Tsi Nikahá:wi: Onkwehón:we Perspectives on Time

Frank Deer, *University of Manitoba*

Author's Note

Frank Deer https://orcid.org/0009-0005-5034-4332

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Correspondence concerning this article should be addressed to Frank Deer at Frank.Deer@umanitoba.ca

Abstract

Time, a term that is normally used to refer to the experience of the continual passage of events in a sequential way, is central to how we organize our lives. In most areas of human endeavour, from the general management of one's personal life to the rather precise activities related to scientific measurement, time is understood to be linear and studied with an emphasis upon events of the past, present, and future. Although many may take a linear conception of time with precisely apportioned intervals for granted, it may be worthwhile to consider Onkwehón:we perspectives of time as one branch of the reconciliatory journey toward a science that reflects Onkwehón:we knowledges. This essay, presented by a Kanienkeha'ka social scientist who studies Onkwehón:we education and has served as an educator in First Nations school contexts, explores Onkwehón:we perspectives on time through focus upon how the passage of events is resident in the human experience and how this compares to how time is normally understood within the scientific endeavour. This exploration will contribute to ongoing dialogue on the nature of Onkwehón:we perspectives on science and how it is explored in educational settings.

Keywords: Indigenous epistemologies, Onkwehón:we science, temporality, cyclical time, science education

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Setting the Context

It may be said that modern science is fundamentally concerned with producing models of reality through scientific investigation. Otherwise stated, science is an endeavour through which people employ systematic processes such as objective observation, experimentation, and reasoning in order to understand the natural world and its resident phenomena. The products of scientific activity have, through history and the present (and at times imperfectly), helped humanity in areas such as industry, health, and security. There is little doubt that scientific inquiry and initiative have benefited human well-being and will be an essential aspect of some of humanity's pressing concerns such as climate change and communicable diseases.

For all the benefits that may be attributed to modern science and the scientific method however, there is an observation that is occasionally levied against it: its relative inability to survey some of the fundamental aspects of humanity such as human values, moral concerns, and other important aspects of consciousness. Although numerous advancements in neuroscience have helped develop an understanding of how the human brain works such as studies of electro-chemical activity amongst neurons in the human nervous system, the manner through which humans do such things as sense a self, establish a moral compass, and judge the aesthetic qualities of an environment is, ostensibly, areas for which modern science has difficulty making useful contributions (Chalmers, 1995). One of the reasons why, it is imagined, science is incapable of studying issues such as these is due to one of its central features – that of scientific reduction (Mittelstrass, 2015). Although there are numerous ways of regarding scientific reduction, a general way of describing this is the deliberate reduction of complex phenomena into its constituent elements in order to facilitate the study of the phenomenon in question (Perlovsky, 2019). This argument is sometimes adduced like this: by breaking down complex phenomena into constituent elements and representing these elements separately and/or numerically, the fundamental character of the phenomena in question is obscured or, at worst, rendered impossible to adequately study and understand (Gershenson, 2013).

The issue of scientific reduction was explored in Thomas Nagel's (2012) essay "What is it Like to be a Bat?" In this essay, Nagel focused upon the mind-body problem and how consciousness is difficult and perhaps impossible for modern scientists to study, asserting that the methods that are taken for granted in the scientific community have "led to the acceptance of implausible accounts of the mental largely because they would permit familiar kinds of reduction" (p. 166). Nagel's view on the ability of science to study and successfully describe consciousness was rather doubtful:

> We have at present no conception of what an explanation of the physical nature of a mental phenomenon would be. … The most important and characteristic feature of conscious mental phenomena is very poorly understood. Most reductionist theories do not even try to explain it. And careful examination will show that no currently available concept of reduction is applicable to it. Perhaps a new theoretical form can be devised for the purpose, but such a solution, if it exists, lies in the distant intellectual future. (p. 166)

One of the key observations made by Nagel in exploring the difficulty in scientifically investigating consciousness is the ubiquity of consciousness across species as well as the centrality that consciousness occupies in the human condition. Nagel's exploration of how consciousness is resident in the human condition leads to his fundamental claim: "an organism

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has conscious mental states if and only if there is something that it is like to be that organism – something it is like for the organism" (p. 166).

The profundity of Nagel's claim, that a conscious creature is conscious if there is something that it is like to be that creature, requires one to engage with some deliberate consideration of what it means to be conscious. Meacham (2013) and Cavanna et al. (2011) state that consciousness can be understood as the state of being awake, aware, or both. Meacham and Cavanna et al. caution on the use of the term consciousness given how many use the term expansively to mean all sorts of things. Meacham (2013) offers one example: "sometimes the term 'consciousness' means not the content but the container, that which holds or includes the content" (p. 2). Although the current discussion is related to consciousness, it is here where we will make the perhaps necessary move toward a focus upon experience; the "rich field of sensation, including emotions and thoughts, some of which fall under the spotlight of attention" (Pinker, 1997, p. 134). It is within human experience where we observe what it is like to be us. It is within human experience that we observe and interact with the world. It is within human experience where we apprehend the passage of events – what we often refer to as time.

Time, the passage of events in a discernible sequence, may be understood as an experiential concept for which we often make assumptions. For instance, we tend to assume that because we experience time, others do as well. We also assume that the general sequence of time that we experience is one that others experience as well. Husserl's (1928/1964) phenomenology of time-consciousness argues that human experience is structured through retention of the past, awareness of the present, and anticipation of the future, and that this temporal structure is understood as intersubjectively shared among subjects. Thus, we recall experiencing events of the past that may condition what we experience in the present and further inform our anticipation of events of the future, is how others experience time. We collectively apprehend, however uniformly, what time is and how this apprehension can be essential to our lives and well-being. It may be understandable why time has become an important scientific consideration as well. Because time is a concept that is foundational to the way phenomena in our world are structured, studied, and theorized, it is a topic that merits continued study.

Herein, I discuss Onkwehón:we[1] perspectives on time as one avenue toward addressing how our world may be understood and argue that time is not merely an objective external quantity measured by science, but a phenomenon structured through experience, relation, and perception. By tracing discussions of consciousness, scientific reductionism, Kantian epistemology, Onkwehón:we cyclicality, and modern physics, the essay demonstrates that differing understandings of time emerge from differing assumptions about how human beings encounter reality itself.

Onkwehón:we Perspectives on Time

Nagel's critique of reductionism raises an important epistemological question: if subjective experience cannot be fully reduced to physical description, then how is experience itself structured? Kant's (1781/1998) theory of space and time as a priori forms of intuition may provide one possible answer. Rather than existing independently 'out there' in the world, time becomes a condition through which conscious beings organize experience.

[1] Herein, the term *Onkwehón:we* (from Kanien'kehá, meaning "original peoples") will be used interchangeably with the term *Indigenous* and refers only to the First Nations, Inuit, and Metis peoples of Canada and related territories.

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Ekong (2022) put forth the following observation about time (i.e., the continual passage of events in a sequential way): that time exists only in the experience of conscious human beings. Ekong defends the Kantian view that both space and time do not exist as properties of things in themselves, but only as a priori forms of human experience. Time, on Ekong's account, is not an independently existing phenomenon outside of human experience but instead that it is a part of the structure of our conscious experience. As Ekong writes: "Kant identifies the a priori forms of sensibility: space and time, which the mind contributes, to make experience possible….an event cannot be experienced at all, unless it is recognized as being in 'space' and occurring in 'time'" (p. 34). For Ekong, time is not something that exists independently in the world, but a pure form[2] through which the human mind structures all appearances. Time, in the Kantian sense, is a necessary organizing structure that is put forth by human consciousness. Ekong's commentary may compliment what was previously stated regarding the observations of Nagel: it is like something to be human. More associated with the current discussion, it is like something to experience the continual passage of events in a sequential way. Human beings experience the passage of events. Time, in most conceptualizations that may be offered on the term, emerges from nowhere else but the experiences of conscious creatures such as human beings.

If time is understood not as an independently existing entity but as a structure of lived experience, then differing cultural experiences and relationships may generate differing temporal frameworks. Onkwehón:we perspectives on time can therefore be understood not as deviations from a universal temporal order, but as coherent experiential and relational orientations grounded in land, ancestry, ecology, and interdependence. Human beings do not necessarily experience the passage of events in the same way. It is sometimes cited that Onkwehón:we peoples experience the passage of events in ways that are different from those of other people (Cajete, 2000). There appear to be some features that are shared amongst many Onkwehón:we peoples' perspectives on time. Principal amongst these features, which may have close relation to each other in the unique manifestations of Onkwehón:we perspectives, are those of cyclicality and ecology.

Just as the seasons follow a cyclical pattern, Onkwehón:we peoples conceptualize time having a cyclic or circular form rather than the Western's linear understanding (Christie & Halpern, 1990; Hatfield et al., 2018; Janca & Bullen, 2003; MacKenzie et al., 2017; Michie et al., 2021). Such conceptualizations of time are in harmony with Onkwehón:we perceptions of the interrelatedness of all things as evidenced, for example, through the Medicine Wheel (Michie et al., 2021). As such, notions of past, present, and future may be understood to coexist in concentric time circles (Janca & Bullen, 2003). The individual abides with future and past relatives (Hatfield et al., 2018) and events may be placed closer or further from the individual in such concentric circles depending on the relevance of such events to that person (Janca & Bullen, 2003). As Hatfield et al. (2018) explain, "cyclical time or cyclical temporality, here, refers to various ways of experiencing ourselves in the world as participants within narratives involving our ancestors and descendants" (p. 3).

An integrationist approach toward the two general approaches toward understanding time may merit consideration. Christie and Halpern (1990) offer an integrationist possibility. They first explored the concept of "technical time," which is "mathematically based, mechanically, electronically or geophysically regulated, [it] is the clock and calendar time of Western society"

[2] In the Kantian sense, a *pure form* is a built-in a priori structure that is not derived from experience but rather makes experience possible.

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(p. 741). However, as the authors explain, technical time has both cyclical and linear dimensions: seasons, months, days, and minutes, they all repeat throughout time. However, even within cyclical time there is a certain quantitative precision which "ensures that its units are, by some objective measure, the same" (p. 742), thus allowing us to 'save,' 'spend,' or 'waste' time. Time can be then conceptualized as having two axes: a horizontal cyclical dimension and a vertical linear dimension (Christie & Halpern, 1990). For these authors, the Onkwehón:we worldview allows for these two axes to co-exist and, despite controversies, one is not necessarily better than the other but are rather intertwined (Krech, 2006). A problem seems to arise, however, when Western societies put too much emphasis on linear time to the detriment of cyclical time, with bad consequences for, for example, nature and human health (Christie & Halpern, 1990; Hatfield et al., 2018). In regard to possible consequences for nature, industrial systems driven by continuous economic growth and year-round extraction often ignore seasonal ecological cycles, contributing to soil depletion, overfishing, and climate instability. For human health, rigid clock-based work schedules and constant productivity expectations can disrupt natural bodily rhythms, contributing to stress, sleep disorders, anxiety, and burnout. Therefore, the Two-Ways approach (with and without epistemic insight; critical reflection on the assumptions, methods, and limits through which different knowledge traditions construct understanding) is recommended as a way to bring together Onkwehón:we and Western science education (Michie et al., 2021).

Christie and Halpern's (1990) focus was upon the rapid sociocultural change in the Canadian Arctic; specifically, the shift from traditional Inuit temporal systems to Euro-Canadian technical time. Their analysis reveals that this shift has contributed to rising mental-health challenges among Inuit communities. Traditionally, Inuit life was structured by cyclical, land-based temporal patterns tied to seasons, hunting activities, and social rhythms. However, settlement life replaced these with rigid clock-based schedules and externally imposed approaches toward life. As Christie and Halpern note, "the establishment of settlements built around Euro-Canadian institutions has created temporal environments which … regulate life on the land by eliminating the seasonality of Inuit migratory and exploitive patterns" (p. 739). For Christie and Halpern, this temporal disruption has weakened community integration, distanced younger generations from land-based identity, and created a sense of dislocation especially for settlement-born Inuit who are "temporally marginalized" and constitute the "highest risk population for mental ill-health" (p. 739). The resulting mismatch between traditional Inuit temporal orientation and the imposed technical time of the settlements contributes to rising rates of social and psychological distress, including substance abuse and suicide.

Krech (2006) was charitable to this reconciliatory effort of the sort offered by Christie and Halpern (1990) with specific focus on how time may be generally perceived within both traditions. Krech critiques the orientations of some disciplines including Onkwehón:we education that is critical of linear, chronological time and favours culturally specific, cyclical, or non-Western temporalisms. Krech (2006) argues that while Onkwehón:we conceptions of time are essential for understanding cultural meaning and worldview, being dismissive of the utility of linear time undermines the ability to analyze such things as historical change and social processes. In his view, scholars should adopt a balanced approach that incorporates both Onkwehón:we temporal frameworks and linear chronology, which is a necessary methodological tool for reconstructing historical events. Krech concludes that scholars should not view Onkwehón:we perspectives of time and those of Western scientific traditions as mutually exclusive. Instead, effective ethnohistorical research must integrate culturally specific understandings of time with chronological analysis to produce richer, more accurate histories.

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Cajete (1994, 2000) presents Onkwehón:we understandings of time as deeply relational, ecological, and cyclical rather than linear. In his 1994 work *Look to the Mountain*, Cajete focuses on the learning of Onkwehón:we perspectives and contends that time emerges through participation in the rhythms of land, ceremony, ancestry, and community. In this vein, learning is not separated into abstract units of progression but is instead embedded within seasonal and intergenerational relationships. Cajete (1994) explains that "Indigenous education is rooted in a philosophy of perpetual relationship to the natural world" (p. 209). Time, according to Cajete, is experienced through continuity with nature and with the knowledge carried by ancestors. In his 2000 work *Native Science*, Cajete expands this idea into a broader philosophical and cosmological framework. He argues that Onkwehón:we knowledge systems understand reality itself as interdependent and cyclical. He writes that "Native science is a metaphor for a wide range of tribal processes of perceiving, thinking, acting, and 'coming to know' that have evolved through human experience with the natural world" (Cajete, 2000, p. 2). Within this framework, time is not simply chronological progression, but a living process of renewal, reciprocity, and connection among past, present, and future.

Whyte (2018) extends these ideas on Onkwehón:we time and how it is experienced into contemporary discussions of colonialism and climate change. Whyte asserts that many Onkwehón:we peoples already experience environmental crises not as a distant future but as an ongoing reality rooted in histories of dispossession and disruption. This perspective challenges Western assumptions that time unfolds through linear narratives of progress. Instead, Whyte emphasizes intergenerational responsibility and ancestral continuity, noting that "many Indigenous peoples already inhabit what our ancestors would have understood as a dystopian future" (p. 227). For Whyte, Onkwehón:we time links memory, responsibility, and futurity into a single relational continuum. Both Cajete (1994, 2000) and Whyte (2018) describe Onkwehón:we temporality as grounded in land, ecological cycles, and enduring relationships among ancestors, present communities, and future generations rather than in the segmented and linear structures common to Western modernity.

Studying Onkwehón:we perspectives on science (including time) can help reveal how dominant Western perspectives and institutional practices can obscure Onkwehón:we ways of understanding the world. Although there is very little in the academic literature that offers this focus with specific consideration for time, Wilson et al. (2020) explored this topic and, in doing so, essentialized the importance for Onkwehón:we well-being. They argued that a core source of misunderstanding between Onkwehón:we peoples and settler institutions, especially healthcare, are their fundamentally different experiences of time. Non-Onkwehón:we orientations treat time as linear, progressive, and individualized; a person's medical history begins at birth, unfolds through life stages, and problems are understood as the result of personal choices across that timeline. Onkwehón:we perspectives on time, by contrast, is frequently non-linear, relational, and expansive. These perspectives on time reach back across generations, remain embodied in the present, and extend forward beyond an individual's lifespan. Past events that feature such experiences as racism in healthcare, child removal, and colonial dispossession remain active and present in shaping how Onkwehón:we people interpret contemporary experiences. As Wilson et al. (2020) assert: "For Indigenous people, the past and the future are always present and embodied within our understandings and interactions with the dominant culture and institutions" (p. 144). These differing views on time form part of what the authors call the double perspective, in which Onkwehón:we people must navigate both their own temporality and that imposed by non-Onkwehón:we institutions. When healthcare systems fail to recognize Onkwehón:we

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perspectives on time, they misinterpret behaviours, attribute blame to individuals rather than history, and overlook the ongoing effects of colonialism. According to Wilson et al. (2020), acknowledging Onkwehón:we conceptions of time by non-Onkwehón:we institutions can lead to a better understanding of Onkwehón:we experiences and designing more equitable, culturally grounded approaches to health.

In the little focus that exists in the academic literature on Onkwehón:we perspectives on time, the topic of health and well-being is a recurrent theme across works. Both Wilson et al. (2020) and Christie and Halpern (1990) focus on these areas, reporting how Inuit peoples in northern Canada have experienced psycho- and sociopathologies as a result of the disconnection between their cyclical orientation of time and the more linear orientation resident in northern settlements in or near which they reside.

Reconciling Cyclical Time and Western Science

In reconciling Onkwehón:we perspectives of time with Western scientific approaches, the aim is not to collapse Onkwehón:we temporality into modern physics nor to suggest direct equivalence between them. Rather, developments in contemporary physics complicate earlier assumptions that time is singular, universal, and absolute. In doing so, they open conceptual space for considering temporal plurality and relationality in ways that resonate with certain Onkwehón:we perspectives.

Time is a foundational concept in physics because it structures how change, motion, and causality unfold in the universe. As Newton (1687/1729) argued in his famous work *Philosophiae Naturalis Principia Mathematica*, time provides an absolute framework within which physical processes occur, allowing the laws of motion to be expressed mathematically and consistently. However, later developments, notably Einstein's (1905/1923) theory of relativity, reconceptualized time as intertwined with space, forming a four-dimensional spacetime whose geometry is shaped by mass and energy. This development in the study of physics revealed that time is not universal but instead varies for observers moving at different velocities or experiencing different gravitational fields, profoundly altering our understanding of simultaneity, measurement, and the structure of physical laws. Together, these contributions illustrate that time is not merely a backdrop for events but an active, dynamic ingredient in the physical description of reality. These contributions have been central to the developments in mainstream Western science that have essentialized the linear conception of time.

In exploring how one might understand Onkwehón:we conceptions of time herein, the notion that such conceptions merit consideration by scientists raises an important question: can one reconcile Onkwehón:we and Western scientific conceptions of time? It seems that within the current era in which Onkwehón:we knowledge is increasingly sought out and respected, this question is worthwhile addressing because (put generally) such reconciliation has the potential to allow Canadian society to (for instance) integrate long-term historical progression with the recurrent rhythms that shape ecological, cultural, and social life for everyone. Such reconciliation can foster more sustainable decision-making by highlighting how seemingly linear actions produce recurring consequences over time, something central to the seven-generations view held by many Onkwehón:we peoples. As Adam (1994) noted, recognizing multiple temporalities broadens our capacity to understand social processes and their long-range effects.

Scholarly explorations of time in various orientations (although not necessarily those of Onkwehón:we people) do predate current discussions that have involved Onkwehón:we

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knowledge and scholarship. Although never representing the prevailing view within scientific dialogue, a small number of scholars have explored time that is a departure from the mainstream Western scientific view. Caillois (1963), who had no interest in, and possibly no knowledge of, Onkwehón:we perspectives of time, contrasted two fundamental cultural conceptions of time, one of which bears some thematic overlap with Onkwehón:we perspectives: the Western model of linear, chronological progression and the Eastern model of cyclical recurrence. For Caillois (1963), Western history depends on "a rectilinear" succession of occurrences in which "each event is unique, fixed, eternal in its place" (p. 11). This model emphasizes chronology, causality, and the irreversibility of events. By contrast, many Eastern traditions view time as circular; "a chain of identical cycles … endlessly reenacted" (p. 2). In such systems, events gain meaning not from progress but from their position within recurring cosmic patterns. Caillois illustrates this through examples ranging from the Chinese 60-year cycle to the Indian kalpas spanning billions of years, all of which treat history as patterned recurrence rather than linear advancement.

Caillois (1963) shows how these differing temporal models shape historical imagination, responsibility, and cosmology. In cyclical traditions, what matters most is Kairos, which for the author refers specifically to "the moment in which each event occurs…This instant largely determining the occurrence" (p. 8). Meanwhile, Western thought generally insists on accumulated human agency, rejecting doctrines like eternal recurrence because they threaten the idea of moral responsibility. He notes that even when cyclical ideas reappear in the West, they never overturn the deep assumption of linear development. Caillois demonstrates that both views coexist latently. For this author, even the most linear historians subtly fall into cyclical patterns when describing civilizations passing through phases of "gestation … flowering … [and] decadence" (p. 12).

A circular conception of time has been expressed by Caillois and others as valuable because it highlights patterns, rhythms, and recurring conditions that shape human experience; thus, the relevance to Onkwehón:we knowledge and thought might be understood. Caillois (1963) notes that cyclical frameworks treat history as structured by "moments with fixed properties" that succeed one another in predictable ways (p. 9). This perspective corresponds and even supports those Onkwehón:we perspectives on time mentioned earlier in so far as they point to the importance for individuals and societies to recognize recurring opportunities and dangers, anticipate cycles of growth and decline, and respond more thoughtfully to the conjuncture, the kairos, or opportune moment, rather than assuming all change is linear or unprecedented.

The Kairos concept as offered by Caillois (1963) brings us into an issue explored at the outset of this essay – that of human experience and it how it mediates phenomena in our world. At times, the experiential aspect of understanding our world is through the observations we make of it. Although this is clearly a facet of those who retain an orientation toward the circular conception of time or even an Onkwehón:we conception of time, there are some scholars of mainstream Western science who have included the importance of human observation and experience into their own studies. Werner Heisenberg is one of some high-profile physicists who maintained that electrons do not always exist and only exist if they are being observed (Jaroszkiewicz & Eakins, 2006).

Carlo Rovelli (2014) offers one of a small number of descriptions of time that are at once a departure from what may be regarded as mainstream Western science, an affirmation of the achievements of mainstream Western science, and an acknowledgement of how human beings may apprehend the passage of events in particular ways. Although Rovelli does affirm that time

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is not a fundamental feature of the universe and does hover over the notion that thermal phenomena such as entropy gives rise to what might be understood as the passage of events, he also offers a subtle but important commentary on how time (the passage of events) is conditioned by our limited consciousness. As he states: "Physicists and philosophers have come to the conclusion that the idea of a present that is common to the whole universe is an illusion and that the universal 'flow' of time is a generalization that doesn't work" (2014, p. 60). Is there a straightforward journey to reconciling Western scientific understandings of time with those of whose understandings are orientated toward a non-linear view? Perhaps this journey requires confronting the contexts in which we find ourselves applying such understandings. Although some might posit that Western scientific discussions have no 'space' for non-linear approaches and/or vice versa, we have explored enough herein to point toward the importance of exploring their reconciliation and sampled some of the theoretical antecedents that support its importance. Perhaps the semantics related to our understandings of time matter more than we realize. It may be said that views on time that are resident in contemporary Western science may correspond to an experiential apprehension of time. The concept of circular time might overlap with other areas of scientific concern.

Discussion: Semantics and the Utility of Experience

The essay now returns to the earlier critique of reductionism. If modern physics operationalizes time through measurable periodicity, then Onkwehón:we temporal frameworks foreground dimensions of lived experience that may resist such reduction. The contrast is therefore not between 'scientific' and 'non-scientific' understandings, but between different ways of organizing and interpreting temporal experience.

Anderson (1972) explored how phenomena in our world cannot be fully understood just by knowing all there is to know of their simplest parts. Although acknowledging the role that the reductionist view has in the scientific endeavour, Anderson's work considers how natural phenomena emerge from constituent parts and are not readily analyzable with a reductionist approach. As stated earlier, this sort of approach may be useful in considering how we may understand time.

In the Western scientific tradition, particularly in physics, time is understood in terms of measurable quantities, or so-called 'standards of measurement.' The current standards for time and space measurements are both taken from the same reference; periodic oscillations of light emitted from a particular atom in a particular manner.

It is the oscillation that may be particularly interesting as this is something that repeats identically. That is why it is chosen as a base unit for measurement. Amongst physicists, this repetition is used to define time, and there is an associated distance that is travelled by the light during its oscillation which defines length. Using a definition of periodicity lies at the heart of what is meant for time and space in physics and is also used in a fundamental way for defining quantum mechanics. We define the inverse of these oscillation periods as quantities used to describe waves and, consequently, quantum states. In physics this periodic repetition is exact; one cannot say of a wave that any particular oscillation is unique. There is no identity for a wave except through its periodicity. Physicists who study quantum mechanics would assert that a particle can be in a particular state, but that state does not define any portion of a wave, only the length or time interval associated with the wave.

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As intimated earlier, one may wonder if there is a consequence from this sort of definition of time and space in terms of periodicity that appears as a limitation on what physics is able to describe. There seems to be difficulty for physics to describe events that are one-off in any terms other than the probability of their occurrence. One may observe this trouble as a direct consequence of using periodicity as a basis for defining measurable states in quantum mechanics; these observables must always be described as possibilities that are delineated by the consequences of periodicity (Busch et al., 2016).

An observation made by some (Buonomano & Rovelli, 2023; Frischhut, 2016) might be that in contrasting this Western scientific approach, such as our awareness of days and years, it seems that very little is periodic in our everyday experience. Such things as colour, which is the basis for physicists' measure of time and space, is perceived by us in a way that is quite personal and subjective. For some, what is seen as red even depends upon which eye a person uses through which to observe that colour. In terms of events and their passage, it may seem that each event is unique, even if it is similar to other events. Could it be that one's personal experience can never be described by physics in ways that are based on periodicity?

At a level of personal and experiential analysis, time is not simply a phenomenon of investigative interest that may be studied within a paradigm of scientific reduction in which perfection of measurement is sought. It may be said that time, the continual passage of events, is a part of one's experiential reality and a factor in the process of organizing one's life. Unique features of the passage of time might be understood with a focus upon how periodicity is resident in that passage of time, but to do so at the expense of the experiential would be to miss an important aspect of the Onkwehón:we paradigm and how the passage of events is understood by Onkwehón:we peoples. As cited above, many scholars have reflected on the ways many Onkwehón:we peoples apprehend time in a way through which stories and experiences are central. Where scientists employ principles of periodicity to study/describe how to measure the continual passage of events, many Onkwehón:we peoples will speak of seasons, events, and generations and how passing/future events are a part of their lived experience.

This discussion is offered in the English language. The language employed to explore how one may apprehend the passage of events matters. It has been said that language conditions meaning and informs the constitution of worldview in rather important ways (Fontaine, 2025). When Battiste and Henderson (2000) referred to the cultural landscape of Onkwehón:we peoples, they described it as the "unique manifestations of Indigenous knowledge, heritage, and consciousness" (p. 35). The exploration of these manifestations may be best initiated through the meaning and cultural references that are resident in the languages of those peoples (Deer, 2025). If one wished to know what word or phrase a Kanienkeha'ka (Mohawk) person would use for the English word "time," one might use the term tsi nikahá:wi which may be understood to mean "It is now time" or "when it is time." There is no term that articulates the passage of time as a noun in this language in the way it appears in English. Although this is an observation of a particular concept as it is reflected in a particular Onkwehón:we language, this observation is generalizable to other Onkwehón:we language contexts. For some Onkwehón:we groups, temporalities are not reflected in simple terms that denote the passage of events only; in some cases, they reflect experience in the form of such things as kinship, continuity, and prophecy (Awasis, 2020).

Understanding time, whether in Western scientific terms or in those of Onkwehón:we peoples who observe non-linear orientations, may be difficult for us as conscious creatures not just because the theoretical aspects are complicated or that the experiential aspects do not lend to

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shared need for such things as temporal measurement. Instead, this discussion may cause us to confront that the difficulty is us and our limitations. Hoffman (2019) explored these limitations in ways that leads to a potentially uncomfortable notion: not only is it the case that human beings cannot accurately perceive and even understand ourselves, our universe, and phenomena of various sorts (including time), but if we did, it would be maladaptive for us.

To explore this, Hoffman (2019) employed the fitness-beats-truth theorem that posits that natural selection does not favour organisms that perceive reality as it truly is, but rather those that perceive reality in ways that enhance survival and reproductive success. In this view, accurate perception is often unnecessary and energetically costly. Instead, simplified, distorted, or strategically biased perceptions can offer faster and more adaptive responses to the environment. The theorem emphasizes the notion that the human mind has evolved perceptual and cognitive systems tuned not for truth, but for usefulness, filtering and reshaping the world into a set of symbols that guide effective behaviour rather than reveal objective reality. This means that even our most confident intuitions about the world may be deeply misleading, making the pursuit of truth far more difficult than our everyday experience suggests. It is within this neuroscientific framework that experience has an important part to play. However, it plays this part imperfectly because human experience is exactly that: imperfect.

Perhaps the fundamental problem regarding how human experience affects our understanding of time is best reflected by Rovelli (2017) who offered an interesting notion: we are not in time; we are time. It exists, as Ekong (2022) put it, within human experience. If it is important for us to consider Nagel's main point that consciousness requires one to consider if it is like to be something, then it is here where we ought to put forth a natural extension: it is like something to be Onkwehón:we. The perspectives that emerge from the unique manifestations of Onkwehón:we knowledge, heritage, and consciousness affect the views, conceptualizations, and analyses of our world, ourselves, and our relations. It also affects how we, Onkwehón:we, understand time.

This essay is intended to explore Onkwehón:we perspectives on time that may contribute meaningfully to ongoing discussions about how Onkwehón:we science may be understood. By foregrounding relational, cyclical, and experiential understandings of our world that differ from dominant Western scientific conceptions of linearity, it is hoped that educators will seriously consider such Onkwehón:we frames for inquiry. Drawing on Onkwehón:we and non-Onkwehón:we scholarship, this essay explored Onkwehón:we perspectives on time not merely as a quantifiable sequence of events, but as something embedded within experience including relationships with territory, ancestors, community, ecology, and future generations.

This essay suggests that Onkwehón:we science may be understood as a knowledge tradition grounded in lived experience, interdependence, and continuity rather than exclusively through reductionist frameworks. By examining how Onkwehón:we temporalities intersect with questions of experience, ecology, language, wellness, and cosmology, the discussion broadens the conceptual terrain through which science itself may be interpreted in educational contexts. Onkwehón:we science education is a developing field of study and practice. Conversations about Onkwehón:we science education may be enhanced by illustrating that differing understandings of scientific topics such as time are not simply cultural variations, but foundational epistemological perspectives that may deepen scholarly and educational dialogue concerning the nature, scope, and meaning of science within public schools.

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