

ON BELIEF SENTENCES

REPLY TO ALONZO CHURCH

By RUDOLF CARNAP

Church's paper¹ raises objections against the explication of belief sentences which I had proposed in my book *Meaning and Necessity*. The first part of Church's paper does not apply to my analysis because the latter does not refer to historically given languages, but rather to semantical systems, which are defined by their rules. Thus only the objection stated in Church's last paragraph applies. This objection is correct, but it can be met by a modification in my explication of belief sentences, suggested by Putnam.² I shall not discuss this point here, because at present I am inclined, for general reasons, to make a more radical change in that explication.

It seems best to reconstruct the language of science in such a way that terms like 'temperature' in physics or 'anger' or 'belief' in psychology are introduced as theoretical constructs rather than as intervening variables of the observation language. This means that a sentence containing a term of this kind can neither be translated into a sentence of the language of observables nor deduced from such sentences, but at best inferred with high

¹ In this volume, pp. 125-128.

² Hilary Putnam, "Synonymity and the analysis of belief sentences", *Analysis*, Vol. 14 pp. 114-122.

probability. I think, this view is at present shared by most logical empiricists; it has been expounded with great clarity and convincing arguments by Feigl¹ and Hempel.²

In application to belief sentences, this means that a sentence like

(i) John believes that the earth is round,

is to be interpreted in such a way that it can be inferred from a suitable sentence describing John's behaviour at best with probability, but not with certainty, e.g., from

(ii) John makes an affirmative response to "the earth is round" as an English sentence.

When I wrote my book, I had already developed the general view mentioned above, concerning the nature of sentences in physics and psychology. However, I believed then erroneously that for the intended semantical analysis the simplification involved in taking a response as a conclusive evidence for a belief, would not essentially change the problem. It seems that Benson Mates³ was the first to see the difficulty involved, although not its solution. He pointed out (l.c., p. 215) that any two different sentences, no matter how similar, could evoke different psychological responses. He argued that therefore my explication of synonymy, and likewise any other one, would lead to difficulties, e.g., in the case of the following two sentences:

(iii) Whoever believes that *D*, believes that *D*,

(iv) Whoever believes that *D*, believes that *D'*,

where '*D*' and '*D'*' are abbreviations for two different but synonymous sentences. Then (iii) and (iv) would themselves be synonymous. However, while (iii) is certainly true and beyond doubt, (iv) may be false or, at least, it is conceivable that somebody may doubt it. This is indeed a serious difficulty, but only as long as we regard an affirmative response to '*D*' as a conclusive indication of belief in *D*.

Church pointed out to me that Mates' paradoxical result concerning (iii) and (iv) disappears if we give up that view. We may then

¹ H. Feigl, "Existential hypotheses", *Phil. of Science*, 17, 1950, 35-62 ; "Principles and problems of theory construction in psychology", in *Current trends in psychological theory*, University of Pittsburgh Press, 1951, pp. 179-213.

² C. G. Hempel, *Fundamentals of concept formation in empirical science*, *Enycl. Unified Science*, Vol. II, No. 7, 1952.

³ Mates, "Synonymy", in: *Meaning and Interpretation*, Univ. of California Publications in Philos., Vol. XXV, 1950, pp. 201-226.

take (iv) as logically true, just like (iii). If somebody responds affirmatively to ‘*D*’, but negatively to ‘*D*’, we shall merely conclude that one of his responses is non-indicative, perhaps due to his momentary confusion.

While I agree with Church in this point, there remains a divergence of view with respect to the question of the best form for belief sentences in a formalized language of science. One form uses indirect discourse in analogy to the form (i) of ordinary language. The other form avoids indirect discourse; here a belief sentence does not like (i) contain a partial sentence expressing the content of the belief, but instead the name of such a sentence, for example

(v) John has the relation *B* to “the earth is round” as a sentence in English.

It is to be noted that, according to the new interpretation explained above, (v) is not deducible from (ii) but is merely confirmed by it to some degree. ‘*B*’ is a theoretical construct, not definable in terms of overt behaviour, be it linguistic or nonlinguistic. The rules for ‘*B*’ would be such that (v) does not imply that John knows English or any language whatsoever. On the other hand, the reference to an English sentence in (v) may be replaced by a reference to any other synonymous sentence in any language; e.g., (v) is taken to be L-equivalent with

(vi) John has the relation *B* to “die Erde ist rund” as a sentence in German.

As an explication of synonymy we may use here the relation of intensional isomorphism as proposed in my book; it holds, if the two expressions are constructed in the same way out of signs with the same intensions; as an alternative, a slightly stronger relation, suggested by Putnam, may be used, which requires that the two expressions have, in addition, the same syntactical structure.

Church entertains the view that a belief must be construed as a relation between a person and a proposition, not a sentence, and that therefore only the first form, like (i), is adequate, not the second, like (v). I do not reject the first form, but regard both forms as possible. I do not think that the arguments offered by Church so far show the impossibility of the second form. Both forms must be further investigated before we can decide which one

is preferable. It must be admitted that the second form has certain disadvantages; it abolishes the customary and convenient device of indirect discourse, it uses the metalanguage, and it becomes cumbersome in cases of iteration (e.g., “James asserts that John believes that . . .” would be replaced by a sentence about a sentence about a sentence). The main disadvantage of the first form is the complexity of the logical structure of the language, whereas the language for the second form may be extensional and therefore very simple. The introduction of logical modalities produces already considerable complications, but the use of indirect discourse increases them still more. The greatest complexity would result from the use of the Frege-Church method, according to which an expression has infinitely many senses depending upon the text (see my book pp. 129 ff.). Church believes that these complications are inevitable, but I am not convinced of it. I regard it as possible to construct a language of the first form in such a way that every expression has always the same sense and that therefore two expressions which fulfill a certain criterion of synonymity are synonymous in any context, including contexts of simple or iterated indirect discourse. But many more investigations and tentative constructions of languages will have to be made before we can see the whole situation clearly and make a well-founded decision as to the choice of the language form.