

DONALD NUTE. *Topics in Conditional logic*, Philosophical studies series in philosophy, vol. 20. D. Reidel Publishing Company, Dordrecht, Boston, and London, 1980, x + 164 pp.

In this book, Donald Nute examines several issues in the theory of conditionals. The first four chapters constitute an essay on the semantics of conditionals in ordinary discourse. The remaining chapters comprise three essays – on causation, on subjunctive probability, and on algebraic semantics for conditionals. This review will concentrate on a central issue – that of the *principle of compositionality*. It is discussed by Nute in Chapter 2, entitled *Classical vs. non-classical logics*.

A basic idea in semantics is that a closed sentence expresses a proposition, which in turn is true or false. The principle of compositionality (which traces to Frege) maintains that the proposition expressed by a compound sentence is a function of the propositions expressed by the constituent sentences. Thus, there is a corresponding function associated with each connective. For example, suppose \rightarrow is the function associated with the if-then connective. If sentence A expresses proposition P , and sentence B expresses proposition Q , then the conditional sentence ‘if A , then B ’ expresses the proposition $P \rightarrow Q$.

Two questions arise: What are propositions? How do we calculate $P \rightarrow Q$ given P and Q ? According to a widely accepted doctrine, a proposition may be identified with a set of possible worlds. Within this framework, one approach to conditionals posits a selection function f which assigns to each proposition P and world w a set of worlds $f(P, w)$. The proposition $P \rightarrow Q$ is then defined to be the set of worlds $\{w : f(P, w) \subseteq Q\}$.

The semantics proposed by Nute is similar, but it is not compositional. The crucial difference is that his selection functions are not indexed by propositions but by sentences, so that \rightarrow cannot be defined as above. Nute adopts this approach in order to avoid having to accept the following substitution principle.

(SUB) if A and B are logically equivalent, then ‘if A , then C ’ and ‘if B , then C ’ are logically equivalent.

SUB is an immediate consequence of compositionality, granted the following generally accepted principle: Logically equivalent sentences express the same proposition.

According to Nute, SUB leads to unsatisfactory results in conditional logic. His chief argument is based on the following disputed principle of *simplification of disjunctive antecedents*.

(SDA) if A or B , then C ; therefore, if A , then C (and if B , then C).

SUB and SDA yield the validity of the following argument form

(SA) if A , then C ; therefore, if A and B , then C .

Since SA is generally rejected for counterfactual conditionals, we must relinquish either SUB or SDA. Nute accepts SDA and rejects SUB.

Nute's argument for SDA is based on an examination of arguments formulated in English, much like the argument inferring from the premiss

(P1) if either Anderson or Bush had been nominated (by the Republicans),
then Carter would have won (the 1980 presidential election)

the conclusion

(C) therefore, if Anderson had been nominated then Carter would have won.

Nute analyzes this argument as having the form SDA, so its validity suggests the validity of SDA.

I accept the validity of the above argument, but reject Nute's analysis. Consider strengthening P1 as follows.

(P2) if anyone except Reagan had been nominated, then Carter would have won

The subtleties of the 'any' quantifier are well known. In particular, although 'if-then' appears in (P2) to have wider scope than 'any', just the opposite is true; contrary to superficial appearance, (P2) is not a conditional but a universally quantified sentence.

There is reason to suppose that (P1) and (P2) are completely analogous. In particular, I wish to suggest that 'either' is often a special case of 'any', one in which the domain of quantification is presumed to be two in number. The following three sentence-pairs illustrate the interchangeability of 'either' and 'any' as wide-scope universal quantifiers.

- (1) can either/any of the Smiths' children play the piano?
- (2) not either/any of the Smiths' children can play the piano.
- (3) if either/any of the Smiths' children can play the piano, then the Smiths will be pleased.

In the pair 'either'/'any' we have the wide-scope counterparts of 'both'/'all', which are (usually) narrow-scope quantifiers. To see the difference, substitute 'both'/'all' for 'either'/'any' in (1)-(3).

With this in mind, we can analyze (P1) and (P2) in the following way as having the same logical form.

- (P1') for all x [$x = \text{Anderson}$ or $x = \text{Bush}$], if x had been nominated, then Carter would have won.
- (P2') for all x [x is a person and $x \neq \text{Reagan}$], if x had been nominated, then Carter would have won.

In these analyses, the bracketed expression specifies the domain over which the quantifier ranges. The logical form common to (P1') and (P2'), therefore, is the following.

((quantifier) [domain specifier]) (conditional sentence)

Not every example by Nute falls under a simple quantificational scheme. Consider the following example.

- (P3) if either the Yankees win or the Red Sox lose, the Yankees win the Pennant.

In order to subsume (P3) under the proposed analysis, one can resort to quantification over events (which is allowed in English) and analyze (P3) as follows.

- (P3') for all x [$x = \text{the-Yankees-win}$ or $x = \text{the-Red-Sox-lose}$], if x happens, then the Yankees win the Pennant.

To sum up, if it is granted that 'either-or' is occasionally used as a wide-scope universal quantifier (and also that 'or' is a "lazy" version of 'either-or'), then we can accept Nute's examples as valid English arguments without accepting the validity of SDA. It should be mentioned that in challenging SUB, Nute also appeals to another simplification principle which is similar to SDA. But his argument for this principle can likewise be subverted by making distinctions of quantifier scope.

As Nute points out, there is no good reason to reject SUB *except* the intuitive appeal of his proposed simplification principles. With no good reason to accept these, we have no good reason to reject SUB. Thus, for conditional logic we can keep a semantics that is compositional (classical).

In this work, Nute not only offers a systematic presentation and overview of important issues in conditional logic; his further contribution is to show how simplification principles, such as SDA, fit into the general scheme of conditional logic. A number of writers have suggested that SDA is a valid principle. Nute defends SDA but also, what is more important, undertakes the task of incorporating it into a formalized conditional logic. In so doing, he shows exactly what price must be paid to uphold these simplification principles. It might be added that, since writing this book, Nute has renounced SDA (see *Journal of philosophical logic*, vol. 9 (1980), pp. 153-166).