to expect that one is also willing to accept the former. For example, a

³ This argument might be questioned by rejecting the assumption that $(\alpha \vee \neg\alpha) > \beta$ is logically equivalent to β just on the basis of the apparent similarity between (7) and (12). However, such a move would go against our initial stipulations about $>$.

case in which one assertively utters (9) is normally a case in which one regards (15) as true, even though this is not quite the same thing as to say that one would utter (15) along with (9).⁴ The same does not hold for standard if-sentences, unless they are interpreted as material conditionals. Biscuit conditionals also differ from whether-or-not claims in this respect, given observation W2.

As in the case of W1 and W2, B1 and B2 only concern the logical profile of biscuit conditionals — their truth conditions — so they are not intended to provide a complete characterization of biscuit conditionals. In particular, one distinctive trait of biscuit conditionals which is hardly definable at the truth-conditional level is the contribution of the if-clause. Although the if-clause of a biscuit conditional is truth-conditionally idle, it plays some role as an indicator of the circumstances in which the main clause may be relevant. In (15), the claim expressed by (9) is somehow qualified by the if-clause as being relevant depending on whether the addressee is interested in going out.

The role of the if-clause in biscuit conditionals may be further clarified by considering some examples that have been discussed in connection with (14) but differ in some important respects. Consider the following sentences:⁵

- (16) If you want me to lie, you look great today.
 (17) If you want to hear a piece of existentialist nonsense, nothing nothings.

Although (16) and (17) may resemble (14) and (15) in some way, they are not exactly like (14) and (15). The if-clause of (16) and (17) is not truth-conditionally idle in the same sense in which the if-clause of (14) and (15) is truth-conditionally idle. The following sentences seem to be acceptable paraphrases of (16) and (17):

- (18) It is a lie that you look great today.
 (19) ‘Nothing nothings’ is existentialist nonsense.

In other words, in (16) and (17) the if-clause is used to ascribe a non-trivial property to the content expressed by the main clause, or to the

⁴ There might be pragmatic reasons for not uttering (15) in addition to (9) in spite of the fact that one regards it as true.

⁵ These two examples come respectively from (Zakkou, 2017, p. 85) and (Predelli, 2009, p. 297).

main clause itself. Clearly, no such paraphrase is available in the case of (14) and (15). So, although (16) and (17) are not standard if-sentences, their content cannot be reduced to the content expressed by their main clause. According to the characterization of biscuit conditionals suggested above, this is a reason for thinking that (16) and (17) are not biscuit conditionals, although it must be recognized that there is no generally accepted definition of ‘biscuit conditional’.⁶

How can we explain the apparent dissimilarities between biscuit conditionals and standard if-sentences? To appreciate the difficulty of this question, I will briefly consider two options that may easily cross one’s mind but are unlikely to lead to a satisfactory answer. The first route is to adopt a pragmatic approach and hold that the dissimilarities at issue are explainable in terms of assertibility rather than truth. In this case the idea is that biscuit conditionals do not differ from standard if-sentences from the semantic point of view. Assuming that a principled distinction can be drawn between what is said and what is implicated, as suggested by Grice (1975), one might claim that a biscuit conditional differs from a standard if-sentence only in that it implicates a different kind of content, so it does not require a separate logical treatment. For example, one might claim that (15) is exactly like (8) from a logical point of view, in that they both are sentences of the form $\alpha > \beta$, but that (15), unlike (8), implicates (9).

The main problem with this route is that it seems unable to provide a sufficiently detailed explanation of the logical behaviour of biscuit conditionals. This includes observations B1 and B2, plus further facts that are presumably related to them. Here is an example that concerns Contraposition, the principle considered in Section 1. As Austin pointed out, (14) clearly does not entail the contraposited conditional:

it would be folly to infer that ‘If there are no biscuits on the sideboard
you do not want them’. (Austin, 1961, p. 210)

Failure of Contraposition seems to be a characteristic trait of biscuit conditionals, a trait that is presumably related to observations B1 and

⁶ Note that one can easily accept (16) and (17) without taking their main clause to be true. So, if (16) and (17) were classified as biscuit conditionals, they could be taken to show that biscuit conditionals do not require their main clause to be true, contrary to observation B1. This is the suggestion made in (Siegel, 2006, p. 180) and (Zakkou, 2017, p. 85). Predelli (2009), instead, questions the ascriptions of truth to (16) and (17).

B2.⁷ However, it is hard to see how this fact can be explained in purely pragmatic terms. If (14) is a sentence of the form $\alpha > \beta$, and Contraposition holds for $>$, then (14) does entail the contraposed conditional, so it should be explained why it appears otherwise.⁸ More generally, as in the case of observations B1 and B2, it has to be explained why biscuit conditionals manifest exactly these properties rather than others.

The second route is to adopt a syntactic approach and take the apparent dissimilarities between biscuit conditionals and standard if-sentences to depend on some difference in meaning determined by syntactic features. In this case biscuit conditionals and ordinary conditionals would be classified as distinct types of if-sentences. However, this route seems hopeless. Although biscuit conditionals typically exhibit syntactic features such as the absence of ‘then’, they can hardly be defined in terms of such features. Not only standard if-sentences often exhibit the same features, but it is not even obvious that these features are essential to biscuit conditionals. According to (Zakkou, 2017), for example, there are reasonably clear examples of biscuit conditionals which include ‘then’.

Since no principled distinction between standard if-sentences and biscuit conditionals can be drawn at the level of surface grammar, perhaps a more promising way to go is to postulate two distinct readings of if-sentences — call them the *standard reading* and the *biscuit reading* — which are to be characterized at some deeper level of analysis. So, in the case of (15) the most natural reading is the biscuit reading, whereas the same does not hold for (8). According to this line of thought, which I find rather plausible, biscuit conditionals are not to be identified with a type of if-sentence, but rather with a type of *interpreted* if-sentence.

Predelli (2009) provides an account of biscuit conditionals along these lines, as he suggests a semantic characterization of the biscuit reading. According to Predelli, in the biscuit reading the if-clause fails to provide any contribution to the truth conditions of the sentence — which is expressed by saying that its character is the trivial function which merely returns the truth-value of the main clause — but it affects the appropriate class of contexts, so that a context is conversationally relevant for the sentence just in case, on top of obeying general constraints of relevance, it is a context with respect to which the if-clause is true.

⁷ De Rose and Grandy (1999, p. 406,) emphasize this trait of biscuit conditionals.

⁸ Note that the material account of conditionals, which is traditionally associated with the pragmatic approach, validates Contraposition.

Independently of the details of Predelli's proposal — that is, independently of how the biscuit reading is characterized — a key issue remains open, the issue of formalization. If an if-sentence s admits two readings, the standard reading and the biscuit reading, and it is agreed that in the standard reading s is adequately formalized as $\alpha > \beta$, then what is the logical form of s in the biscuit reading? The answer to this question crucially depends on the view of logical form one adopts. If the logical form of s in a given reading is determined by the syntactic structure that s has in that reading, it may be claimed that s is adequately formalized as $\alpha > \beta$ in the biscuit reading. By contrast, if one thinks that the logical form of s in a given reading is determined by the truth conditions that s has in that reading, then one can say that a different kind of formula has to be assigned to s , presumably one that does not contain the symbol $>$.

It is easy to see that the first option is problematic: if the logical form of s in the biscuit reading is $\alpha > \beta$, then in this reading s should have exactly the same logical properties it has in the standard reading, which is at odds with observations B1 and B2. So, the most plausible answer to our question is that the two readings of s — the standard reading and the biscuit reading — are to be represented by means of different types of formula. More precisely, if the standard reading of s is represented as $\alpha > \beta$, its biscuit reading is represented by a formula $\alpha\mathbf{b}\beta$ which is logically equivalent to β . The simplest option is to say that $\alpha\mathbf{b}\beta$ is β itself:

DEFINITION 2. $\alpha\mathbf{b}\beta \stackrel{\text{df}}{=} \beta$

An alternative option, which accords with the observation made in Section 2 about the equivalence between $(\alpha \vee \neg\alpha) > \beta$ and β , is to define $\alpha\mathbf{b}\beta$ as $(\alpha \vee \neg\alpha) > \beta$. In this case the if-clause of s is represented by α , which occurs as part of the disjunctive antecedent $(\alpha \vee \neg\alpha)$. The absence of the other disjunct, $\neg\alpha$, could be explained along the lines suggested above, that is, the fact that α , as opposed to $\neg\alpha$, features in the surface grammar indicates that the class of contexts that is conversationally relevant for the sentence is that in which α holds. No matter which of the two definitions is adopted, we get a simple explanation of observations B1 and B2, along with related facts such as the apparent failure of Contraposition.⁹

⁹ An equivalent option, suggested by Georg Brun, is to equate $\alpha\mathbf{b}\beta$ with a truth-functional formula formed by α and β that is true just in case β is true.

4. Concessive conditionals

Concessive conditionals resemble biscuit conditionals in some respects, as they exhibit distinctive logical features that are in need of explanation. Imagine that the sentence below is uttered in a situation in which I want to go out tonight and hope that you approve my decision:

(20) Even if you do not like it, my plan is to go out tonight.

In this case (20) is a concessive conditional. What it says is that a negative attitude on your side will not affect my plan for tonight, that is, I'm determined to go out anyway. In order to spell out the difference between concessive conditionals and standard if-sentences, I will list three observations that I take to be relatively uncontroversial.

Observation C1. Normally, when one assertively utters a concessive conditional, one implies that its main clause holds no matter whether its if-clause holds. For example, (20) seems to entail (9). In fact (20) seems to entail (7), which entails (9) according to W1. By contrast, (10) does not convey such claim, for it leaves unspecified what I will do in case you do not like my plan.¹⁰

Observation C2. In a concessive conditional, the if-clause clearly does not support the main clause, in the sense that it does not provide a reason for thinking that the main clause holds. The best way to appreciate this fact is to realize that concessive conditionals cannot be paraphrased by adopting terms that explicitly indicate support. For example, it is clearly inappropriate to paraphrase (20) by using terms such as 'infer', 'reason', or 'consequence', as in the following sentences:

(21) If you do not like it, we can infer that my plan is to go out tonight.

(22) If you do not like it, this is a reason for thinking that I want to go out tonight.

(23) If you do not like it, then as a consequence I will go out tonight.

Clearly, (20) differs from (10) in this respect (see [Gomes, 2020](#), pp. 8–10).

Observation C3. A concessive conditional seems to involve some sort of asymmetry between its if-clause and the negation of its if-clause, in that the connection between the latter and the main clause is more natural,

¹⁰ The assumption that a concessive conditional entails its main clause is explicitly made in several works ([Gomes, 2020](#); [Hunter, 1993](#); [König, 1986](#); [Lycan, 1991](#); [Pollock, 1976](#)).

or less surprising. (20) suggests that the connection between ‘You like it’ and (9) is more natural, or less surprising, than the connection between ‘You do not like it’ and (9). In this respect, there is a clear sense in which a concessive conditional is stronger than a whether-or-not sentence. While the former entails the latter, as noted above, the converse does not hold.¹¹

As in the case of biscuit conditionals, at least two distinct routes can be pursued to tackle concessive conditionals. One is to adopt a pragmatic approach and hold that the apparent dissimilarities between concessive conditionals and standard if-sentences are explainable in terms of assertibility rather than truth. For example, [Bennett \(1982\)](#) advocates an account of concessive conditionals along these lines. The other is to adopt a syntactic approach and take the dissimilarities at issue to depend on some difference in meaning between ‘if’ and ‘even if’. This is the line of thought pursued by [Pollock, Lycan, and Vidal](#), among others.¹²

As [Crupi and Iacona \(2022\)](#) have argued, both routes are hindered by serious troubles. On the one hand, pragmatic accounts seem unable to provide a precise characterization of the logical behaviour of concessive conditionals. In particular, they seem unable to capture C1–C3. On the other, syntactic accounts seem unable to explain why the presence of the word ‘even’ is neither necessary nor sufficient for that behaviour. Not only are there concessive if-sentences that do not contain ‘even’, but the ‘even if’ construction is admissible for sentences in which the if-clause is intended to support the main clause. Consider the following example, discussed by [Bennett](#), which concerns a worker whose boss is particularly puritanical:¹³

(24) Even if he drinks just a little, he will be fired.

[Bennett](#) describes (24) as a concessive conditional that does not imply its own consequent. However, his description is not entirely compelling. It is far from obvious that (24) is a concessive conditional, at least as long as C2 is granted, given that the if-clause of (24) seems to support

¹¹ This fact is emphasized in ([Bennett, 1982](#); [Gomes, 2020](#); [Vidal, 2017](#)), among other works.

¹² See ([Pollock, 1976](#), pp. 29–31), ([Lycan, 2001](#), pp. 115–138) and ([Vidal, 2017](#), pp. 265–266).

¹³ ([Bennett, 1982](#), p. 410). This example, attributed to [Lewis](#), is first used in ([Pollock, 1976](#), p. 30).

its main clause. This emerges clearly if one thinks that (24) can be paraphrased by using ‘infer’, ‘reason’, or ‘consequence’, as in (21)–(23).

According to [Crupi and Iacona](#), concessive conditionals are not to be identified with a type of sentence. They can rather be identified with a type of interpreted if-sentence, so they resemble biscuit conditionals in this respect. The difference between concessive conditionals and standard if-sentences is revealed by the kind of paraphrases they admit, and is to some extent independent of the words they contain. So, although the word ‘even’ is typically associated with a concessive interpretation of ‘if’, its presence is neither sufficient nor necessary for such interpretation. As in the case of biscuit conditionals, one can assume that, for some if-sentence s , at least two distinct readings – the *standard* reading and the *concessive* reading – can be ascribed to s . These two readings may be represented by means of two distinct kinds of formulas: $\alpha > \beta$ and $\alpha c\beta$.

In order to provide a formal analysis of the concessive reading of if-sentences, Crupi and Iacona adopt the symbol \triangleright , which is defined in terms of their evidential account of conditionals and is stronger than $>$. More precisely, they define $\alpha c\beta$ as follows:

DEFINITION 3. $\alpha c\beta \stackrel{\text{df}}{=} (\alpha > \beta) \wedge (\neg\alpha \triangleright \beta)$.

In other words, a concessive conditional says that its main clause holds on the supposition that its if-clause holds, and the negation of its if-clause supports its main clause. For example, (20) says that it is credible that I will go out tonight in case you do not like it, but on the other hand the assumption that you like it is a reason for thinking that I will go out.

Although a proper defence of this analysis would require a detailed presentation of the formal semantics and a discussion of the possible alternatives, here it will suffice to point out that Definition 3 explains observations C1–C2. C1 is explained because $\neg\alpha \triangleright \beta$ entails $\neg\alpha > \beta$, hence $(\alpha > \beta) \wedge (\neg\alpha \triangleright \beta)$ entails $(\alpha > \beta) \wedge (\neg\alpha > \beta)$. C2 is explained because $\neg\alpha \triangleright \beta$ entails $\neg(\alpha \triangleright \beta)$. Finally, C3 is explained again in virtue of the second conjunct, $\neg\alpha \triangleright \beta$, which determines an asymmetry between α and $\neg\alpha$.¹⁴

¹⁴ [Crupi and Iacona \(2022\)](#) discusses some possible alternatives to the analysis suggested here.

5. Conclusion

What has been said so far suggests that whether-or-not sentences, biscuit conditionals, and concessive conditionals are pseudo-conditionals. Contrary to what might appear, these sentences do not have the form $\alpha > \beta$: a whether-or-not sentence is adequately represented by a formula $\alpha w \beta$ as understood in Definition 1, a biscuit conditional is adequately represented by a formula $\alpha b \beta$ as understood in Definition 2, and a concessive conditional is adequately represented by a formula $\alpha c \beta$ as understood in Definition 3.

Of course, in each of the three cases the analysis suggested is not the first thing that comes to mind. After all, pseudo-conditionals look like conditionals in some respects, and this is precisely why they are called pseudo-*conditionals*. But the plausibility of the analysis suggested can be measured in terms of its capacity to explain the apparent logical behaviour of the sentences involved. For example, on the basis of Definitions 1–3 one can easily explain why (20) intuitively entails (7), why (7) intuitively entails (9), and by transitivity why (20) intuitively entails (9).

Moreover, note that although the formal representations of pseudo-conditionals suggested are not adherent to surface structure, they require no increase of expressive power with respect to the formal resources that are already needed for conditionals. The first two kinds of formulas considered — $\alpha w \beta$ and $\alpha b \beta$ — are formulas of \mathbf{L} , just like $\alpha > \beta$. The third kind of formula, $\alpha c \beta$, requires that the symbol \triangleright is suitably defined, which implies enriching \mathbf{L} . But presumably anyone who accepts the analysis of concessive conditionals advocated by Crupi and Iacona will also be willing to grant that the definition of this symbol is justified for independent reasons.¹⁵

The three cases discussed seem to show in different ways that an adequate formalization of a sentence s that contains ‘if’ or similar expressions must take into account the content expressed by s . Restricting consideration to the syntactic structure or the linguistic meaning of s will not do. More generally, there is no straightforward correspondence between being superficially a conditional and being really a conditional. The elucidation of logical form may require a substantive work of analysis, and conditionals are no exception in this respect.

¹⁵ In (Raidl et al., 2023), \triangleright is defined in terms of $>$.

Acknowledgements This paper was given as a talk at the workshop “What are Logical Forms (Good for)?” held in Prague in October 2022. I received a lot of useful questions and suggestions on that occasion. I would also like to thank Georg Brun, Enzo Crupi, Gilberto Gomes, and one anonymous referee for their comments on previous versions of the text.

References

- Adams, E. W., 1965, “The logic of conditionals”, *Inquiry* 8: 166–197.
- Austin, J. L., 1961, “Ifs and cans”, pages 153–180 in J. O. Urmson and G. J. Warnock (eds.), *Philosophical Papers*, Oxford: Clarendon Press.
- Bennett, J., 1982, ““Even if””, *Linguistics and Philosophy* 5: 403–418.
- Bennett, J., 2003, *A Philosophical Guide to Conditionals*, Oxford: Clarendon Press.
- Crupi, V., and A. Iacona, 2022, “On the logical form of concessive conditionals”, *Journal of Philosophical Logic* 51 (3): 633–651. DOI: [10.1007/s10992-021-09645-1](https://doi.org/10.1007/s10992-021-09645-1)
- De Rose, K., and R. E. Grandy, 1999, “Assertions and “biscuit” conditionals”, *Noûs* 33: 405–420.
- Gärdenfors, P., 1988, *Knowledge in Flux*, Boston: MIT Press.
- Gomes, G., 2019, “Meaning-preserving contraposition of conditionals”, *Journal of Pragmatics* 152: 46–60.
- Gomes, G., 2020, “Concessive conditionals without *Even if* and nonconcessive conditionals with *Even if*”, *Acta Analytica* 35: 1–21.
- Grice, P., 1975, “Logic and conversation”, pages 41–58 in P. Cole and J. L. Morgan (eds.), *Syntax and Semantics*, 3, Academic Press.
- Hunter, G., 1993, “The meaning of ‘if’ in conditional propositions”, *Philosophical Quarterly* 43: 279–297.
- Iacona, A., 2018, *Logical Form: Between Logic and Natural Language*, Cham: Springer. DOI: [10.1007/978-3-319-74154-3](https://doi.org/10.1007/978-3-319-74154-3)
- König, E., 1986, “Conditionals, concessive conditionals and concessives: Areas of contrast, overlap and neutralization”, in C. E. Traugott et al. (eds.) *On conditionals*, Cambridge: Cambridge University Press.
- Lewis, D., 1973, *Counterfactuals*, Oxford: Blackwell.

- Lycan, W. G., 1991, “*Even and Even if*”, *Linguistics and Philosophy* 14: 115–150.
- Lycan, W. G., 2001, *Real Conditionals*, Oxford: Oxford University Press.
- McCawley, J. D., 1993, *Everything that Linguists Have Always Wanted to Know about Logic but Were Ashamed to Ask*, Chicago: University of Chicago Press.
- Pollock, J. L. 1976, *Subjunctive Reasoning*, Dordrecht: Reidel.
- Predelli, S., 2009, “Towards a semantics for biscuit conditionals”, *Philosophical Studies* 142 (3): 293–305. DOI: [10.1007/s11098-007-9187-8](https://doi.org/10.1007/s11098-007-9187-8)
- Raidl, E., A. Iacona and V. Crupi, 2023, “An axiom system for concessive conditionals”, *Studia Logica*. DOI: [10.1007/s11225-022-10034-1](https://doi.org/10.1007/s11225-022-10034-1)
- Russell, B., 1905, “On denoting”, *Mind* 14: 479–493.
- Siegel, M. E. A., 2006, “Quantification over potential literal acts”, *Linguistics and Philosophy* 29: 167–203.
- Stalnaker, R., 1991, “A theory of conditionals”, pages 28–45 in F. Jackson (ed.), *Conditionals*, Oxford: Oxford University Press.
- Vidal, M., 2017, “A compositional semantics for ‘even if’ conditionals”, *Logic and Logical Philosophy* 26 (2): 237–276. DOI: [10.12775/LLP.2016.031](https://doi.org/10.12775/LLP.2016.031)
- Zakkou, J., 2017, “Biscuit conditionals and prohibited ‘then’”, *Thought: A Journal of Philosophy* 6 (2): 84–92. DOI: [10.1002/tht3.235](https://doi.org/10.1002/tht3.235)

ANDREA IACONA

Center for Logic, Language, and Cognition

Department of Philosophy and Education

University of Turin, Italy

andrea.iacona@unito.it