

Einstein has been mistranslated

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Confusion has been caused by Einstein being mistranslated. Example is presented of a mistranslation in Einstein's 1905 special relativity paper. This example was spotted in 1963, and most (if not all) relativists seem to have not corrected for this and still go by the mistranslation.

Charles Scribner Jr. in 1963 [1] points out that the usual translation of Einstein 1905 paper on special relativity (STR) has had its meaning changed from what was in the original German, and this has perpetrated a misunderstanding.

The relevant translated passage from Einstein, translated by Perrett and Jeffrey, with the problem part enclosed in square brackets:

“But it is not possible without further assumption to compare, in respect of time, an event at A with an event at B. We have so far defined only an “A time” and a “B time. We have not defined a common “time” for A and B, [for the latter cannot be defined at all unless we establish *by definition*] that the “time” required by light to travel from A to B equals the “time” it requires to travel from B to A.”

The square bracket section:

[for the latter cannot be defined at all unless we establish *by definition*]

Should read: “the latter time can now be defined in establishing by definition that the ‘time’”.

Charles Scribner Jr. seems to think this a small problem. I however think it a big problem.

Adolf Grünbaum referring to this issue in *Philosophical Problems of Space and Time: Second, enlarged edition*, [2] says:

"Perrett and Jeffrey unfortunately mistranslated the pertinent sentence in his original 1905 German paper into English. Hence their mistranslation can be mistaken as documentary proof that Einstein himself erroneously asserted that simultaneity can be specified in the STR only by stipulating the equality of the to and fro velocities of light. But in Einstein's original German text, he had offered the stipulation of the equality of these one-way velocities as a (contextually) sufficient condition for simultaneity, and not as a necessary condition."

What this means is there is really a problem in the logic of what is said in the German to how the logic has now been presented in the translation into English.

Its talking about difference between "can only be specified" (i.e. necessary condition) VERSUS "sufficient condition" (i.e. not a necessary condition).

Referring now to definitions [3]:

Definition of "necessary condition" Definition:

A condition A is said to be necessary for a condition B, if (and only if) the falsity (/nonexistence /non-occurrence) [as the case may be] of A guarantees (or brings about) the falsity (/nonexistence /non-occurrence) of B.

Definition of "sufficient condition" Definition:

A condition A is said to be sufficient for a condition B, if (and only if) the truth (/existence /occurrence) [as the case may be] of A guarantees (or brings about) the truth (/existence /occurrence) of B.

i.e. the translation from German to English is getting the "condition" wrong for simultaneity; thus, two different theories about simultaneity-- one theory for those reading the German, and another theory for those reading it in English.

Comparing two translations:

The first translation, by W. Perrett and G.B. Jeffery [4]: "But it is not possible without further assumption to compare, in respect of time, an event at A with an event at B. We have so far defined only an "A time" and a "B time. We have not defined a common "time" for A and B, for the latter cannot be defined at all unless we establish *by definition* that the "time" required by light to travel from A to B equals the "time" it requires to travel from B to A."

Contrasted with translation by A.F. Kracklauer [5]: "Thus, so far we have "A" - time and "B" - time, but still no common time for both. This latter, common time can now be defined in terms of the time that light takes to go from A to B, and its equal return, i.e., the time from B to A."

In the first translation the claim is that it must define this way, and second translation says it is optional.

"we establish" = compulsory

"can now" = optional

So, first is a compulsory definition and second more of an optional assumption.

"cannot be defined at all unless" VERSUS "can now be defined"

compulsory definition VERSUS optional

In original German - have the option of not defining simultaneity in the way that Einstein chooses to define it. But in the English - you MUST define it in the way that Einstein chooses.

Two different theories about "time"; in the German- flexibility of how to deal with "time" and in the English its rigid inflexible and compulsory as to how "time" is to be dealt with.

Then when we consider light, if light goes from A to B and from B to A, and the optional assumption is to assume both journeys take the same time interval; given that don't have to take that option then light could take different time interval from A to B as it takes from B to A then lightspeed is not constant. i.e. the 2nd postulate then becomes mere optional.

And if cite Charles Scribner Jr. who cites Einstein from *The Meaning of Relativity*, trans by Edwin P. Adams [6]:

Einstein: "The theory of relativity is often criticized for giving, without justification, a central role to the propagation of light. The situation, however, is somewhat as follows. In order to give physical significance to the concept of time, processes of some kind are required which enable relations to be established between different places. It is immaterial what kind of processes one chooses for such a definition of time. It is advantageous, however, for the theory, to choose only those processes concerning which we know something certain. This holds for the propagation of light in vacuo in a higher degree than for any other process which could be considered, thanks to the investigations of Maxwell and H.A. Lorentz."

i.e. don't have to have lightspeed as constant. Assuming it constant merely imposes one type of definition for "time" when can define "time" in other ways.

There are of course other problems with what I consider ambiguity of saying lightspeed is constant that I omit from this article and take up in my other articles.

The issue highlighted here is that those relativists going by the usual English translation of Einstein (i.e. Perrett and Jeffery translation) have got things wrong, and those reading Einstein in the original German have a different perspective on relativity.

Appendix

Mistranslation of a Passage in Einstein's Original Paper on Relativity

STUDENTS of the Special Theory of Relativity who have read Einstein's fundamental paper "Zur Elektrodynamik bewegter Körper"¹ only in the English translation by W. Perrett and G. B. Jeffery may appreciate our pointing out the following passage² in which an unnecessary elaboration of the text on the part of the translators has somewhat altered its exact meaning. We quote below the original passage and then the translation, placing brackets around the questionable part of the latter.

"Es ist aber ohne weitere Festsetzung nicht möglich, ein Ereignis in A mit einem Ereignis in B zeitlich zu vergleichen; wir haben bisher nur eine ' A -Zeit' und eine ' B -Zeit,' aber keine für A und B gemeinsame 'Zeit' definiert. Die letztere Zeit kann nun definiert werden, indem man *durch Definition* festsetzt, dass die 'Zeit,' welche das Licht braucht, um von A nach B zu gelangen, gleich ist der 'Zeit,' welche es braucht, um von B nach A zu gelangen."³

"But it is not possible without further assumption to compare, in respect of time, an event at A with an event at B . We have so far defined only an ' A time' and a ' B time.' We have not defined a common 'time' for A and B , [for the latter cannot be defined, at all unless we establish *by definition*] that the 'time' required by light to travel from A to B equals the 'time' it requires to travel from B to A ."²

A faithful translation of the last sentence of the passage in question would read simply: "The latter time can now be defined in establishing *by definition* that the 'time,' etc."

In his Stafford Little Lectures delivered in May 1921 at Princeton University, Einstein remarked that:

"The theory of relativity is often criticized for giving, without justification, a central theoretical rôle to the propagation of light, in that it founds the concept of time upon the law of propagation of light. The situation, however, is somewhat as follows. In order to give physical

significance to the concept of time, processes of some kind are required which enable relations to be established between different places. It is immaterial what kind of processes one chooses for such a definition of time. It is advantageous, however, for the theory, to choose only those processes concerning which we know something certain. This holds for the propagation of light *in vacuo* in a higher degree than for any other process which could be considered, thanks to the investigations of Maxwell and H. A. Lorentz.”⁴

It would seem possible that the above-mentioned liberty by the translators has helped to perpetuate a misunderstanding of Einstein's own position on this point.

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¹ A. Einstein, *Ann. Physik* 17, 891 (1905).

² H. A. Lorentz, A. Einstein, et al., *The Principle of Relativity*, translated by W. Perrett and G. B. Jeffery (Methuen and Company Ltd., London, 1923), p. 39.

³ Reference 1, as reprinted in H. A. Lorentz, A. Einstein, H. Minkowski, *Das Relativitätsprinzip* (B. G. Teubner, Leipzig, 1913), p. 29.

⁴ A. Einstein, *The Meaning of Relativity*, translated by Edwin P. Adams (Princeton University Press, Princeton, New Jersey, 1922), p. 28. Also see W. Pauli, *Theory of Relativity* (Pergamon Press, Inc., New York, 1958), p. 9.

References

[1] Mistranslation of a Passage in Einstein's Original Paper on Relativity, *American Journal of Physics* 31, 398 (1963);

<https://doi.org/10.1119/1.1969543> Charles Scribner Jr.

<https://aapt.scitation.org/doi/10.1119/1.1969543>

[2] *Philosophical Problems of Space and Time: Second, enlarged edition.* By Adolf Grünbaum p 702

[3] *The Concepts of Necessary and Sufficient Conditions*, Norman Swartz, 1997 Department of Philosophy, Simon Fraser University

<http://www.ucd.ie/artspgs/semantics/swartznsc.pdf>

[4] Einstein's *On the Electrodynamics of Moving Bodies* which appeared in the book *The Principle of Relativity*, published in 1923 by Methuen and Company, Ltd. of London. Most of the papers in that collection are English translations by W. Perrett and G.B. Jeffery from the German *Das Relativitätsprinzip*, 4th ed., published by in 1922 by Tuebner.

[5] *The electrodynamics of objects in motion*, translated by A.F. Krakauer in book *Einstein in English vol. I*

[6] The Meaning of Relativity, Einstein, trans by Edwin P. Adams, Princeton University Press, 1922 p. 28

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updated for typo error 25 March 2019: in ref 5 was “objects” not “objections”