

Research Essay

Why Time Flies When You're Having Fun

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Abstract

This paper distinguishes scientific and psychological time, and suggests how cycles of mentality define units of psychological time. This explanation explains the elasticity of psychological time and gives a broad account of the relationship between consciousness (mental activity) and time.

Key Words: time, consciousness, psychological time, la durée, Social Self, creativity, intentionality, subjectivity.

To the title question of this issue of JCER: "Time and Consciousness: Two Faces of One Mystery?" the short answer is, "No." Time is mysterious. Consciousness is mysterious. But that is not a sufficient basis to link them. However, there seems to be a deep connection between time and consciousness, even though they are clearly discriminable entities.

Why is it so difficult for a person to know what time it is? Why do we have clocks in every room of the office and the house, and just to be sure, wear a wristwatch? The computer, the cell phone, and the television constantly display the time. Radio stations report the time as a "public service." Even my coffee pot tells me the time. We have no trouble knowing where we are located in space, but for time, we need a lot of help.

This difficulty arises because psychological time, as experienced, is virtually unrelated to scientific time, the unrelenting arrow of Newton's clockwork universe that all our household clocks and calendars track. Exact, uniformly divisible scientific time is not a good fit to the continuous elasticity of psychological time, yet scientific clock time is what we use to coordinate our social lives. Scientific time is like the rigid plaster cast a doctor puts on a broken arm to constrain the movements of living tissue. We force ourselves to conform to scientific-social time, but like wearing the plaster cast, it is never going to be comfortable.

My main point in this essay is to distinguish psychological and scientific time then try to explain how psychological time arises from mentality. However, I will briefly stick my neck out to suggest that scientific time may not be a fundamental fact of the universe anyway, and can safely be ignored in considering psychological time.

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Scientific Time

The idea that the universe (at least the heavenly universe) might be a giant machine stems from the days of Kepler, who in the early 1600s, formulated exact laws of planetary motion. The heavens became autonomous, deterministic and predictable. Newton's *Principia* in 1687 and its theory of gravity congealed the idea of a clockwork universe. Although Newton never used that term, it became obvious to others that the new celestial mechanics was so well defined and exact, it was as if God had wound up a big clock at creation then stepped back to let the machine run its course. Oddly, Newton's equations are entirely reversible, making equal mathematical sense running forward or backward in time, so the metaphor of the clockwork universe does not quite work despite its grip on the philosophical imagination. However, Newton did assume, and his equations required, a master clock that made absolute time a fundamental fact of the universe. That is what allowed him to define simultaneity for events occurring anywhere in space.

Absolute time endured as a basic assumption of science until Einstein's theory of relativity proposed that time was not absolute. The rate at which a clock ticks depends on whether it or its observer is moving and how fast. That idea was used in making Einstein's prediction of the gravitational distortion of light, which was confirmed in observations of a solar eclipse. Newton's master cosmological clock was thus debunked.

The theory of general relativity does not use a universal clock. Frames of reference can be compared to each other without an absolute standard. Callender (2005) makes an analogy to money. Money is a convention that makes comparative valuation easier, but money is not a fundamental fact of nature. One could price a new car in units of hamburgers, as *The Economist* magazine sometimes demonstrates with exchange-rate theory (www.economist.com/markets/bigmac/). How many hamburgers would a dealer accept as payment for a new car? Ten thousand? Enough to feed a city for a month? The ratio of cars to hamburgers establishes the value of each, without reference to artificial money. In the same way, the units of time are social conventions that make comparisons of change easier, but that does not mean time is a fact of nature (see Sorli, 2010, for a technical version of this argument). Scientists do not agree whether time is fundamentally real or not. Time has been largely spatialized into the fourth dimension, space-time, in general relativity, but quantum theory seems to still need something like Newton's absolute time. Nevertheless, I wanted to cast some doubt on the idea, accepted by nearly everyone, except relativity theorists, that scientifically described time is a fact of nature. It may not be. It may be just a made-up convention of science.

Psychological Time

Whether scientific time is a natural fact or not, it has little to do with psychological time, which is a subjective estimate of experiential duration. Psychological time is highly elastic, depending

on the circumstances of experience. Time goes by very quickly when you are enjoying your activity. Who has not been surprised to see the clock after enjoying a party, a sports event, or watching a good TV show? It is widely known that interacting with a computer can consume hours of clock time when experientially, it might seem like only a few minutes. You can “lose track of time” altogether while reading an engrossing novel. Your mind is in a world of imagination where the time scale might be years or centuries, yet scientific clock time ticks along as before while you read. When you put the book down, the difference can be shocking.

Some experiences stretch psychological time beyond scientific clock time. Boredom makes psychological time move slowly, often excruciatingly so. A day at work is always longer than a day of recreation. I would guess that prison time is longer than time spent free. Music can slow down psychological time or increase it. Psychoactive drugs also can slow psychological time, although some increase its pace. Psychological time seems to run faster as we get older, and yet, in memory, individual episodes may seem like they went on forever. Dream time is a species of psychological time that seems to have no fixed relation to scientific time.

Time disappears altogether during dreamless sleep, anaesthesia, and certain meditative states. When you recover from such states, you may not know how long you have “been out” until you consult a clock or otherwise deduce the passage of clock time from waking context. We can all think of examples of how psychological time, as a subjective measure of the pace of lived experience, is highly elastic and not easily aligned with scientific time.

There is more to time than its pace. Scientific time also has qualities of continuity, duration, simultaneity, flow, and direction. It defines order, causality, repeatability, prediction, persistence, memory, infinity, history, and much else. Does psychological time have the same, or similar qualities and carry the same explanatory burden?

Psychological time has many of the qualities of scientific time, but they differ importantly from their scientific counterparts. For example, experiences can repeat in psychological time. We have no problem recognizing an experience we have had before. So repeatability is a quality defined by psychological as well as scientific time. Yet no experience ever repeats exactly. The memory of what happened before is not identical to what actually did happen, and in any case you, the person having the repeated experience, are different now than you were before, so the experience cannot be a replica.

This problem also occurs in science because the world is always changing. It was the basis of Heraclitus’ maxim that you can’t step into the same river twice. Scientists overcome variability with abstraction – often mathematical abstraction – as Newton did. However we do not have precise methods and language for abstracting (or even identifying) the essential features of experience. So, while repeatability is a roughly comparable feature of psychological and scientific time, the differences are significant.

Likewise, we can see that psychological time does have qualities of continuity, duration, simultaneity, flow, and direction, with important differences from scientific time. It is a project beyond the scope of this paper to detail all the characteristics of psychological time. This discussion is only meant to establish that there are similarities and important differences between scientific and psychological time and to propose that psychological time is generated by consciousness.

Bergson and Psychological Time

The French philosopher, Henri Bergson, was the first in the modern era to give a thorough analysis of psychological time. He was more than skeptical of scientific time; he rejected it altogether, saying it is merely a derivative of psychological time. He argued that the construct of scientific time is built from enumeration of simultaneous observations that occur in psychological time. While psychological time is elastic, the count of simultaneities is not (Bergson, 1889/2001), so he turned his attention to analysis of psychological time.

While Bergson's analysis of psychological time is rich and complex, I will focus on just three of his major points: the self-existent nature of psychological time, its inherent indivisibility, and the relationship between time and self. The first two of these I disagree with and in explaining why I hope to present better alternatives. On the third point, the relationship between time and self, I find an important point of agreement that will also, I hope, illuminate my own approach. First I will briefly describe these three points of contact.

Self-Existent Psychological Time?

Bergson called psychological time *la durée*, usually translated as duration, but since that also has scientific meaning, I prefer the unambiguous term, psychological time. For Bergson, psychological time is a fundamental, inherent quality of consciousness that provides continuity and sequence to mental events, enabling memory. And, since memory *is* consciousness for him, psychological time enabled consciousness.

Bergson's axiom of psychological time as a self-existent quality of mind goes back to Newton's absolute metaphysical clock, only now the clock was in the head. (Bergson wrote his dissertation on psychological time pre-Einstein). I will argue against the idea of a Newtonian clock in the head, but I do accept the fundamental status of psychological time. My objection is to supposing that the psychological clock is self-existent. Instead of supposing that mental activity conforms to the pace of an arbitrary psychological clock, I will propose that mental activity itself generates the clock.

Indivisibility of Psychological Time

Bergson emphasized that psychological time is indivisible. Whereas scientists can divide time into indefinitely smaller units, limited only by available measurement technology, psychological time, he said, is continuous and indivisible because moments of experience blend smoothly into each other. Perhaps Bergson was taking his cue from William James's (1890) stream of consciousness metaphor. While discrete episodes of psychological experience are discriminable, it is a mistake, Bergson said, to think of them laid out in a pre-existing homogeneous spatial medium, because experiences are not physical, not extended in space, and never wholly outside each other. Nor do experiences overlap, which is another inappropriate spatial metaphor. Instead, they interpenetrate and are thus indivisible. This explains why the past continuously flows into the present without any seams, gaps, joints or discontinuities.

I will argue instead that experience and therefore psychological time are in fact marked by sharp discontinuities. The obvious example of such a discontinuity is dreamless sleep, where psychological time does not even operate. Upon awakening one can deduce or estimate that time has passed, and how much, but during dreamless sleep itself there is not sufficient cognitive capacity to make such a judgment, so we say that no psychological time exists during that period. At the subpersonal level where psychological time begins, experience is also interrupted by discontinuities of unconceptualized experience, what Merleau-Ponty called "hollows of experience" (Merleau-Ponty, 1968, cited by Nixon, 2010, p. 37), or alternatively, periods in which there is a complete absence of all experience, what I have called "the black hole of non-experience" (Adams, 2010). As a consequence of these phenomena, psychological time is gappy rather than continuous.

Psychological Time and the Two Selves

Near the end of *Time and Free Will*, Bergson (2001) proposed that there are two different selves, which he called a fundamental self and a social self. The fundamental self is intuitively understood as one's sense of being alive, sentient, and psychologically developing. That description maps to what Damasio (1999) and Zahavi (2006) call the "core" self and what I have called the "sensorimotor self" (Adams, 2009). According to Bergson, it is the fundamental self in which indivisible psychological time flows continuously.

Bergson also identifies a social self, a conceptual, linguistic ego oriented toward the world. Numerous writers, including James (1890), Mead (1934) and others, have defined a similar social self. Bergson lamented that we live most of our socialized lives outside our fundamental self, "the Social Self hardly perceiving anything of ourselves but our own ghost—a colourless shadow..." (Bergson, 2001, cited by Gunn, 1920, Ch. VI). Since the Social Self is oriented toward the world, most of our life seems to unfold in space rather than in time, he noted.

This discrimination of two selves is critical to my discussion of how psychological time is generated by the nonintellectual, nonlinguistic, largely unconceptualized sensorimotor self (Bergson's fundamental self) and how it is then interpreted by the social, intellectual social self.

How Consciousness Generates Time

It is helpful to imagine a structural model of mental activity analogous to a storage battery (Adams, 2010). Two poles, or electrodes, are separated by a directional flux that completes a cycle. The poles of mental activity are subjectivity and objectivity. That is a dualism, but not a Cartesian dualism. This dualism says nothing about mind and matter. It is only about the internal structure of mental activity.

The Structure of Mental Activity

In any mental activity, the subjective pole initiates each cycle. In perceptual observation, for example, it is the observer that does the observing. The observed object is passive. It doesn't "do" anything. That is true even if the targeted object is a memory or a feeling. This principle is consistent with James's (1912) description of mentality, in which mental events had to pass through memory to become static, passive, mnemonic objects before they could float down the stream of consciousness and be apprehended by the introspecting ego.

The subjective pole of mentality is active because it is inherently self-relating (Adams, 2005). Subjectivity knows that it exists, and it exists in a state of self-knowing. This intuition is what motivated the Cartesian cogito: I think, therefore (I cannot doubt that) I am. Subjectivity's knowledge is *proto-knowledge*, where *proto-* means the earliest, most primitive form of something that can be hypothesized or inferred. Proto-knowledge is not knowledge in the ordinary sense, but the condition needed for ordinary knowledge. Proto-knowledge of its own existence is what defines subjectivity's self-relatedness.

Subjectivity exercises its self-relatedness by directing intentionality toward its alterity, objectivity. Intentionality is the most basic form of attention, a proto-attention. For example, it is the minimum mental relationship between an observer and observed. Intentionality is directional (always from subject to object) and effortful, which is why we talk about "paying" attention.

Intentionality must be satisfied to complete a mental cycle. A technical term for that satisfaction is accommodation (Adams, 2005). When it occurs there is a moment of subjective self-recognition that closes the loop of the mental act by satisfying its intentionality. In ordinary terms we might think, "Yes, that is what I was looking for," or, "I recognize this situation," or, "I created this thing." Without accommodation, intentionality remains unsatisfied and the mental act incomplete.

Accommodation differs from ordinary recognition in that it involves *self*-recognition alongside recognition of the object. It is a simultaneous recognition of two entities, not just one. Bergson (2001) hinted at a similar phenomenon: "*La durée* is the continuous progress of the past which gnaws into the future and which swells as it advances, leaving on all things its bite, or the mark of its tooth" (cited by Gunn, 1920, Ch. VI). I usually think of a patina of objectified subjectivity covering recognized objects, but I like Bergson's metaphor of subjectivity recognizing its tooth marks on things. In ordinary experience, the self-recognition of accommodation constitutes the subjective feel of the experience, or as philosophers say, "what it is like" to have that experience.

Stopping and Starting Time

At the moment of accommodation, the intentional act is satisfied, complete, essentially canceled. At that moment, the cycle of mental activity is finished. Subjectivity is no longer in relationship with objectivity, and, without that bipolar structure, there is no mental activity. If there is no mental activity, there is no experience. If there is no experience, there is no psychological time. Time stands still each time we complete a mental cycle.

We can identify that moment of stillness when it occurs just before the "aha!" phenomenon. I propose that it is also the stillness of zazen and other meditation. It is also the stillness of death. It is also the stillness of what I have described as the "black hole" of non-experience that defines nirvana, samadhi or "enlightenment" (Adams, 2010).

Moments of absolute stillness occur all day every day, each time we understand or recognize something; each time we complete a mental act. But we don't notice these moments of timeless emptiness because they are not experiences. They are the opposite of experience, the complete absence of experience. They are black holes, or discontinuities in experience. So we skip over them in our understanding of experience.

Once experience has stopped, how does it ever get started again? Subjectivity starts up the next mental cycle with a spontaneous, creative act. It projects an objectification of itself into the landscape of objectivity. That creative move is an inherent capacity of subjectivity, an eruption of the internal tension between knowing and being that constitutes its self-relatedness. That move is the foundation of all human creativity (Adams, 2005). I have called the process of creative self-objectification *psychological projection*, and elsewhere described how it works (Adams, 2005).

With subjectivity once again linked to objectivity, the bipolar structure of consciousness is restored and experience can resume with the subjective issuance of a normal intentional act targeting some aspect of objectivity. Another mental cycle then occurs, and the process of mentality continues, in tiny loops of activity, as the apparent flow of experience progresses, seemingly continuously, but actually via these discrete quanta of mentality.

This is the basis on which I disagree with Bergson's hypothesis that psychological time is indivisible. Experience is analyzable into these quanta of cyclic mental acts. In principle, where there is experience, it has duration, and when there is no experience, just after the moment of accommodation, there is no duration. Therefore, psychological time is not continuous, but lumpy, down to an ultimate granularity defined by the smallest single cycle of mental activity. However, in the ordinary experience of the Social Self, it *seems like* experience is continuous.

The Ticking of Psychological Time

Psychological time seems continuous in ordinary experience because we have been taught that it is. The Social Self is socialized. We understand experience to be a continuous stream just as we understand vision to reveal a coherent scene. But as research has shown (e.g., Noe, 2004), only very fragmentary visual information is available at the retina and visual cortex at any one moment, so our impression of seeing a smooth, full scene is entirely illusory, just a mental (or neurological) construction, not the fact we believe it is. Conversely, our perception of a scene may include large, obvious, and even bizarre elements that we do not notice because they don't fit with the scene being constructed to meet expectations (Simons & Chabris, 2010). The inexorable conclusion is that the convincing impression we have of the visual world as a continuous, coherent plenum, is merely a construction understood by the Social Self, not a fact directly perceived.

The situation is analogous with psychological time. We construct, tacitly in the Social Self, the understanding and then the intuition, of continuous experience, as Bergson described. However in my interpretation of that thesis, psychological time is discontinuous because experience is. Furthermore, since mental cycles can have different durations, the ticks of the psychological clock are variable.

The duration of a mental cycle is a judgment we social selves make retrospectively, applying the construct of scientific time to mental experience. A mental cycle itself simply takes as long as it takes. There is no aspect of duration embedded in its operation as experienced. But considered from the social self perspective, we realize that the intentionality it takes to glance up at the clock on the wall is satisfied with the flick of an eye, and the more encompassing intention to determine "what time it is" runs only a second or two longer before it too is satisfied. Going to the store to buy milk takes considerably more clock-time to satisfy the most encompassing intentionality of that plan. Intending to earn a Bachelor's degree from a university takes even more clock time to satisfy. So, while it is difficult to use scientific time to precisely measure the duration of individual mental cycles, it is clear that there are differences among them, and that the duration of a mental cycle of intentionality and accommodation is variable with respect to clock time.

Rather than force the construct of scientific time onto mental activity, it makes more sense to say that the cycles of mental activity themselves define the units of the psychological clock. That would account for the apparent elasticity of psychological time, which should be seen, not

as anomalous with respect to scientific time, but as completely consistent with the pace of experience that drives it.

Psychological time is thus manifest in proportion to what you are doing, whether behaving purposefully, perceiving, talking, or thinking. If you are not doing anything, you are not exercising intentionality, not churning through those mental cycles. If mental activity is at a low level, psychological time is drawn out, compared to scientific time, because mental activity defines the units of the psychological clock. We can see therefore that psychological time does not inexorably “pass” as does the time of Newton’s cosmological clock, but is created at a rate proportional to mental activity. In intense mental activity, psychological time runs faster (as later adjudged by the Social Self). At low levels of mental activity, psychological time runs slower (compared to scientific time). At zero level of mental conscious activity (dreamless sleep, for example), psychological time is undefined.

The Mainspring of Psychological Time

The pulsing of psychological time arises, as described, from cycles of mental activity. But what drives those? Ultimately, mental activity is driven by the nature of self-relating subjectivity. Subjectivity is not a static complementarity of knowing and being, but is animated in such a way that the epistemological function strives to subsume its own existence. In other words, knowing strives to overcome its alienation from being. Sartre (1947) used analogous concepts to propose that the project of the *pour-soi* is to eliminate the *en-soi* by becoming all-encompassing (even though that is impossible). Hegel (1807/1967) said that the mission of subjectivity is to “sublate,” or actually destroy, objectivity. The point is that subjectivity’s self-relatedness entails a directional dynamic intended to eliminate its alterity, to overcome objectivity by somehow converting it all into subjectivity. As far as we know that is a feat not possible to achieve, but, nevertheless, that dynamic is the driver of intentionality. The energy of that dynamic is conceptualized in ordinary (social self) experience as psychological motivation. Thus at the bottom of the explanatory stack for psychological time is this motivational principle: knowing strives to consume being.

Conclusion: Time and Consciousness

Can we imagine time without consciousness (mentality)? Scientists who believe in the view from nowhere can imagine autonomous, self-existent time. Isaac Newton certainly did. Modern physicists are less sure. But my proposal is that for psychological time at least, time without mentality is unimaginable.

Conversely, can we imagine consciousness without time? Here, scientists have nothing to say, because consciousness is not scientifically observable or measurable. From introspective observation, we can describe certain experiences as virtually, or seemingly timeless, but that is only metaphorical talk. As I have described the relationship between psychological time and

mentality, time is a consequence of mental activity when experience is retrospectively conceptualized by the Social Self. If experience is not so conceptualized, it is as if it didn't happen because it remains unknown to consciousness, and from that perspective, has no duration, no time.

Finally, if experience is interrupted, psychological time is stopped, because psychological time is generated by units of mental activity. Because of these interdependencies between time and consciousness, we can conclude that the two phenomena are distinct but deeply related.

In the interest of brevity I draw this discussion to a close at this point. I have distinguished scientific and psychological time, and suggested how the cycles of mentality define the units of psychological time. This explanation accounts for the elasticity of psychological time and explains the relationship between consciousness (mental activity) and time.

What I have omitted is discussion of memory, and related phenomena that arise from it, such as one's sense of continuous self-identity over the span of psychological development. That remains a project for another time, so to speak.

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