

On Einstein and the Axiom of Special Relativity

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Looking at articles by Claes Johnson on Special Relativity (SR) in the way that he treats the subject. Different people have had different perspectives on SR.

He starts off [1]: It is well known the Einstein did not do well in mathematics in school, and thus we may expect that Einstein is one of the many people who have misunderstood mathematics and the nature of mathematics.

Johnson points out that Einstein was bad at math, he uses this to highlight that the math of SR is bad; what would be expected is thus - someone bad at math creates a bad math theory.

Others have criticised that Einstein was bad at math. And those defending Einstein sometimes retort that this is attacking the “messenger” instead of the “message” (i.e. SR), but it’s because Einstein (the messenger) was so bad at math that it is why his message (SR) is so bad. So pointing out both message and messenger is bad is valid, because the two things are complimentary. What is amazing is that so many others are bad at math that they can be deceived by such bad math as Einstein presents.

Johnson continues: Well, let's take look at the special theory of relativity which brought Einstein to fame: This theory is based on one axiom connecting space-time observations of two observers moving with constant velocity with respect to each other in the form of the Lorentz transformation, which is a linear transformation of simple form, of the same complexity as a straight line.

Well the way SR is usually presented is that it is two axioms not one, of (1) Principle of relativity and (2) and sometimes SR texts point out that there are additional hidden assumptions. Also the supposed fact that Lorentz transformation (LT) can be derived

from assuming constancy of light speed, I dispute because when we look at the derivation of that by Einstein and co it was a mess.

Johnson continues: The simple linear Lorentz transformation changing our conception of space and time?

That's one of the supposed claims of SR.

Johnson: The axiom of special relativity is the Lorentz transformation.

That's not how it is usually presented, LT is supposedly derived from two axioms, so we have to allow "it" that Johnson is looking at SR slightly different to the norm, and treating SR as assuming LT. Different people do look at these things differently.

Johnson: Just like you can specify a straight line in many different ways, by specifying two points on the line, or a point on the line and the direction of the line, you can specify the Lorentz transformation in many different ways, all being equivalent and expressing the same thing.

I don't know what he means by this.

Johnson: One way of deriving the Lorentz transformation is to assume as an axiom that the speed of light is the same for all observers.

As noted earlier I dispute that supposed claim of SR.

Johnson now contrasts SR to a hypothetical theory of GNP (Gross National Product): If the axiom is that GNP grows linearly in time at a rate of 1 zillion a year, you will not be surprised to hear that after 2 years it has grown with 2 zillion, according to the theory based on that axiom.

Ok, he is illustrating the circular nature of the GNP theory.

Johnson: If you take as an axiom that the space-time observations of two observers is connected by the Lorentz transformation, then you should not be surprised to learn that each observer consider the clock of the other to run twice as fast as his own, if this is what the Lorentz transformation says.

Ok, he is illustrating the circular nature of SR theory. My perspective is math mistakes made with SR, so according to me - SR under mistakes made with math of LT, the SR believers make such a claim.

Johnson: This is if you don't misunderstand mathematics and how theorems are derived from axioms.

In otherwords he is saying if "you" are "surprised" then "you" don't understand math.

Johnson: But if we, like Einstein, forget that the Lorentz transformation is an axiom, then we can be misled to believe that mathematics has somehow magically predicted that the rate of a clock is affected by motion.

Exactly, the theory only gives prediction of what is put into it by its assumptions.

Johnson: This was what Einstein did, which was explicitly forbidden by Lorentz, who was the one who derived the transformation and thus understood its premises. Einstein thus interpreted transformed time as physical time, which was not allowed according to Lorentz, who knew.

Yes, Lorentz had his theory using math of Lorentz transformations and Einstein came along and reinterpreted what that math was supposed to mean. Einstein supposedly derived the math of LT from two axioms/assumptions which led to his reinterpretation. (But looking at Einstein's supposed derivation of LT it is a mess.)

Johnson: This is exposed in detail in Many-Minds Relativity and the related knol.

The "knol" is another article, which I will have to look at anon.

Johnson: The fact that Einstein's special theory of relativity represents a misunderstanding of the physical meaning of the Lorentz transformation, is demonstrated by the paradoxes of the theory, such as the twin paradox and the ladder paradox, which Einstein left to the scientific community to resolve, while he moved on to another level of mathematics and possible misunderstanding in the form of general relativity with its curved space-time, which very few seem to understand and hence many risk to misunderstand.

What Johnson should really be saying is that Einstein's reinterpretation of Lorentz's LT math is not really a physically realistic interpretation because of the paradoxes it generates. The issue of GR (General Relativity) --when Einstein went on to extend the math of SR should have then have been a continuation of misunderstandings.

Johnson: Another indication that relativity theory is an unphysical theory, is that Einstein was 100% sure that it was correct; no evidence whatsoever could change his conviction, an attitude you often meet when discussing relativity theory with physicists. Einstein expressed his 100% conviction as follows in 1911: "*The question whether the Lorentz contraction does or does not exist is confusing. It does not really exist in so far as it does not exist for an observer who moves (with the rod); it really exists, however, in the sense that it can as a matter of principle be demonstrated by a resting observer.*"

What Einstein is doing is believing his theory is mathematically consistent. If his math of the LT was correctly derived then it cannot be incorrect from a mathematical point of view, in the same sense that $1+1 = 2$ cannot be incorrect as a statement about natural numbers, as a matter of principle. (However there are problems with Einstein's math as dealt with in my other articles.)

Johnson makes very valid points. SR is a theory asking that physical reality be interpreted from it, so in that sense it is a tautology. But the math of SR is itself full of

mistakes. So not only is it a tautology in the sense that you interpret physical reality from it, but it is asking that you interpret physical reality from math mistakes.

Johnson: But the consequences can be physically absurd, if the Lorentz transformation has no physical meaning,

Exactly.

And Johnson then points out that Max Born had this viewpoint; Max Born was one of the original supporters of Einstein's relativity and early promoter of it.

Johnson: which is the case, as illustrated by the Nobel Laureate Max Born:

- *Length contraction and time dilation are ways of regarding things and do not correspond to physical reality.*
- *It is hardly possible to illustrate Einstein's kinematics by means of models.*

Exactly, at least Born seems to have recognised that SR is a theory that demands physical reality be interpreted from "it", and "it" does not make predictions of things that can be tested, instead it demands that measurements be interpreted from its beliefs. I.e. if you go to measure lengths and time intervals, you don't notice any length contraction or time dilation; instead SR says you should make your measurements and then interpret those measurements by adjusting them as per the way SR demands of its bad math to be in agreement with the way that SR viewpoint looks on physical reality.

Johnson: If you misunderstand Born's statements, then you may believe that special relativity is a theory about physics, but if you understand what Born says, then you see that it is an empty mathematical theory based on a very simple linear transformation, a theory without physical meaning.

Exactly, others have pointed this out like Essen (I think). But a point to realise is that Born himself might not have realised the consequences of what his statement meant; namely that SR is just a viewpoint. We make measurements, and SR tells us to interpret those measurements a certain way. If we suppose there are two viewpoints (1) Newtonian and (2) SR then ideally there is no reason why we should not interpret measurements from either viewpoint. But problems have been introduced because of the math of SR being full of mistakes, and even with Newtonian physics some mistakes have been made. But in the two idealised viewpoints (1) universal time (and variable light speed) and (2) constant light speed (both viewpoints restricted to constant velocity frames) there is no reason why we cannot interpret experiments from either viewpoint.

Johnson: Mathematics can be seductive in the sense that it is the only science which can give you the good feeling of being 100% sure. But being 100% sure of something should send a warning signal that what you are so sure about can be a tautology,

which is true by definition, like the statement that there 100 centimeters on a meter. Remember that mathematical statements are tautologies, true by definition, although (in the worst case) hiding in a 500 page proof unwinding the tautology.

Yes, whether we interpret experiments by viewpoint (1) or (2), both viewpoints can be interpreted as tautologies.

Johnson: Since 1983 the standard length unit meter *is the length of the path traveled by light in vacuum during a time interval of 1/299792458 of a second. In other words, the length unit is so defined that the speed of light is exactly 1 lightsecond per second with the length unit of a lightsecond (equal to 299792458 meters) being the distance traveled by light in one second.*

Suppose now that you as an inquiring researcher set up an experiment to check if the speed of light in fact is one lightsecond per second. Would that be reasonable? Can you check the validity of a definition by experiment? Can you check by experiment if there are 100 centimeters on a meter? Of course not. A definition is a statement which is true by its own logical construction. If you by experiment find that there are only 99 centimeters on a meter, then you can be 100% sure that you have made an experimental mistake.

Yes

Johnson: So when you hear physicists telling you that experiments show that the axiom of special relativity that the speed of light is the same for all observers, is verified experimentally, you will smile and say that the physicist confuses a definition with a statement about physics which can be tested experimentally.

Yes

Johnson: You may continue and say that special relativity being true by definition is not a theory about physics.

Yes, not a “theory” as we would normally think of what a “theory” meant, rather now it becomes a “viewpoint”.

Johnson: At least not according to the Swedish Nobel Laurate in Physics Hannes Alvéén: Many people probably felt relieved when told that the true nature of the world could not be understood except by Einstein and a few other geniuses who were able to think in four dimensions. They had tried to understand science, but now it was evident that science was something to believe in, not something which should be understood.

Yes

Johnson: Physicists influenced by Einstein believe in the magic of invariance, a property of a mathematical expression to take the same form under certain transformations of coordinates. Maxwell's equations are invariant under Lorentz transformations. Invariance can reflect that a physical property is symmetric in the sense that it is independent of orientation.

The influence of Einstein has been to interpret things something like that, but what I would add it is based on interpretation due to bad math.

Johnson: However, Einstein turned this around into magically believing that if a mathematical expression is invariant, then it must reflect some deep physical principle. This kind of logic leads into believing that the Lorentz transformation must represent some hidden deep physics, because Maxwell's equations are Lorentz invariant, although nobody has been able to understand that physics. We have to admit that the Maxwell equations represent an ad hoc model of electromagnetics, simply postulated by Maxwell, and drawing conclusions about physics from an ad hoc model of physics is not science.

Yes

Johnson: Today thousands of physicists are devoting their lives to a mathematical model named supersymmetric string theory, which seems to require eleven space dimensions, based on the idea that since the mathematical model has eleven dimensions, so must our physical world, but nobody has found any trace of these extra dimensions.

That is an attack on superstring theory, it is disputable. Given that SR is really a "viewpoint", extending along this "viewpoint" leads to interpreting physical reality from extensions to SR viewpoint by theories such as superstring theory. Where superstring theory itself is more like a "viewpoint" than a "theory" from how we might commonly think of as "theories". So one thing leads to the other; looking at things through viewpoint of SR leads to viewpoints like superstring. But as I point out again the math of this is bad.

The math is being bad is related to the contradictions in Einstein's relativity. Johnson points out that: Einstein liked contradictions and ambiguity [2]:

- *There is no aether according to the special theory of relativity (1905)*
- *There is an aether according to the general theory of relativity (1920)*

In straightforward terms, we see Einstein making a statement X and then saying the opposite.

However, if we look at Einstein's work as math modelling then what was being referred to was that the math model of SR had no aether then got updated to math model GR with aether. But Einstein was himself not clear on this, and those who have followed in his footsteps are confused and might not look at it as math modelling.

And Johnson points out from a quote from Einstein: Since the mathematicians have invaded the theory of relativity, I do not understand it myself anymore.

So Einstein was no longer himself to understand the theory he developed as others developed on it. Thus we have Einstein not understanding "it" and others not understanding "it".

(Since Einstein did not understand his own theory (theories) this leads us to speculate that it was not his theory (theories), and there have been claims he plagiarised them. That would account for “why” he did not understand. But that is not going to be dealt with in this article.)

Johnson then points out: OK fine, nobody understands relativity, not even Einstein, but how are we then going to judge? There are two possibilities:

- (A) Since nobody understands, the theory is most likely correct and meaningful.
- (B) Since nobody understands, the theory does not make sense.

My position is that the theory (theories) are a mess. Einstein was no good at math, and left a mathematical theory (theories) which was a mathematical mess, which he himself admitted to not being able to understand, and others who followed him differed in how to try to make sense of the mess he left.

So to the question Johnson raises: What can you expect from a mathematical theory developed by someone who did not understand mathematics?

My answer is we would expect a mess.

Johnson also points out some quotes from Einstein:

- The scientist must appear to the systematic epistemologist as a type of unscrupulous opportunist: he appears as realist insofar as he seeks to describe a world independent of the acts of perception; as idealist in-sofar as he looks upon the concepts and theories as the free inventions of the human spirit (not logically derivable from what is empirically given);
- as positivist insofar as he considers his concept and theories justified only to the extent to which they furnish a logical representation of relations among sensory experience. He may even be viewed as Platonist or Pythagorean insofar as he considers the viewpoint of logical simplicity as an indispensable and effective tool of his research.

Which highlight that Einstein’s philosophic interpretation was a bit of a mess as well. From my viewpoint- the correct philosophy of science/physics is Pythagorean (Platonic). The conflict with positivist type philosophies trying to take over science/physics has also be a large contributor in making a mess; with some people believing one thing and others believing something else – as regards interpretation of physical reality.

Claes Johnson points out no one really understands relativity theory. [3] He says: It seems that nobody really understands relativity, because there is nothing to understand. It is empty! It is a non-physical theory, which says nothing about physics.

This is because he says: You see this from the fact that there is no physics input, and thus there can be no physics output. Einstein's special theory of relativity is based on the following two assumptions: (i) There is no aether (aether = material medium for light propagation). (ii) The speed of light is 1 (lightsecond/second).

To understand the nature of these axioms, let us compare with a theory of economy based on the following axioms: (i) There is no free lunch. (ii) There are 100 cents on each dollar. We understand that (i) is a negative statement stating the non-existence of something, and that (ii) is a definition. There is no physics/economics input in these assumptions, just absence or non-existence of physics/economics.

SR is not usually stated that way.

He continues: You ask if a theory about physics can come out from two basic axioms stating non-existence of something + a definition, which have no positive content of physics? It seems to me that you need something more substantial, something positive and not just non-existence?

He answers: you cannot get something out of nothing. No physics input means that there is no physics output. Einstein's special theory of relativity is non-physical.

And claims you can develop various positive alternative theory of relativity accommodating the result of Michelson-Morley experiment and Maxwell's equations.

He says: An example is many-minds relativity based on the following basic axiom: All observers assume that light propagates according to the same Maxwell's equations in a vacuum fixed to the observer. In a theory of economy, this could be like an agreement among all actors to follow the Bretton Woods system.

For this he claims: the basic axiom has a substantial positive physical content, and I understand that in this theory the Michelson-Morley experiment will turn out the same for all observers, as was observed. In this theory there are many vacui, one attached to each observer. In the same way as each economic actor has an individual perspective, while following Bretton Woods.

And tells us: this was suggested already in 1914 by the British mathematician Ebenezer Cunningham, which unfortunately was overshadowed by Einstein's non-physical theory.

He claims that this many-minds relativity seems compatible with quantum mechanics.

So it maybe replacing Einstein by Cunningham can help modern physics out of its 20th century trauma.

However as he claims there are many different relativity theories we could construct, so his many minds relativity is just one of many examples. The numerous different theories proposed by those anti Einstein is in part due to the fact that Einstein gave a non-physical theory (to a certain extent) and there are numerous proper theories we could replace it by. Because we are swamped by numerous different theories we have difficulty agreeing what to replace Einstein by, so Einstein with his bad theory (theories) wins merely because no agreement can be made.

Anyway, will now look at Johnson's proposed theory.

Johnson claims his "Many-minds relativity" theory is a physical theory in contrast to Einstein's special theory of relativity that is non-physical.

He says that the Modern Physics dilemma of not being able to combine quantum mechanics and Einstein's special/general theory of relativity is the fault of Einstein's theories.

He points out: Einstein's special theory of relativity was first ignored by the scientific community and then dismissed as a non-physical theory belonging to epistemology without significance for the real physical world. Today 100 years later, it is considered to be a corner stone of modern physics, but the initial scepticism and criticism has not been eliminated by reason, only by politics of science and coercion.

We argue below that indeed Einstein's special relativity is non-physical, and thus of no relevance, and we present an alternative theory of relativity, in a simple model case, which is physical and thus can have relevance.

Johnson: Einstein is famous as an exceptionally brave scientist with an exceptional talent of drawing far-reaching revolutionary consequences about space and time from almost no assumptions. It is also known that Einstein did not do well in mathematics at school and probably suffered from what today is called dyscalculi. The nature of mathematics is such that everything that can be concluded is already hiding in the assumptions, just not yet made visible. Without assumptions nothing can be concluded. If the assumptions are non-physical, the conclusions are also non-physical,

because physics cannot be brought in on the way by mathematical reasoning from non-physical assumptions.

Johnson: Einstein's special theory of relativity formulated in 1905 concerns observations of motion by different observers moving with constant velocity with respect to each other. It is based on the following two assumptions: (E1) all observers measure the same the speed of light (E2) there is no aether.

As I have already pointed out SR is not usually presented as based upon these assumptions. SR is usually presented as based on two assumptions – relativity principle and constancy of light speed. Some texts do point out that there are hidden assumptions. But the idea that there is no aether is usually presented as a consequence of the theory. However, Einstein had no aether in SR and put aether back for GR. We can look at this as math modelling, where model with no aether gets updated to model with aether. Another way of looking at it is that in SR a positivist type philosophic interpretation of the math in that model is that the idea of aether is superfluous to that math and then by that philosophy if superfluous it therefore does not exist. The problem then comes with the update if one sticks rigidly to that type of philosophy, because then one wants to refuse the update of reintroducing the aether. Thus the correct philosophy is Pythagorean (or Platonic) which allows you to accept the update. The positivist type philosophy does not want to accept the update, and in the SR theory has discarded the aether as not existing, with a belief that wants to continue believing in the aether as being discarded or relegating aether to being a metaphysical belief. Thus the positivist type philosophy has trouble with reintroducing aether in GR which it views as metaphysical, and hence why Einstein had to change his philosophic belief when he moved from SR to GR. Anyway, proceeding with Johnson who interprets the rejection of aether in SR as an assumption by SR

Johnson: An aether would be a medium for the propagation of light, which would have the same function as the medium of air for the propagation of sound.

Ok

Johnson: The special theory came out from experiments by Michelson and Morley in the late 19th century indicating that (MM) detecting an aether medium common to all observers is impossible.

That is one interpretation of the Michelson Morley experiment (MMX), probably the common interpretation. There are other interpretations of the experiment. (See for example Monti as dealt with in my other papers.) The interpretation that the MMX has a null result is pointed out by some that this is false and really it was a non-null result. So as far as I am concerned there is a math model which looks upon MMX as giving null, while updated math model treats it as non-null. The null result math model is thus an approximation. Johnson is proceeding from the math model of MMX gives null result:

Johnson: Einstein was led to his special theory in an attempt to handle the apparent contradiction between (E1) and (MM). To see the contradiction, compare with different observers moving through still/motionless air with different velocities, who can agree on the same speed of sound if they only compensate for their velocities with respect to still/motionless air, that is, if they compensate for their different air-winds.

That is apparently! Because Einstein was vague and ambiguous and claimed he did not know about the Michelson-Morley experiment in 1905 when he formed SR. Others have concluded he must have known about it, thus that experiment's results were leading him to form SR as interpretation of it.

But anyway, proceeding with this interpretation of the experiment it is supposedly leading us to the formation of SR, carrying on.

Johnson: So Michelson and Morley expected a compensation of the measured speed of light to be necessary depending on the motion of an observer, but could not detect that compensation was necessary. In other words, they could not detect any aether-wind in the motion of the Earth around the Sun with varying velocity (direction). It seemed that there was no still aether or no fixed vacuum through which light could propagate with a certain velocity. This was the contradiction which had to be resolved.

And that was apparently. Johnson proceeds based on idea that MMX gave null result, and that is the way many texts present SR, when actually it did not. The math model being developed is thus based on assuming null result as pointed out earlier.

Johnson: Einstein's solution was radical: remove the aether/vacuum completely from the picture and thus replace (MM) by (E2).

Yes it was radical; Einstein apparently working from belief in null result of MMX gave a radical solution.

Johnson: If there is no aether, there is no contradiction coming from variable motion through an aether without aether-wind, simply because there is no aether. Clever!?

i.e. Einstein's radical solution in the context of SR was to discard the aether. (But as noted he brought it back for GR, just supposedly aether not required in the context of the situation being dealt with by SR.)

Johnson: We shall see below that this is too radical, resulting in a non-physical special theory, which does not describe any physical reality.

In other words Johnson wants to bring back aether. A lot of critics of Einstein's relativity have wanted to bring back aether. It is strange that he claims the theory without aether is non-physical, because in the context of positivist type philosophy the aether in context of SR is beyond physics (metaphysical) and discarded. Presumably Johnson is working from a Pythagorean type philosophy and wants to define an aether as a physical theory; this is the opposite way round to how things are defined by

positivist type philosophy. So we have an immediate conflict between two philosophies in the different way that they want to define things. In the existing way that things are defined Johnson's introduction of aether is a metaphysical theory contrary to how he would want to define it as a physical theory. From his viewpoint the existing theory that has no aether is non-physical, but that is contrary to how the positivist type philosophy would define it namely as physical theory. This philosophic viewpoint conflict has led to much confusion. We thus have to make allowances for Johnson's philosophic viewpoint as we proceed with analysing what he says.

Johnson: We shall see that the special theory is a (trivial) purely mathematical theory without physical interpretation.

Ok, and that is from the Pythagorean type philosophic viewpoint that we make that interpretation; a philosophic viewpoint I like to adhere to in general.

Johnson: This was understood by Einstein, who quickly left the special theory (and never returned) and instead raised the bet to his general theory of relativity, which is so difficult that nobody can understand it.

What Johnson refers to is the change in philosophic viewpoint of Einstein. When Einstein formed SR he was working from a positivist type philosophy, he abandoned that for a Pythagorean type philosophy when he formed GR. Heisenberg and others involved with the Quantum revolution were influenced to follow Einstein's old philosophic viewpoint of positivism, and based their Quantum mechanics on it. While they rejected the newer philosophic viewpoint. Since not everyone properly understands this that is another area where there has been confusion.

Johnson now offers his solution that is contrary to the solution that Einstein offered (of abandoning the aether) in forming SR.

Johnson: There is another less radical resolution, which is to handle (MM) by accepting that different observers can have different aethers/vacui, which was suggested in 1914 by the British mathematician Ebenezer Cunningham.

A very interesting solution, and so now Johnson starts to offer up a different math model to the math model of Einstein's SR.

As far as the math modelling process is concerned we can create many different math models.

Johnson points out that Cunningham's solution was allowed to be mostly forgotten

Johnson: But it [Cunningham's theory] was overshadowed by Einstein's more radical resolution which took fire in 1919, when the British physicist Eddington proclaimed that the general theory was confirmed by observations at an Eclipse of a very slight

bending of light from a distant star around the Sun. And if the general theory was confirmed, also the special theory would be confirmed, right?

The answer to his proposed question is yes, it was assumed that if GR was true then SR was believed to be the theory from which GR was built would also be true. But really all that demonstrates is the difficulty that people have had with the math relationship between different math models. We have the math model of SR and the math model of GR and there has not been proper appreciation of how these math models are related.

Johnson: But the bending was so slight that it was barely notable and there was a risk that expectation influenced the measurement, and Einstein's relativity is still today waiting for experimental confirmation.

What Johnson is trying to now do is say that GR has not been supported by the observation of light bending; he wants to dismiss that result and with it dismiss GR. He wants to believe something contrary to the evidence.

Anyway, Johnson proceeds with forming his replacement theory for SR.

Johnson: Cunningham's resolution may be better, because it is less radical, and suggests a form of physical relativity theory, which we refer to as many-minds relativity [4a], based on the following assumptions: (M1) all observers agree on the same the speed of light (M2) each observer has his own aether/vacuum in which he does not move.

Johnson: In Einstein's special relativity, there is no aether/vacuum, because observers cannot agree on a common aether/vacuum, while in many-minds Relativity different observers are allowed to have different aethers/vacui. To have nothing is not physical; to have something can be physical.

What Johnson has done is redefine the aether. When SR was constructed it was assumed aether was common to all observers (everyone), now Johnson wants to define aether – as everyone having their own version of aether.

Johnson: Einstein's approach resembles the debate climate in Sweden, where an opinion is possible only if it is shared by everybody, which is an extreme form of democracy and can result in no opinion at all. On the other hand, many-minds relativity resembles the culture in France, where everybody is allowed (expected) to have a different opinion, which does not contradict common agreement to some extent.

He is now seeking to misrepresent things. The idea of an aether common to everyone is not the same as everyone having to vote for a certain opinion, and that opinion only being accepted if everyone agrees to it. In order to make progress, we need to have a common agreement as to what words/terms mean, and in the aether issue it was commonly thought of that aether being common to everyone. If a person does not

want to agree to that definition for aether, then they are inventing their own version of aether. There are many examples of people wanting to redefine the meaning of the term “aether”. What Johnson is really proposing is a different type of aether to the commonly accepted version.

Johnson: We will below present both Einstein's non-physical special relativity based on (E1)+(E2), and different forms of physical many-minds relativity based on more precise versions of (M1)+(M2) connecting mathematical theory to physics.

Johnson: We shall then understand that (M1) really is an agreement to measure length in lightseconds, and thus is simply a definition, and we shall then understand that (E1) is also a definition expressed a little bit differently. If now (E1) is a definition and (E2) a negative statement, then there is no physical content of the special theory, since it is based solely on (E1)+(E2), and thus special relativity is a non-physical theory without physical relevance, which was understood by Einstein, although he kept it for himself.

In otherwords - just proceeding to redefine words to mean something different in his theory to what they are commonly used to mean.

He now looks at sound.

Johnson: To understand relativity theory it is useful to recall the basics of propagation of sound through still/motionless air. We know that the speed of sound is about 340 meter/second, and the frequency of audible sound ranges from about 20 periods/second to about 20.000 periods/second.

Johnson: Suppose we normalize and in suitable units consider sound of frequency 1 which propagates through still air with a speed of 1. We know that there is a Doppler effect changing the perceived frequency from 1 to $1/(1 - v)$ if the source is approaching an ear at rest in the air with the speed v , and to $1/(1+v)$ if the sound source is receding from the ear at speed v .

From wikipedia [5] : In classical physics, where the speeds of source and the receiver relative to the medium are much lower compared to the speed of light, the relationship between observed frequency f and emitted frequency f_0 is given by:

$$f = \left(\frac{v + v_r}{v + v_s} \right) f_0$$

where

v is the velocity of waves in the medium

v_r is the velocity of the receiver relative to the medium; positive if the receiver is moving towards the source.

v_s is the velocity of the source relative to the medium; positive if the source is moving away from the receiver.

We need to write this equation as: $f = (v_a + v_r)/(v_a + v_s)f_0$ to avoid any confusion with Johnson's use of v

v_a = velocity of waves in medium

v_r , f , f_0 and v_s all the same as before

So he is setting $f_0 = 1$, $v = 1$, $v_r = 0$, $v_s = v$

That is giving $f = 1/(1-v)$ for sound source approaching and $f = 1/(1+v)$ for sound source receding.

Johnson: Altogether with the Doppler factor $1/(1 + v)$ if we count v negative in approach and positive in recession.

Johnson: We experience the Doppler effect as drop in pitch of the whistle of a train as the train passes, first approaching and then receding. The drop in pitch is evidently from $1/(1-v)$ to $1/(1+v)$, thus with a factor $(1-v)/(1+v)$. If the train is moving with 34 meter/second this amounts to a 20 percent drop in pitch. The propagation of sound waves in air is mathematically modeled as solution of the wave equation, properly modified according to the air-wind. The wave equation thus takes different forms for different observers moving with respect to each other and with different velocities with respect to the air.

Next he jumps to measurement of light speed

Johnson: Physics of motion is based on measuring time and length. According to the 1983 SI Standard, time is measured in seconds according to an atomic cesium clock showing Coordinated Universal Time (UTC) with one second equal to 9192631770 cycles of a cesium clock and length is measured in meters with one meter being the distance traveled by light in 0.00000003335640952 seconds or 9192631770/299792458 cycles of a cesium clock. This is in particular the standard of the GPS system working so amazingly well. Equivalently, the length standard can be chosen as lightsecond or 299792458 meters. With the SI Standard the speed of light is 1 lightsecond/second, and thus all observers following the SI Standard possibly moving with respect to each other, will agree on the same speed of light, namely 1 lightsecond/second: The constancy of the speed of light is an agreement or definition and not a physical fact which can be verified experimentally. To someone claiming to have measured the speed of light to something different from 1 lightsecond/second, one would simply say that a mistake has been made. It would be like claiming that measurements indicate that there are 101 centimeters on a meter, which is impossible since by definition 1 meter is 100 centimeters.

Johnson then points out: The idea of using lightsecond as length standard is not new: The mathematician Poincare suggested this already in 1897 [5]: This hypothesis of Lorentz and Fitz-Gerald (space contraction) will appear most extraordinary at first sight. All that can be said in its favor at the moment is that it is merely the immediate interpretation of Michelson's experimental result, if we define distances by the time taken by light to traverse them.

Johnson: Often the argument is made that the reason the SI meter standard can be used, is that the speed of light is constant as a physical fact, but this is not science. It is not allowed in science to view a definition as a physical fact, because a definition can be chosen at will (as long as it is not self-contradictory), while a physical fact cannot.

Exactly as Essen and others have pointed out. Next he goes to his theory-

Johnson: The assumptions of Many-Minds Relativity take the more precise form:
(M1) all observers use identical cesium clocks and measure length in lightseconds
(M2) each observer uses Maxwell's equations in a vacuum to which he is a rest.

Johnson: Note that (M2) means that Maxwell's equations take the same form for all observers, in contrast to the wave equation for propagation of sound waves, which take different forms depending on the air -wind.

Johnson: Many-minds relativity concerns coordination of observations by different observers. If there is just one observer, there is no need for coordination, but if there are several there is.

Johnson: Many-minds can take different forms depending on what observations are being made. All observers use identical cesium clocks, which can be synchronized or not synchronized, and it is natural to distinguish between the following different types of measurements: (i) non-synchronized time + velocity, (ii) synchronized time + length, (iii) synchronized time + length + velocity. A more detailed presentation considering these alternatives is given in [4a] The GPS system uses (ii).

Claes Johnson proceeds with the development of his theory; but to do a proper analysis seems to require buying his book, so I will stop. Really he just builds a math model. Johnson has shown significant mistakes with the existing Einstein's relativity, and I have shown how his math model that he is developing is connected to other math models, so I think it a good place to stop.

Reference

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[3] Galileo's Dialogue Revisited, Claes Johnson
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[4a] Claes Johnson, Many-Minds Relativity, Icarus Ebook.

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[5] http://en.wikipedia.org/wiki/Doppler_effect

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