CONTENT AND DEGREE OF CONFIRMATION

Remarks on Popper's Note on Content and Degree of Confirmation

IN a recent note,[1] Popper has raised objections against some points in my book on probability[2] and a later paper of mine.[3] I shall not enter into a substantial discussion of Popper's arguments but merely correct some points where he attributes to me statements which I did not make.

(*a*) Popper mentions (p. 158) the three concepts of confirmation which I distinguish, viz. (i) the classificatory, (ii) the comparative, and (iii) the quantitative concepts of confirmation. Referring to my book, he says (p. 158): 'All three concepts are discussed at some length; but in the end, only a theory of (iii) is offered', and later (p. 158 n.): 'Thus no current theory of either the classificatory or the comparative concepts is claimed to exist.' These statements are not correct. In fact, I gave a definition for (i), based on the degree of confirmation *c* (*Probability,* p. 463, (2)). According to this definition, (i) is the same as the concept of positive relevance. An analogous definition for (ii) based on *c* is obvious (see *Comparative*, p. 311, (3)); thus the theory of (ii) is part of the theory of *c* given in *Probability***,** Chapter IV (see the list on p. 456 of quantitative theorems with a merely comparative content). Popper supports his assertions by the following alleged quotations from *Probability:*

(1) 'This concludes the discussion of the classificatory concept. We have not found an adequate explicatum . . .';

and on the comparative concept:

(2) 'However . . . it seems doubtful whether a simple definition can be found.' If I had made these statements as quoted, the reader might indeed conclude that I did not see any way of defining either (i) or (ii), although he might wonder why I had forgotten so soon my own definition of (i). What I actually said was quite different. Instead of (1), the book says:

(1') 'This concludes the discussion of the classificatory concept of confirming evidence. We have not found an adequate explicatum *in non-quantitative terms*' (p. 482).

Then it continues as follows:

(1'') 'The concepts which were considered as possible explicata were found to be too narrow. *However, we have a theory of confirming evidence* [i.e. concept (i)] *in quantitative terms*. The general part of this theory . . . was constructed in the preceding chapter as the theory of relevance.'

Instead of (2), the book says:

(2') ' However . . . it seems doubtful whether a simple definition *in L-terms* can be found' (p. 467).

(The italics in (1'), (1''), and (2') are not in the original.) The essential point of my discussion of the concepts (i) and (ii) in the book was the following. The obvious

[1] Karl R. Popper, "' Content" and "Degree of Confirmation": A Reply to Dr Bar-Hillel', this *Journal*, 1955, 6, 157-163

[2] R. Carnap, *Logical Foundations of Probability,*1950, here referred to as *Probability*

[3] R. Carnap, 'On the Comparative Concept of Confirmation', this *Journal*, 1953, 3, 311-318, here referred to as *Comparative*

definitions of these concepts use quantitative terms, viz. the degree of confirmation, while I tried, without success, to find definitions using only non-quantitative terms, e.g. *L*-terms. In each quotation Popper omits a few words which would have destroyed his argumentation ; and the sentence in (1") here italicised directly contradicts his assertion. (The discovery of the omission in (1) is not made easier by the fact that Popper refers to page 492 instead of page 482. The omission in (2) is not even indicated by dots.)

(*b*) Popper reports correctly (p.158) that my definition of degree of confirmation (viz, *c**, *Probability,* § 110) leads to the result that the degree of confirmation for any universal law for a universe with infinitely many individuals is zero. Like many others, he regards this result as counter-intuitive. This is a serious problem, which I shall not discuss here. However, Popper continues (p. 159) : 'And Carnap himself admits that this result is counter-intuitive.' This assertion, which he repeats again later, is not correct. On the contrary, my whole discussion (in § 110 G) tries to show that the result, in spite of the first appearance, is not counter-intuitive. I can easily imagine that a reader might remain unconvinced by my arguments. But it is thoroughly puzzling to me how any reader could have the impression that I myself believed the proposition which I tried so hard to refute.

(*c*) Popper shows correctly (p. 160) that the following theorem holds for logical probability p:

(3) If x follows from y, then, for every z, $p(y, z) \leqq p(x, z)$.

He adds: 'which is, precisely, the invalid condition which Carnap uses on the bottom of page 474 of *Probability* as an argument to show the invalidity of a confirmation concept'. This is an error. If I had actually asserted the invalidity of (3) or rather of its analogue for degree of confirmation, as Popper thinks, then my theory would indeed contain a glaring inconsistency ; for I myself have asserted this analogue as a theorem (T59-2d, p. 317). The condition, which I showed to be invalid and used as stated by Popper (I call it 'special consequence condition', as Popper mentions correctly), is in fact the following (in the simple form for initial confirmation, see *Probability,* p. 471 (H 8.21) and p. 464 (4), 't' is the tautology):

(4) If x follows from y, then, for every z,

$$\text{if } c(y, z) > c(y, t) \text{ then } c(x, z) > c(x, t).$$

The conditions (3) and (4) have a certain similarity but are not the same. I have explained their difference in *Probability* page 475.

Popper's whole argument (p. 160) is based on the confusion of (3) with (4) and collapses with it.

RUDOLF CARNAP

University of California
at Los Angeles