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The Human Language Capacity and Physics: Eleven Dimensions of Empirical Reality Proved by Construction

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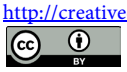


Abstract

The human language capacity at the 11th dimension of the material manifold enables us to construct countless true narrative representations (TNRs) and derivatives grounded in their meaningful components. Every true narrative consists of a sequence of signs reporting a distinct sequence of material events. The simplest TNRs are constructed in a chronological order. The constructive proofs given here show that time is dynamic. Although the present instant must be unextended to be distinct from past and future instants, it includes the unbounded past and future from the vantagepoint of TNRs. Ordinary wakeful experience—during which any competent observer is not drugged, hallucinating, or cleverly deceived—reveals itself in a series of TNRs. The past is determined by existing TNRs but the future is always becoming determined as the present instant is represented. Perceptually grounded experience truthfully reported by one or many observers, outranks any system of beliefs or expectations grounded only in theories or even in the laws constructed from such theories—this follows because TNRs have been proved to be consistently (without any contradictions) connected with each other. It follows that ordinary TNRs form the whole basis for the sciences pertaining to the material world. If this is so, linguistics—at the front and center of semiotic studies, the studies of meaningful sign systems—outranks the other empirical sciences with physics at their base and material extremity.

Subject Areas

Linguistics, Mathematics, Physics, Physiology, Empirical Science, Experimental Science

Keywords

Dimensionality, Human Language Capacity, Manifolds, Quanta, Quantum

Physics, TNR-Theory, True Narrative Representations, Unextended Present Instant

1. Introduction

Bernard Riemann in his first major university lecture delivered in 1854, ended by saying that to pursue the geometrical foundations of manifolds beyond the level of pure abstractions would require entering the domain of physics [1] [2] (p. 12). That is exactly where I pick up the thread of his argument in order to prove by construction the existence of at least 11 dimensions of ordinary empirical experience. Riemann argued that the highest level of "empirical certainty" must be associated with the notion that empty space is a continuum. This conclusion he derived from the fact that our perceptual representation of the whole region of space—through which a moving object, such as a person walking along a path may be perceived—is continuously being renewed from the remembered past on its former side toward the materializing future on its later side. Details aside, for the moment, the fact just stated already shows that the 3-dimensions of space must be completely contained within the 4th dimension of time. Moreover, without that 4th dimension there could be no perception whatsoever of the continuum of space, and by the same line of reasoning, it is also easy to prove by construction that at least 7 more dimensions are required in order for the existence of space, time, and perceptual experience itself to acquire empirical status with any competent observer(s).

Putting the punchline up front, perhaps the most important finding of all the reasoning and the proofs to follow is that the study of the material world by physicists (and by scientists of all stripes)—as argued by Albert Einstein [3] [4]—is utterly dependent on our capacity to express abstract propositions in some human language that faithfully report facts known to us solely through sensory impressions.

2. The Human Language Capacity & TNRs

Bearing in mind Riemann's arguments for the 3-dimensions of space, I begin with an exceedingly simple proof by construction that uncountably many true narrative representations (TNRs) exist. It is easy to prove by construction that TNRs exist. Let a TNR be any sign sequence whose meaningful content is realized in the material event sequence that it represents. Simply put if the sequence of signs, A, B, … Ω, is faithfully linked to a sequence of actual events, a, β, … ω—for instance by a chronological linking of the two sequences through another event series of mappings such as ${}^{A}\pi_{a}$, ${}^{B}\pi_{\beta}$, … ${}^{\Omega}\pi_{\omega}$ by anyone producing or interpreting the inter-related sequences—the result is a TNR. To be complete, every such construction must have all three parts and they must stand in complete agreement relative to each other. That is to say, no sign in the sequence (the A,

B, …Ω) asserts anything false about the reported facts, states, or events (α, β, …, ω) nor are any of the π-mappings ($^{A}\pi_{a}$, $^{B}\pi_{\beta}$, …$^{\Omega}\pi_{\omega}$) mistaken or distorted. The three sequences agree with each other as completely as possible in their explicit (real) relations.

Now, to prove by construction that such TNRs exist, let some skeptic, or any group of them—perhaps merely pretending to be skeptical about the existence of TNRs—come forward to assert that they do not believe that any such constructions exist. In stating any such belief in any imaginable form that might be intelligible to the users of any natural language, the want-to-be refutation defeats itself in being constructed. To be intelligible at all it must deploy one or more TNRs. To express any such argument in which any such skeptic(s) may assert intelligibly that they do not believe in any TNRs, they must implicitly, or explicitly, refer to themselves in the sign sequence, that is in the A, B, … Ω part of their argument, and to their own material existence in its factual part (a, β, … ω), and they must do so in a manner that constitutes a valid sequence of one or more π-mappings, that is to say in the $^{A}\pi_{a}$, $^{B}\pi_{\beta}$, … $^{\Omega}\pi_{\omega}$ part asserting that it may be the case that no TNRs whatsoever exist.

Having done no more than this, they have placed themselves in the common world of experience in which their argument relies on multiple TNRs connected in perfect harmony (with no contradiction whatsoever) to an uncountable number of other TNRs receding away from their statement(s) both into the past and into the future. Therefore, TNRs exist. Q.E.D.

The proof just provided, as will be shown in what follows, is at the 11th dimension of the material manifold (see the discussion of **Figure 2** below), however, to prove its status at the 11th dimension, it is necessary to walk through a series of constructive proofs leading upward to that 11th dimension beginning from Riemann's lecture about the geometry of manifolds. To reiterate the punchline stated above: the constructive proofs that follow show that only TNRs—valid intelligible reports of observed sequences of events—make empirical science possible. In this way, we discover and prove the somewhat surprising finding that the empirical science of physics is utterly subservient and outranked by the science of linguistics in precisely the manner argued by Einstein [3] [4]. In a manner that is more abstract and yet simpler that the proof of the existence and uniquenesses of TNRs, the constructive proofs that follow also lead to an unexpected and, I believe, more profound about time. The proofs leading to the 11th dimension show that the whole of the time continuum must be regarded as present in spite of the straightfoward and indefeasible proof that the present instant itself if we mark (*i.e.*, locate) it anywhere on the time continuum nonetheless contains (is mathematically equal to) the whole continuum. The most surprising aspect of the latter proof, I believe, is that the perceived (illusory) conflicts of "quantum" physics with general relativity are resolved and the traditional distinction between "local" as contrasted with "global" time-space-matter vanishes.

3. Proving the First Four Dimensions by Construction

By truthfully reporting, a sequence of movements producing a series of constructions—say, a point, line, surface, volume, and moving volume—anyone can easily demonstrate and prove by construction the existence of the first 4-dimensions of the Riemannian manifold—3 of space plus 1 of time, as illustrated in Figure 1. The necessary details of the series of experimental actions just described involve systems of relations that can only be understood and represented in a sequence of TNRs[1]. Each of the successive steps of the dynamic construction involve the full complexity of the mature language capacity of competent individuals who not only are able to perform the actions required, but who can also report them intelligibly as I am doing here. The intelligible correspondences (especially, what I have called the π-mappings) in TNRs, are, as has been proved in a variety of ways by Peirce, Tarski, and myself [5] [6] [7] [8] utterly dependent on prior truthful uses of the component signs.

In fact, the most ordinary kind of true uses of meaningful signs—the uses seen in TNRs—are the only means by which it is possible to determine any factual state of affairs or sequence of events in ordinary experience. It follows that only the component signs found in TNRs are determinately connected to material states of affairs and sequences of actual events in the ordinary world of common experience. From these two provable facts about TNRs it follows further than only the component signs found in TNRs can be generalized to other material contexts exactly up to the limit of the similarities across those contexts. These unique logical properties of TNRs are known as determinacy, connectedness, and generalizability. In terms of their strictly formal (abstract) structure, in addition to well-formed TNRs, the universe of meaningful strings of signs includes only fictions, errors, lies, and gradations of increasingly less meaningful nonsense up to a limit of no meaning at all.

[1]I am indebted to Peirce for the sequence of constructive actions detailed in Figure 1, but am unable to locate the exact source of the text where he laid out at least the first 3 steps of my first 4 diagrammatic and constructive proofs. I suspect, but have not been able to confirm that Peirce may have been influenced by his contemporary, Bernard Riemann, whose 1854 lecture implicitly expressed the same line of reasoning all the way to the 4th step in the constructive proofs spelled out in the several diagrams of Figure 1. Although neither Peirce nor Riemann, to my knowledge, actually drew out the geometric constructions as I have done in Figure 1, the ideas expressed there, except for the emphasis on TNRs leading beyond the first 4 dimensions of the material world through the next 7 that are necessary if we are to know anything of that world, their reasoning certainly adumbrated the whole sequence. If there is anything original in the first 4 constructive proofs leading toward the 11th dimension of the material world as we know it, perhaps it consists merely in drawing the rectilinear diagrams expressing the geometry of the thoroughly abstract 4 dimensions of space plus time. My small contribution to the discussion, if I have indeed made any, is to express the fact (which I believe is indefeasibly proved in the 7 constructive proofs laid out in Figure 2 that follow seamlessly from the pattern unfolded in the first 4 proofs detailed in Figure 1) that none of the 4 abstract and strictly theoretical dimensions, 3 of space plus1 of time, could be known at all (as implied by Riemann [1] [2]) if there were no bounded volumes of space occupied by the tangible bodies of animated entities ("quanta" in Riemann's terminology) capable of moving in time and of constructing and expressing de novo countless TNRs. Peirce [5], I believe, was first to prove conclusively that all meaningful sign systems depend on truthful representations of material facts, as also proved by Tarski [6] [7], but proved more simply in the theory of TNRs [8].

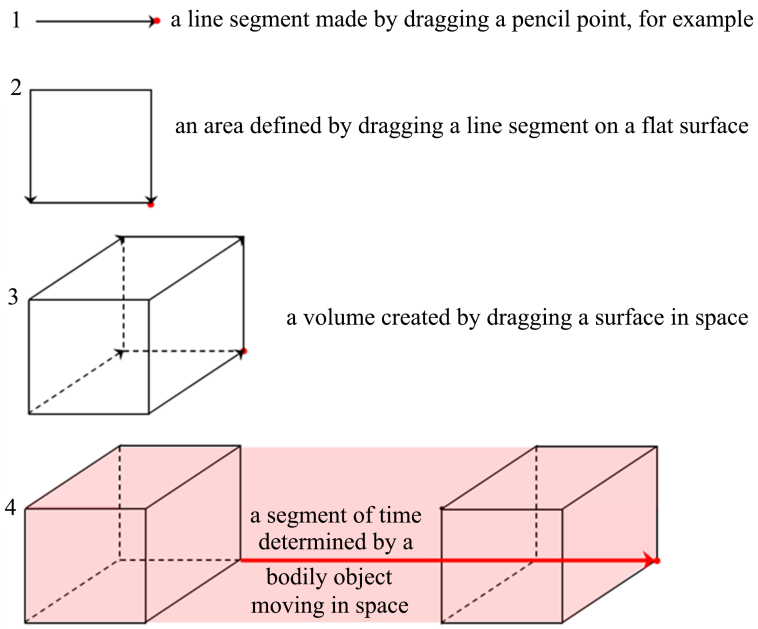


Figure 1. A proof by construction, following Peirce and Riemann (see footnotes 4 and 8), showing that there are at least four dimensions in the material world of common experience.

All of the latter have been proved to be mere derivatives of TNRs [8]. Setting aside details and summing up the proof, if any representation purporting to be about a material sequence of events (or state of affairs) contains some imaginary component, the whole representation becomes a fiction. If such a fiction is regarded as a TNR, unless its purported fictional aspect comes to be realized in material facts, it becomes an error. If that error is knowingly and willfully represented as true, it becomes a lie. It has been strictly proved that there are no other meaningful representations besides these. Although countless gradations of nonsense can be constructed from the surface forms in any meaningful representation, only TNRs can determine facts in the material manifold by virtue of their faithful connection to it, and only TNRs provide a basis for both determining and generalizing the meanings of the signs they deploy and the material event sequences they report. It follows that TNRs can logically contain and faithfully express the content of fictions, errors, lies, and even the forms and any residual meanings of any gradation of nonsense, but none of the latter can perform the work of TNRs. Only TNRs can determine any quantum or relation between quanta in the sense of Riemann [1] [2] in the material manifold. Also, because only TNRs are determinately connected to quanta in the material manifold, only TNRs can provide a determinate basis for generalizing the meanings of their component signs.

Moreover, just as each successive system of relations manifested in the material manifold of the real world as displayed for its first 4-dimensions as seen in **Figure 1** must contain the systems of relations that precede it, every successive system of relations defining the next higher dimension must contain all the prior

dimensions. To illustrate in a completely pedestrian way, as we move any arbitrary point, such as the dot colored red and labelled at the top of Figure 1—say, by dragging the sharpened end of a pencil on a sheet of paper—we construct a continuum of points consisting of a line segment defining the first dimension of space in the Riemannian manifold. Next, if we drag the line segment, we define dimension 2 (an area on a surface) as in the third line of Figure 1. It hardly needs to be mentioned that dimension 2 cannot exist without dimension 1, and 3 cannot be constructed without first obtaining 2. By dragging the 2-dimensional surface, as in line 3 of Figure 1, we obtain a 3-dimensional volume in space, and by moving that volume within and across the 3 dimensions of space, we obtain the 4th Riemannian dimension of time that captured the interest of Albert Einstein [9]. However, a moment's thought will show that each of the constructed dimensions up to this point is strictly virtual. To define them physically—that is, materially—requires that the volume moving in space to define time must be filled with something tangible, something like a solid, liquid, or gas that has some detectible mass, and much more is required for anyone to be able to report such facts.

4. Seven Higher Dimensions Similarly Proved

Transitioning to the 5th dimension as depicted in the series of constructions spelled out in Figure 2—just as any ordinary human at maturity has already done many times over—by touching a solid, tasting a liquid, and smelling a gas, we define and prove the existence of the 5th, 6th, and 7th dimensions. To illustrate and prove this succession, tasting any liquid both includes and reaches beyond the power of touch, just as smell exceeds and out-reaches taste. Similarly, the 8th and 9th dimensions are established constructively by our hearing of sound and seeing of light. The ranking of the 8th and 9th dimensions is proved by the greater reach of the sound of an explosion than the smell of its gasses. Similarly, we can easily see the swinging of a hammer at a distance well before we can hear its impact. Therefore, seeing outreaches but includes the system of relations determined by hearing. The 10th dimension, which must consist of volitional movement, is proved by construction every time we direct the attention of our senses, put food and liquid in our mouths, execute any of the experiments described in Figure 1 and Figure 2, or merely think through any one of them, and so on and so forth, for any volitional action we perform. Clearly, the powers and systems of relations supplied by volitional movement include all the preceding systems of relations and yet our capacity to move at will is greatly exceeded by our imaginative powers which are best expressed in ways that we can share with other human beings through our human language capacity. It is only by virtue of the latter capacity, which defines by construction an 11th dimension of systems of relations, that it becomes possible for us to conduct any scientific investigations of the world of experience, nor could we develop mathematical, genetic, or any other theories about the world of our experience.

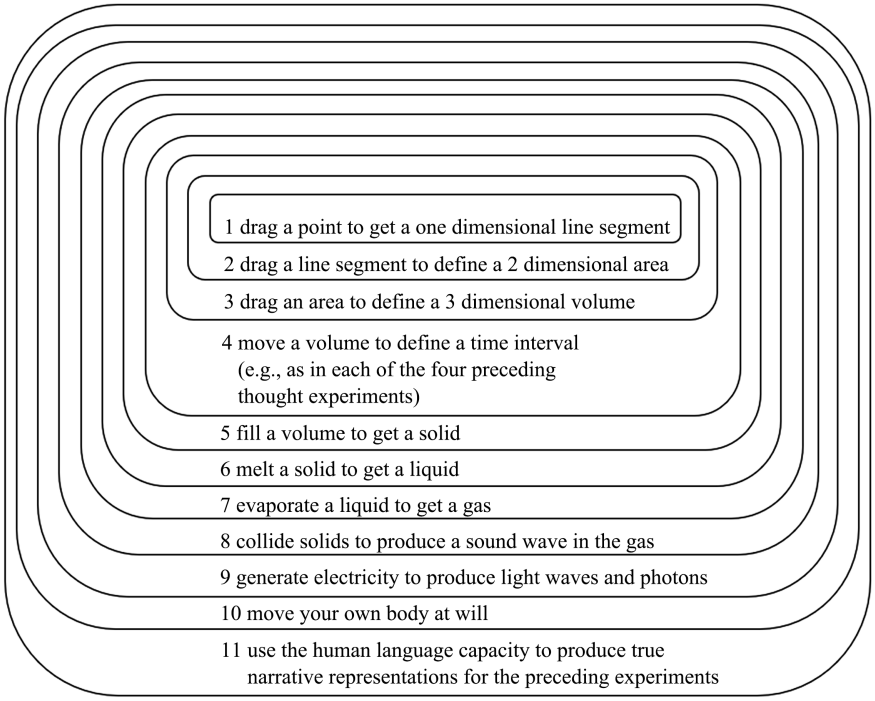


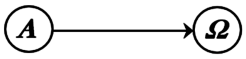
Figure 2. A summary of a series of thought experiments to both generate and demonstrate (prove) the existence of at least 11 dimensions in the common material world that we know and share.

5. Seemingly Paradoxical Aspects of Time

Along the way, I believe, something interesting about the nature of time has been discovered. Whereas the present instant must be a logically unextended point (or, possibly a quantum of time) in order to be present rather than past or future, let the forward advance of time be represented by the movement of any material bodily object—say, the point of a pencil on the sheet of paper referred to with respect to **Figure 1**, or the bodily person traveling along a road, or the refrigerator or washing machine that must be relocated from one place to some other in a move. We may choose any movement that we like.

Next, suppose we put a mark—call it alpha, $\mathcal{A}$—at the former position of the present instant on the timeline where some arbitrarily chosen movement begins, and where the movement is completed (say, the refrigerator gets to its new destination), we put a new mark—call it omega, Ω—at the end of the timeline defined by that movement.

It follows that we have just used the present instant (marked by any quantum of material moved as an occupied volume through space) to define the past behind the last point where the object ends up, and also to define the future relative to its point of origin, as in **Figure 3**. What is not at first obvious, but which we have already just proved, is that the present instant advancing in time from the point of view of any competent observer, even if we should extend it from the beginning of time to the end of time as we know it—say, from the Big Bang to the death of the universe in equilibrated chaos, or from God's perfect creation



Proof: Let the present instant defining the initiation of a segment of time be designated ***A*** and let the ending of that segment of time be designated ***Ω***. Relative to ***A*** the line connecting it continuously to ***Ω*** is the future of ***A*** but it is the past of ***Ω***. Now, let ***A*** represent the beginning of time and let ***Ω*** represent the end of time as we know time in our present experience. In such a case, every point in the continuum is past, present, and future with no exceptions. Therefore, the unextended present always contains all the past and all the future, the whole of time regardless of the length of the timeline.

Figure 3. A simple proof that the present instant must always contain the past and the future.

to his reconstruction of the whole universe (take your pick, or propose any other alternative that you prefer)—regardless how long the line segment may become, it must contain all of the past lying behind it and all of the future lying ahead of it. The advancing present instant, therefore, contains all instants on the timeline (see the summary of the proof in **Figure 3**).

6. An Inference Concerning Quantum Physics

Setting aside the details, quantum physics seems to be roughly comprehended in the fact that the advancing present instant looking toward the past already contains whatever facts and events have been or are being determined in TNRs—including, as Zeilinger [10] observed, experimental set-ups that have even the hypothetical power to bring about the collapse of the super-positioned "quantum" possibilities (probabilities) of the somewhat uncertain future—while the same present instant looking to the future is forever resolving those uncertainties in favor of determined events and the classical physics of Einstein's general relativity. Meantime, as the present instant advances, it always contains all of the past and all of the future.

7. Conclusion

Empirical science, with physics at its material basis—as Einstein argued in the 1940s [3] [4] and as is demonstrated here in the preceding series of constructive proofs—is outranked by the human language capacity. In fact, physics and all the empirical sciences are utterly dependent on the most ordinary and yet completely unique meaningful sequences of signs known as true narrative representations [8].

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Conflicts of Interest

The author declares no conflicts of interest.

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