The Identification of the Intrinsic Nature of Time

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INTRODUCTION

Down through the millennia thousands of scholars have considered what might be the true nature of time. This has been one of the most persistent unresolved problems in all of philosophy. No one has ever come up with adequate answers to the questions: What is time?, Why does time exist?, and Why does time have the specific intrinsic-qualities that it has?

All change in the universe occurs with time, from the interrelations of elementary particles, atoms, and molecules, to mental processes and the development of culture, to the influence of gravity on galaxies. Knowing the answers to the above questions would enhance understanding in all the disciplines in both the sciences and the humanities.

Using transdisciplinary methodology to investigate the intrinsic nature of space revealed the basis of time in the universe.¹

Discipline-Independent-Transdisciplinarity

The methodology of discipline-independent-transdisciplinarity unites the knowledge discovered by the various disciplines into one coherent integrated body of knowledge characterized by both breadth and depth of understanding (Vesterby 2013a,b,c).² This unification of scientific knowledge can result in improved communication between the disciplines. The process of developing discipline-independent-transdisciplinarity results in the emergence of a transdisciplinary language (Vesterby 2013e).

The methodology of this form of transdisciplinarity achieves unification of understanding across the disciplines through the identification of commonalities among the various disciplines, and then the use those commonalities to compare the knowledge within and between the disciplines.³ The commonalities generally occur as factors that play their roles universally throughout the disciplines, or at least in two to many different disciplines. A factor is something that exists and plays a role in the origin, existence, organization, or changes in the situation in which the factor exists. This procedure results in understanding that extends throughout the disciplines.

Developing transdisciplinary integration requires extensive comparisons of the situations in which these factors occur, and detailed comparisons of the roles the factors play in those situations.

¹ The discussion in this paper is not about concepts. It is about the reality-referents of concepts. It is not about the concept of time. It is about time itself. In this paper concepts are recognized to be mental tools that are used by the mind to achieve understanding of the world outside the mind, outside the brain (Vesterby 2013d).

² Discipline-independent-transdisciplinarity is based on valid scientific knowledge. A primary quality of the methodology is the avoidance of speculation in conclusions—no suppositions, assumptions, premises, conjectures, undemonstrated axioms, hypotheses, or theory in the integrated body of knowledge.

³ These commonalities, occurring as isomorphies, are common, abundant actually (Vesterby 2012, 12-13).

List-mapping is one of the transdisciplinary methods that enable these comparisons. A list-map is a list of the intrinsic-qualities (intrinsic properties) of something that exists. The list is organized in a way that provides some insight into the relations between the items in the list—it maps out those relations in list form. There are a number of different types of relations that can be used to provide the order of items in a list-map. For example, the items can be organized according to their intrinsic complexity, from the simpler items progressively to the more complex items.

A Different Approach to the Nature of Time

It was one of these list-maps that resulted in the discovery of the intrinsic nature of time. Time was not the subject of the then current investigation. The list-map that prompted the discovery of the nature of time actually contained a list of the qualities of the continuing-existence of space. This transdisciplinary method was applied to an aspect of the universe that was (at that time) considered to be completely different from time.

It is important here to not confound the ongoing continuance of spatial continuing-existence with the ongoing continuance of the three-dimensional extension of space. The manner of existence of the two forms of continuance is completely different. The continuance of the continuing-existence of space can be measured with a clock. The continuance of the extension of space can be measured with a ruler.

The difference between continuing-existence and extension is the same for material objects. The ongoing continuing-existence of an object, such as a porcelain tea cup, can be measured with a clock from its manufacture to its destruction on the tile floor of the kitchen. The size and shape of the cup, its extension in space, can be measured with a ruler. Continuing-existence in general, of each and every thing that exists, is time-like in that, like time, it can be measured with a clock.

The investigation of the nature of time has always been a top-down process. Scholars tried to find the basis of time by studying the qualities of time.

When a scholar examines time, there is nothing evident in time itself that provides a clue as to what time is, or why it occurs. A list of the qualities of time does not reveal what time is—it does not reveal the basis of time in the universe. That is significant—the qualities of time do not reveal what time is. Time is just-there, with the specific set of temporal qualities that we can observe, and list. This top-down method cannot go down far enough to identify the basis of time.

List-mapping resulted in a bottom-up approach.

Top-down looks at time from the viewpoint of how we observe it, how we experience it. Bottom-up is viewing time as it occurs as a foundational component of the universe. Looking at spatial continuing-existence was not looking at time as we observe it, as we experience it. Instead, it was looking at time (although that was not realized at first) from a bottom up approach. Observing the same thing from opposite viewpoints is why the lists of qualities were the same in each case.

When considering the nature of time from the top-down viewpoint, we can identify its qualities, but we cannot tell what it is that has those qualities. When considering time from the bottom-up viewpoint, we can identify both its qualities and what it is that has those qualities.

The Continuing-Existence of Space

Observation is the basis of science. Repeated observation—checking, double checking, and honing prior observation—is what makes scientific knowledge accurate and reliable.

Observations supply the brain with the data it uses to develop understanding of the nature of the world outside the brain. Since the invention of the microscope and the telescope, technology has greatly extended the scope of what can be observed. Modern science uses a vast array of advanced technology. Still, much of scientific observation is achieved through direct sensory observation—the study of animal behavior, field biology, field geology, and so on. With scientific observation, the nature of the subject under investigation determines the manner of observation.

To understand the nature of the continuing-existence of space, it is necessary to make observations. The human visual system has been honed by biological evolution for millions of years to be effective for the observation of space. For example, it is necessary to be aware of space throughout our daily routine as we maneuver through the intervening space between one destination and another. As long as the eyes are open, and there is sufficient light, the visual system supplies the brain with a constant stream of data about the space in front of the eyes. When investigating the intrinsic nature of space and its continuing-existence, direct observation using the visual system is effective and adequate.

Space itself does not reflect photons into the eyes. Humans use separated material objects to notice the space between the objects. To see that space exists and that it continues to exist it is necessary to focus on the space in between the objects, not on the objects themselves, or anything the objects are doing. For the investigation of the existence of space and its continuing-existence it is of critical importance to focus on space itself.

Just as the visual system can be used to see that space is there, that it exists, the continuing-existence of space can also be observed by using the visual system. In this case the observation is of a selected specific example of space—the night sky with its stars is best. The observation begins and is continued for a while. During that ongoing observation it can be seen that the observed space continues to be there, continues to exist.

FINDING TIME WHEN LOOKING AT SPACE

Space exists, and it continues to exist. Space is there, and it continues to be there. It was noticed that the list-map of the qualities of the continuing-existence of space looked remarkably like a list of the qualities of time. What then are the qualities of the continuing-existence of space?

List-Map of the Evident Qualities of Spatial Continuing-Existence

1. Continuance.
2. Quantity.
3. Parts.

4. Sequentiality.
5. Noncoexistence.
6. Intrinsic-identity.
7. Noncoexistent-sequential-difference.
8. New Part.
9. Change.
10. Unidirectional.
11. Uniform.
12. Nondimensional.
13. Immaterial.
14. Noninteractive.
15. Nonunitized quantity.
16. Omnipresent.
17. Existential-context for change.

The order of items in this list-map is not as simple as organizing a sequence according to complexity from the less complex to the more complex. This list-map has several kinds of relations between the items. Some of the qualities are observed before other qualities. For example, that spatial continuing-existence is a form of continuance was observed before the occurrence of new part was noticed. Then there are intrinsic-qualities of any case of continuance—quantity, parts, sequentiality—and these qualities are listed right after continuance. New part has intrinsic-qualities—change, unidirectionality—which are listed after new part.

Time?

When first reading through this list of the qualities of spatial continuing-existence, the first thing that came to mind was time. It was like reading through a list of the qualities of time. This merited a closer look. Could spatial continuing-existence be the basis of time? It was necessary to look at each quality of spatial continuing-existence, and then compare it to the equivalent quality of time.

The following sections have three parts. First is a statement about the nature of each quality as it occurs with spatial continuing-existence. Second there is a question, with associated comments, asking if each quality also occurs as a quality of time. And third there is a statement considering whether each quality, as it occurs with the continuing-existence of space, is the basis of that quality as it occurs with time—making it possible to understand what time is, why it exists, and why it has its specific set of qualities.

QUALITIES OF SPATIAL CONTINUING-EXISTENCE AS QUALITIES OF TIME

Continuance

When looking at space, it can be seen that space is there, and that it continues to be there. It is possible to observe that spatial continuing-existence is a continuance of being-there. Continuing-existence is a form, a type, of continuance. Continuance is its main, or primary quality. The other qualities of continuing-existence, such as unidirectionality and sequentiality, are secondary—they are qualities of this form of continuance. Continuance is the essential factor of what continuing-existence is.

Is time continuous? Is it consistently ongoing without interruptions?

Sitting idle, attentive to the passing time, it certainly seems to be continuous, without any indications of interruptions to its ongoing occurrence.

Motion takes time to occur. Humans have traditionally used cyclic motion to measure time, such as the rotation of the earth or the orbit of the earth around the sun. An unimpeded object in motion will continue in motion. An unimpeded spinning wheel takes a certain amount of time for each rotation.

When watching a continuously spinning wheel mark off passing time with each rotation, there are no indications of any breaks in the continuance of the time that is occurring as the wheel continues in motion.

The idea of time stopping has been around for a long time. Is there any known reason why time cannot stop, and then resume? Not knowing what time is or why it occurs means there is no way to tell if it is always continuous.

If spatial continuing-existence is time, then the only way for time to stop would be for space to cease to exist. If the continuing-existence of space is the basis of time, then time is continuous because spatial continuing-existence, by its nature, is continuous.

Quantity

Quantity is an intrinsic-quality of continuance. Quantity is a factor that makes continuance what it is, that contributes to the intrinsic-identity of what continuance is.

Look at any continuance, the length of a broom handle, the time of a day from dawn to dusk, the water flowing over the spillway of a dam during a day. There is a specific quantity of continuous length from one end of the broom handle to the other end. There is a quantity of continuous time, of hours or minutes, that occurs from dawn to dusk.

The water flows over the spillway continuously. The ongoing flow is a form of continuance—continuous flowing. By noon there has been a certain quantity of that continuous flowing. This is not the quantity of water flowing, but rather the quantity of the ongoing process of continuous flowing that has occurred during the morning hours. By dusk, an even greater quantity of the process of flowing has occurred.

The existence of a particular continuance is based on the existence of at least some amount, at least some quantity, of whatever the continuance consists of, whether it is wood or plastic, time, or an ongoing process such as flowing water. Quantity is an intrinsic-quality of continuance because without at least some quantity, there will not be any continuance.

When observing spatial continuing-existence, it is evident that there is quantity, some amount, of ongoing continuance. When watching space continuing to be there, you can see that it is there and continuing to be there (as measured by a clock), and it is still there and still continuing to be there, and so on for as long as you care to watch it. There is a steady increase in how long it is

continuing to be there. There is a steady increase in the quantity of continuing to be there that has occurred.

The ongoing continuance of spatial continuing-existence initiates increasing quantity of spatial continuing-existence that has occurred. In the case of spatial continuing-existence, quantity is a consequence of the occurrence of continuance.

Is quantity a factor of the nature of time?

Just as when watching the continuing-existence of space, attention to the ongoing continuance of time reveals that quantity is a quality of that continuance. Quantity is a well-known aspect of time. People have always used one thing or another to measure quantity of time—the passage of the seasons, the passage of the sun and moon through the sky, hourglasses, and clocks.

The ongoing continuance of time initiates an increasing quantity of time that has occurred. Our memories, recorded history, the fossil record, and the geologic record all supply evidence of the quantity of time that has occurred.

The unanswered question is, Quantity of what? Time. Yes, we have a name for it, but what is it? What is time such that it continues with increasing quantity of whatever it is?

If time is spatial continuing-existence, temporal quantity is quantity of the continuing-existence of space. As space continues to exist there is increasing quantity of that continuance. Spatial continuing-existence as the basis of time provides the understanding of why time occurs with increasing quantity.

Parts

It can be observed that a quantity of the continuance of spatial continuing-existence has parts. For example, there is the first part of the continuance that occurs during the first part the observation of space continuing to-be-there, then there is another part of the continuance as the observation continues, and there is another part during the last part of the ongoing observation.

Are parts a factor of the nature of time?

When attending to the passage of time, a hand can be held closed during the first half of the period of observation, and then held open during the second half of the observation period. Two parts of time are experienced. Clocks divide temporal quantity into artificial parts, such as hours, minutes, and seconds. Various parts of recorded history, the fossil record, and the geologic record occurred in various parts of past time.

A quantity of a continuance is always going to have parts. Parts are an intrinsic feature of any quantity of any continuance. So, what is this continuance the quantity of which has parts? If the nature of time is not known, this question cannot be answered.

If time is spatial continuing-existence, the parts of time are the parts of the continuing-existence of space. This provides an understanding of why time has parts and what they are parts of.

Sequentiality

The parts of the ongoing continuing-existence of space are experienced sequentially.

The parts occur in sequential relation to one another, and have specific locations in the sequential continuance, each part occurring before the parts that follow and those following parts occurring after the prior parts. As each part of the continuing-existence of space occurs, it has before and after relations with other parts of the sequential continuance.

Is the occurrence of time sequential?

When using the hand closed and open method, the parts of time are experienced sequentially. Clocks show the sequential passage of the parts of time, and the stages of a process occur sequentially with ongoing time.

The parts of time occur in sequential relation to one another. The parts of time have specific locations in the temporal continuance, each part occurring before the parts that follow and those following parts occurring after the prior parts. As each part of time occurs it has before and after relations with other parts of time.

Time occurs sequentially—What is it that is occurring sequentially? Time—whatever that is.

If the sequentially occurring parts of time are actually the sequentially occurring parts of spatial continuing-existence, then there is an understandable answer to the question of what it is that is occurring sequentially with before and after relations between the parts.

Noncoexistence

The sequentially occurring parts of spatial continuing-existence can be effectively differentiated by the simple procedure of holding a hand closed into a fist and holding the hand in an open position. If, while watching the continuing-existence of space, the observer holds their hand closed during the first part of the observation, and then holds the hand in an open position during the second part of the ongoing observation, it is evident that the two sequential parts of the spatial continuing-existence were not coexistent. During the first part of the observed spatial continuing-existence (when the hand was closed), the following part of the spatial continuing-existence did not then exist (when the hand was held open). Then, during the second part of the observed continuing-existence (when the hand was open), the sequentially prior part of the continuing-existence did no longer exist (when the hand was closed). Prior parts, which occurred before the current part, no longer exist, and later parts, which will follow the current part, do not yet exist. The sequentially occurring parts of spatial continuing-existence are noncoexistent.

Are the parts of time noncoexistent?

The same test that was used for showing that the parts of the continuing-existence of space are noncoexistent, the one that showed that when one part was occurring the other part did not then exist, can be used to show that the parts of time are noncoexistent in exactly the same manner as the parts of spatial continuing-existence. With time, as with spatial continuing-existence, the part

that occurred before the current part, the past, no longer exists, and the part that will follow the current part, the future, does not yet exist.

There is the language for it—the parts of time are noncoexistent—and it is understood what these words mean. Nonetheless, other than (a) having the language for it, (b) understanding what the language means, and (c) experiencing the noncoexistence of the parts of time, it is still not known what it is that is noncoexistent, or why it occurs.

If the reality-referent of the term *time* is the continuing-existence of space, then the evident noncoexistence of the parts of time is actually the noncoexistence of the parts of spatial continuing-existence.

Intrinsic-Identity

In general, that which exists is itself—it has *intrinsic-identity*. That which is noncoexistent is existentially distinct. Noncoexistence can be used to recognize unique intrinsic-identity.

The parts of the continuing-existence of space occur, and thereby have intrinsic-identity. Their occurrence is sequentially noncoexistent, and they are in this way existentially distinct.

Do the parts of time have intrinsic-identity?

The parts of time exist, they occur, and thereby have intrinsic-identity. Because the parts of time are noncoexistent, the existential distinctness makes it possible to recognize their intrinsic-identity.

It is known that the parts of time exist, are noncoexistent, existentially distinct, and have intrinsic-identity. It is just not known what it is that has that intrinsic-identity.

With time occurring as the continuing-existence of space it is known what it is that has sequentially noncoexistent parts with intrinsic-identity.

Noncoexistent-Sequential-Difference

To occur sequentially with unique intrinsic-identity is to occur in a pattern of *sequential-difference*. To occur sequentially with noncoexistent unique intrinsic-identity is to occur in a pattern of *noncoexistent-sequential-difference*. Spatial continuing-existence occurs in a pattern of noncoexistent-sequential-difference.

Does time occur in a pattern of noncoexistent-sequential-difference?

Time occurs in a pattern of sequential-difference, with parts that are different from one another in that they each have unique intrinsic-identity. The parts of time are also noncoexistent, and they thus occur in a pattern of noncoexistent-sequential-difference.

Again, a quality of time is known without really knowing what it is that has this quality.

With time being spatial continuing-existence, it is known what it is that has this quality of noncoexistent-sequential-difference.

New Part

The part of the continuing-existence of space that is occurring currently is non-coexistently distinct from the part of that continuing-existence that occurred just previous. The current part of spatial continuing-existence did not yet exist when the previous part was occurring. Now, as the current part exists, it is newly existent. As space continues to exist, there is continuously new part of that ongoing continuance—new part of ongoing noncoexistent-sequential-difference of spatial continuing-existence.

Are the parts of time newly existent?

The part of time that is occurring currently is noncoexistently distinct from the part of time that occurred just previous. The current part of time did not yet exist when the previous part was occurring. Now, as the current part exists, it is newly existent. As time continues to occur, there is continuously new part of that ongoing continuance.

But why? Why does new part of time occur?

There is an exact match between the manner in which new part of the continuing-existence of space occurs and the manner in which new part of time occurs.

With the continuing-existence of space, new part occurs because space exists and continues to exist. When time is understood to be spatial continuing-existence, it is known why new part occurs. There is something, space, which exists and thereby continues to exist, giving time a known basis in the universe.

Change

With the noncoexistent-sequential-difference of spatial continuing-existence, the occurrence of the new part of the continuance, the occurrence of the *newly existing* part, is an *existential-difference*—something new comes into existence. Existential-difference is change. The coming into existence of something new, existential-difference, is the essence of change, the essential-factor of what change is. Spatial continuing-existence, with its occurrence of new part, is a form of change.

Is time a form of change?

With the noncoexistent-sequential-difference of ongoing time, the occurrence of the new part, the occurrence of the *newly existing* part, is an *existential-difference*—some-thing new comes into existence. Time is a form of change.

Why is time a form of change? Because new part of time occurs as an existential-difference. Why is that? It is not known.

Once more there is an exact match between a quality of time and that quality as it occurs with spatial continuing-existence. With space it is because space exists and continues to exist. But time exists and continues to exist in exactly the same manner. The difference is that with space it is known what it is that exists and continues to exist, while with time that was not previously known. The change that is spatial continuing-existence provides a basis for the change that is time.

Unidirectional

The continuing-existence of space is the ongoing continuance of space being-there. As nothing more than simple continuance of being, it is unidirectional. The factors and qualities that play roles in the nature of spatial continuing-existence do not have the capability to result in anything other than unidirectional change.

Continuing to-be-there occurs in a pattern of continuous unidirectional change—with continuous sequentially new part of the continuance. The occurrence of new part sets the order of the sequentiality. The continuing-existence of space occurs as a sequentially unidirectional change.

Is time unidirectional?

Sequentially new part of time occurs with the present. The occurrence of the new part sets the order of the sequentiality. With the continuous occurrence of new part of time, and the passing of the present into the unchangeable past, time occurs in a unidirectional manner.

That time is unidirectional has been long known, but why has not been known.

Time is sequentially unidirectional in the same manner as spatial continuing-existence. With time as the continuing-existence of space, the unidirectionally changing temporal present is then the current part of the unidirectionally changing continuing-existence of space. The present is the current part of the continuing-existence of spatial-place—the current part of the unidirectional continuing-existence of the place in which we are now existing.

Uniform

The continuing-existence of space is a uniform change because it is a continuance-of-being—nothing more than just continuing to-be-there. Uniform change is an intrinsic-quality of what continuing-existence is.

Is the ongoing change of time uniform?

When a person is busy working on something, the time seems to that person to have gone by very quickly. But to another person sitting nearby waiting for the busy person to finish, the time seems to go by very slowly. A wind-up clock, sitting on a table in the room, was designed to go through its process of measuring time in a constant uniform manner.

When two clocks measure time differently, it is known that the difference is a consequence of differences in the clocks, not that the passage of time is different for the different clocks. Biological factors of the nervous system affect the way people experience the passage of time.

While the people were experiencing time differently, that difference was intrinsic to them, and was not a factor of the passage of time itself. Apparent nonuniformity in the passage of time can be traced back to variations in the systems used to measure time.

Nonetheless, if the intrinsic nature of time is not known, then uniform ongoing time is an unfounded assumption, even when based on highly advanced measuring devices. As far as science has been able to discover, all matter is moving in one manner or another, and it is a universal-factor, a universal pattern-of-interrelation, that matter in motion influences other matter with which it comes into contact. No material device is perfect—the motion of matter will always introduce some variations, however slight. It is not possible to prove (demonstrate) using material devices that time is uniform.

With the unidirectionality of time, even when what time is and why it exists are not known, there is, with the occurrence of new part, something to work with. With the uniformity of time, there are no apparent factors or qualities to work with if the nature of time is not known.

Time as spatial continuing-existence is uniform because continuing-to-be is uniform.

Nondimensional

Spatial continuing-existence exists as a form of change. Because this change occurs as noncoexistent-sequential-difference, with the previous part no longer existing and the following part not yet having occurred, only the current occurrence of change is a part of reality. The current part exists as continuous, unidirectional, uniform change, and as such has no dimension, no length—just continuous noncoexistent-difference.

While spatial continuing-existence occurs as a form of continuous nondimensional change, that continuing-existence, that ongoing change, is a consequence of the existence of space. It is space that continues to exist. Spatial continuing-existence is *existentially-dependent* on the existence of space.

Is the occurrence of the change that is time nondimensional?

Time occurs as continuous change. Because this continuous change occurs as non-coexistent-sequential-difference, with the previous part no longer existing and the following part not yet having occurred, only the current occurrence of change is a part of reality.

People have often wondered how long is the current part of time—how long is the present. How long is the shortest possible length of time, or what is the smallest unit of time? Or, if time is no more than the continuous change of noncoexistent-sequential-difference (as is the case with spatial continuing-existence), does the present, the current part, have any length or dimension at all? If the nature of time is not known, there is no way to decide, no way to figure it out.

Spatial continuing-existence occurs as a form of continuous nondimensional change that is a consequence of the existence of space. It is existentially-dependent on the existence of space. If time does exist as continuous change without length or dimension, then is it existentially-dependent on something else that exists, and if so, what? There has never been a way to tell.

With spatial continuing-existence as the basis of time, it is possible to understand that the present is an occurrence of nondimensional change. It is the current part of the nondimensional change of spatial continuing-existence. As continuous change of spatial continuing-existence, there is no shortest length of time.

Immaterial

Space, spatial-place, is immaterial. What spatial-place is does not require a role for substantiality/materiality. It is similar with spatial continuing-existence—there is no requirement based on what the continuing-existence of space is for a role for substantiality/materiality.

Spatial continuing-existence is the continuing-existence of a component of the universe that has an immaterial mode-of-being.

Is time immaterial?

From what is known about time, there are no apparent reasons to anthropomorphically project any form of materiality onto time. There are, however, important points to consider if time is immaterial. Immateriality significantly limits the types of relations something that is immaterial can have with other things that exist.

If time is the continuing-existence of space and is thereby immaterial, then the following two items in the list are relevant: Noninteractive and Nonunitized Quantity.

Noninteractive

As spatial-place is immaterial, it does not have the attributes whereby it could interact with matter, or any other form of existence, all of which occur within space. Space cannot have any interactive causal relations with matter.

Spatial continuing-existence, also immaterial, cannot interact in any way with matter.

Is time noninteractive?

If time is immaterial, then, like spatial-place and spatial continuing-existence, it does not have the intrinsic-qualities whereby it could interact with other things that exist. Material change—motion, emergence, growth, events—all take time to happen. But the causal origins of these material changes can all be traced back to material interactions, without the necessity of invoking time as an interactive causal factor—that is, all change occurs with time, but time itself does not appear to cause change.

If time is the continuing-existence of spatial-place, then due to immateriality, there is no requirement that time be interactive with other forms of existence, or with the other forms of change, all of which occur with time.

Nonunitized Quantity

Because the continuing-existence of space is a form of immaterial change, it does not have any qualities by which it could have any form of intrinsic units. The quantity of spatial continuing-existence that has occurred did so in an immaterial, continuously uniform, nonunitized manner.

Is the manner in which quantity occurs with time nonunitized?

If time is a form of immaterial change, it would lack the capacity to have any form of intrinsic units.

Time, as the continuing-existence of space, is nonunitized due to the immateriality of the ongoing change that is spatial continuing-existence.

Omnipresent

The qualities of space that determine that it is infinite also determine that spatial continuing-existence is coexistently omnipresent.

Space is infinite because it cannot not exist. To understand why begins with one of the universal basics of the interrelations between things. The intrinsic-qualities of something that exists determine the kinds of relations that something can have with other things that exist. The intrinsic-qualities play the roles that determine the kinds of relations because they are what is there to play these roles. In like manner, the intrinsic-qualities of something that exists determine the types of intrinsically determined changes that can or cannot take place within that something.

The existence and intrinsic-qualities of that which goes before determine the existence and intrinsic-qualities, of both structure and process, of that which follows.

Something cannot come from nothing because nothing does not have any intrinsic-qualities that could play the roles that could determine that something come from nothing. Space cannot originate from nothing because nothing has no qualities that could originate space. In like manner something immaterial, which cannot interact with other things that exist, cannot become nothing if that something does not have qualities that can play the roles of eliminating the factors that determine the existence of that something. Space has no qualities that could play the roles required to eliminate the three-dimensional extension of spatial-place. Space exists, and cannot not exist. Space is infinite because there is no way for there to be a limit to the extension of spatial-place beyond which space does not exist. Space is infinite because there is no way for space to not be infinite.

All infinite spatial-place is-there—all infinite spatial-place is coexistent. All infinite coexistent spatial-place exists and continues to exist. The occurrence of spatial continuing-existence is infinitely omnipresent.

Is time omnipresent, with the present-now the same everywhere?

It is generally assumed that time, the current moment, the present, is everywhere the same. Clocks, designed to run in a continuous even manner, are coordinated to match this universality

of time. But, if the intrinsic nature of time is not known, then, other than through the functionality of timing devices, there is no way to figure out if the present is universal.

The current part of spatial continuing-existence is omnipresent throughout infinite space. If time is the continuing-existence of space, then the present is omnipresent.

Existential-Context for Change

The three-dimensional-immaterial-extension of spatial-place provides an *existential-context*, a place-to-be, for the three-dimensional-extension of all else that exists, such as the three-dimensional-material-extension of matter.

Because space is the existential-context, the place-to-be, for all that exists other than space, spatial continuing-existence is the existential-context, the place-to-be, for the continuing-existence of all that exists. The noncoexistent-sequential-difference of spatial continuing-existence provides an existential-context, a *place-to-occur*, for the noncoexistent-sequential-difference of all forms of change, such as the continuing-existence of matter, and all developed forms of change, such as motion, emergence, plate tectonics, growth, and biological evolution.

Is time an existential-context for change?

Motion, processes, events, all take time. Time appears to be a universal requirement, if not a causal-factor, for change of all kinds.

Why? What is time such that it plays this required role?

Spatial continuing-existence provides an existential-context for all forms of change, enabling them to occur, and thus playing that required role. Understanding that time is the continuing-existence of space answers the question of what time is such that it plays its required role in all forms of change.

Time is specifically the continuing-existence of space because only the continuing-existence of space provides a universal omnipresent existential-context for all other types and cases of continuing-existence. All other cases of continuing-existence are limited in the duration or extent of their occurrence, for example the continuing-existence of Mt. Fuji or that of a postage stamp.

REAL TIME AND EINSTEINIAN RELATIVITY

The discovery of the basis of time in the universe poses a significant problem for Einsteinian relativity.

Neither Einstein nor anyone who has worked in the field of Einsteinian relativity has ever known what time is.

Every statement they made concerning the intrinsic nature of time, concerning the basis of time in the universe, has been a hypothesis—a guess, a speculation.

Continuing-existence is intrinsically uniform. Due to what it is—due to its manner of being—the continuing-existence of space cannot have or display the quality of dilation.

The concept of time dilation is false.

Various observations and experiments have been put forth as evidence for time dilation. These observations and experiments were misinterpreted.

Clocks will operate differently in various environments that have factors that influence the mechanisms of the clocks. The specific conditions in which a clock is operating can increase or decrease the rate at which the clock measures time. For a simple example, lubricants are more or less effective depending on temperature, contamination, and deterioration due to age. Two mechanical clocks that use the same lubricant will measure time differently over a twenty-four-hour period if one is placed in a hot desert and the other is placed ten feet away in a freezer.

The experiments that have been put forth as proof of time dilation proved that there were factors in the different environments of the clocks that influenced their rates of operation. The experiments showed that there was a discrepancy between the rates of operation of the clocks, apparently due to those different conditions of operation in the experiments. There was nothing in the experiments that indicated a change in the rate of time itself.

Time as measured by clocks is sometimes called clock-time. The false interpretations of the experiments were due to confounding this clock-time with real time.

It turns out then, that the claim of time dilation is a form of anthropomorphism. Anthropomorphism comes in many guises. These vary from animism which attributes powers and/or personality to inanimate things such as rocks, trees, and storms, to attributing consciousness or intrinsic purpose to computers and robots.

To attribute consciousness or intrinsic purpose to a machine is technology anthropomorphism. With this form it is projecting a specifically human quality onto the machine.

There is another type of technology anthropomorphism. In this type it is not a human quality that is projected onto the technology, but rather some other quality that the technology does not, or cannot, have or display. Clocks are a form of technology—clock-time is not real time. With the belief in time dilation, it is the projection of real time onto the clock-time situation—the belief that the difference in the time measurements made by the clocks represents a difference in time itself as it occurs in the different situations of the clocks.

The belief that the experiments show time dilation is a type of technology anthropomorphism because it is a belief that is projected onto the situation. The projection of a belief onto a situation can occur when there is an attempt to interpret an observation or the results of an experiment within the context of a paradigm that is not adequate for an accurate interpretation of the observation or those results.

Because Einstein's theory of relativity does not contain knowledge of the intrinsic nature of time, and instead represents time with a hypothesis, space/time, the actual nature of time cannot be understood within the scope of that theory.

Einsteinian relativity is not adequate as a counter argument to the recognition of the continuing-existence of space as the basis of time in the universe.⁴

CONCLUSION

There is an exact match between the qualities of time and the qualities of spatial continuing-existence. The qualities and roles of the continuing-existence of space fulfill all the known qualities and roles of time. Realizing that spatial continuing-existence is time makes time understandable, and clarifies the relations of time to matter, motion, change, and process.

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Here are three other papers that provide additional understanding about the intrinsic nature of time.

- Vesterby, Vincent. 2019. "The Basis of Time in the Universe." OSF Preprints. July 24. osf.io/q4ntk.
<https://osf.io/q4ntk>

⁴ Because mathematics is an artificial manmade construct and not a component of the intrinsic structure and processes of the universe, mathematics does not play any roles with the occurrence of time. Mathematics cannot be used as a counter to the recognition of the continuing-existence of space as the basis of time in the universe.

Vesterby, Vincent. 2019. “Paul Davies and Why Time Is Not a Flow.” OSF Preprints. July 27. osf.io/bh23c.

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Date of original version of “The Identification of the Intrinsic Nature of Time”—2014.