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Cognitive Implication of Globality via Temporal Inversion

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Illusory projection along the arrow of time?

There is a widespread, if not dominant, strategic concern with the future and its prospects. This naturally takes a variety of forms. These include anxiety over prospects of collapse, articulation of remedial proposals and plans, emphasis on the vital importance of growth, and promotion of the need for change and transformation. Less evident are various agendas for a New World Order and anticipation of the arrival of a saviour of some kind, whether framed as new leadership, artificial intelligence, a prophesied Messiah, or extraterrestrials.

Whatever the framing, this implies a collapse of the old order at a singularity in time -- however any newly emergent order is then to be understood. These prospects elicit preoccupation with control and the implication for governance -- however this may be related to the "international community" and the appeals now made to it (*International Community as God or Sorcerer's Apprentice?* 2015).

The present is also witness to various strategies of escaping to elsewhere. These may include back to nature, gated communities, transfer to seaholdings, shift to other planets -- or to other galaxies. Following various spiritual traditions, these may take the form of retreating to intentional and meditative communities, including ecosteries. The direction of escape may however take the form of an escape to the past or to the distant future -- however this may be imagined and cultivated. Use of psychoactive drugs may be valued in this respect.

In the "enhanced interrogation" that this collectively implies, there is a sense of being painfully stretched on a "rack of time:" within the current reality -- whether stretched to 2030, to 2050, or to 2100 -- and reinforced by contractual arrangements over time. Locked into this linear reality, there is very much the sense of "doing time" -- a common jargon description of incarceration.

The requisite forms of change and adaptation envisaged imply their own form of pain for many, as might be inferred from the recent articulation by [Kevin Kelly](#) (*The Inevitable: understanding the 12 technological forces that will shape our future*, 2017).

The role of the "missing" in human evolution has been highlighted by [Terrence Deacon](#) (*Incomplete Nature: how mind emerged from matter*, 2012). It is then useful to ask whether there is a dimension -- or a kind of dimensionality -- which is somehow "missing" from such framings of time. Does the existing framing of change and growth constitute a form of distraction -- obscuring a significant degree of misdirection?

Could this be explored as a peculiar kind of confidence trick -- possibly involving a degree of paradox? Is there a form of "big lie" to be recognized in this misdirection, as can be variously argued (*Existential Challenge of Detecting Today's Big Lie: mysterious black hole conditioning global civilization?* 2016; *Global Economy of Truth as a Ponzi Scheme: personal cognitive implication in globalization?* 2016; *Lipoproblems: Developing a Strategy Omitting a Key Problem*, 2009; *Vigorous Application of Derivative Thinking to Derivative Problems*, 2013).

The concern in what follows is how a sense of a missing dimension is already recognized and valued to a degree -- however faintly and variously. The question is therefore how this might be related to a different understanding of time and to the clues which are offered to

that experience. In other words, is there a formal articulation which could offer an indicative framework for imaginative experiential engagement with a quite different sense of "temporal direction"? Can the future be rendered present "otherwise"?

This would be distinct from the implications of the linear "[arrow of time](#)", or even of recent indications of the possibility of its "reversal". The possibility of other ways of thinking about such matters has long been given a degree of focus by the imaginative appeal of some popular science fiction (such as the extraterrestrial [Time Lords](#) of *Doctor Who*) and of the famous children's tale by [Lewis Carroll](#) (*Alice's Adventures in Wonderland*, 1865; *Through the Looking-Glass, and What Alice Found There*, 1871). The latter framed access to a strange world through a "rabbit hole" -- itself a notable inspiration for the controversial "documentary" *What the Bleep! Down the Rabbit Hole - Quantum Edition* (2006). Is there indeed some way of passing through the mirror, as can be otherwise argued (*Stepping into, or through, the Mirror: embodying alternative scenario patterns*, 2008).

Clearly it could be argued that the failure of systems of governance to encompass effectively the challenges of the times could be attributed in part to reliance on assumptions inspired by Newtonian understandings of force and time -- despite their limitations. Hence the multiplicity of essentially simplistic references to "change" and the desperate quest for growth "acceleration". **The obvious instabilities which become evident merit reframing in the light of higher derivatives of time as explored by physics** -- and otherwise variously described in terms of temporal inversion or negative powers of time

There is a nice irony in the terminology of physics in that the emergence of such instabilities as "ghosts" is understood as needing to be constrained by more insightful models. These "ghosts" are equivalent to the "snakes" recognized as undermining viable nuclear fusion as the much-anticipated energy source of the future. They bear comparison with the "[animal spirits](#)" famously identified by [John Maynard Keynes](#) as undermining conventional economic models. Provocatively, they also recall critical use of the phrase "[ghost in the machine](#)" -- in this case in the "Newtonian machine".

Although readily assumed to be abstruse, the irony is all the greater in that the terms used by physics for such higher order derivatives -- **jerk, jolt, jounce, snap** -- are commonly used with respect to psychosocial systems and the intuitive understanding of their dynamics. These include the thrills of roller coasters and trampolines (as cited by one physicist). Whereas "jerk" and "jolt" tend to be associated with the problematic, "jounce" as a synonym of "bounce" is even indicative of dynamics much valued in living systems, as with resilience ([Jim Brosseau](#), *Jounce: crafting a resilient life in an increasingly chaotic world*, 2014).

However, with that exception, **little use has as yet been made of these insights as they might apply to a more orderly understanding of "change" and the "acceleration" of the forms of social transformation so desperately sought**. Comprehension of the significance of those terms is typically confined to the "mechanical" experiences of daily life of "being jolted", or in the jargon phrase of being "jerked around" -- when change processes exhibit inadequacies and people are "jolted" by starkly uncomfortable new realities. Curiously both revolution and revelation -- whether appreciated or deprecated -- might be better understood in terms of such temporal inversion.

The [processes](#) identified by [Keven Kelly](#) (2017) might indeed be framed problematically by such language. It is not surprising that many leaders are readily described as "jerks", with a notably propensity for "jerking off". If physics has seen fit to devise a "[jerk meter](#)" (now available as a smartphone app), is the failure of the social science models to encompass "jerks" an indication of a lack of realism -- even a degree of oversimplistic naivety?

Beyond the sense of [structural violence](#), this suggests that higher derivatives of time could lead to greater understanding of "temporal violence" ([Eric J. Haanstadt](#), *Violence and Temporal Subjectivity*, *AnthroSource*, 34, 2009; [Luc Reychler](#), *Time for Peace: the essential role of time in conflict and peace processes*, 2015). Related concerns have been framed in terms of time wars by [Jeremy Rifkin](#) (*Time Wars: the primary conflict in human history*, 1987) -- the focus of a recent conference (*Time Wars, Thinking Together*, Berlin 2018).

It has been argued, for example, that **terrorism is fundamentally temporal violence**. There is clearly a need for insight of a "higher order" of some kind (*Global Incomprehension of Increasing Violence*, 2016). Is a more fruitful approach to violence then to be discovered "outside time" as conventionally understood?

However **the primary concern here is with the opportunities offered for the individual by an as yet unexplored "direction" in time -- one of "higher dimensionality" and greater "intensity"**, of which "down the rabbit hole" is but one appropriate indication in an increasingly surreal global reality.

Visual indication of the cognitive challenge of a "hole" in time

The argument can be variously presented. Later sections, which indicate more familiar ways of approaching the basic argument, could indeed be read prior to the initial focus on time. The following images endeavour to provide a visual framework for the basic argument.

There is now a degree of familiarity with the mysterious nature of the [black holes](#) of astrophysics. As summarized by *Winkled*:

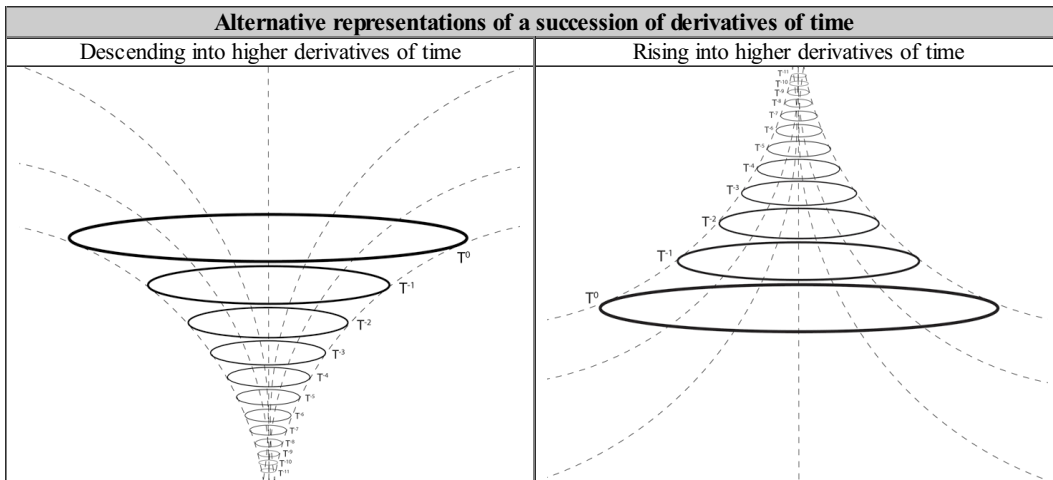
A black hole is a region of spacetime exhibiting such strong gravitational effects that nothing -- not even particles and electromagnetic radiation such as light -- can escape from inside it. The theory of general relativity predicts that a sufficiently compact mass can deform spacetime to form a black hole. The boundary of the region from which no escape is possible is called the [event horizon](#). Although the event horizon has an enormous effect on the fate and circumstances of an object crossing it, no locally detectable features appear to be observed

The concern in what follows is with a cognitive event horizon -- effectively a cognitive modality imperceptible to others. It is the boundary at which the attraction of what is sensed as "massive" becomes so great as to make it impossible to envisage any alternative (other than by the skills of such as [Lewis Carroll](#)). Cognitively the experience may be compared to "falling in love" -- whether with a

person or a belief. In astrophysics emphasis is placed on the acceleration in velocity in approaching a black hole -- namely a switch in emphasis from T^{-1} to T^{-2} , as higher derivatives of time.

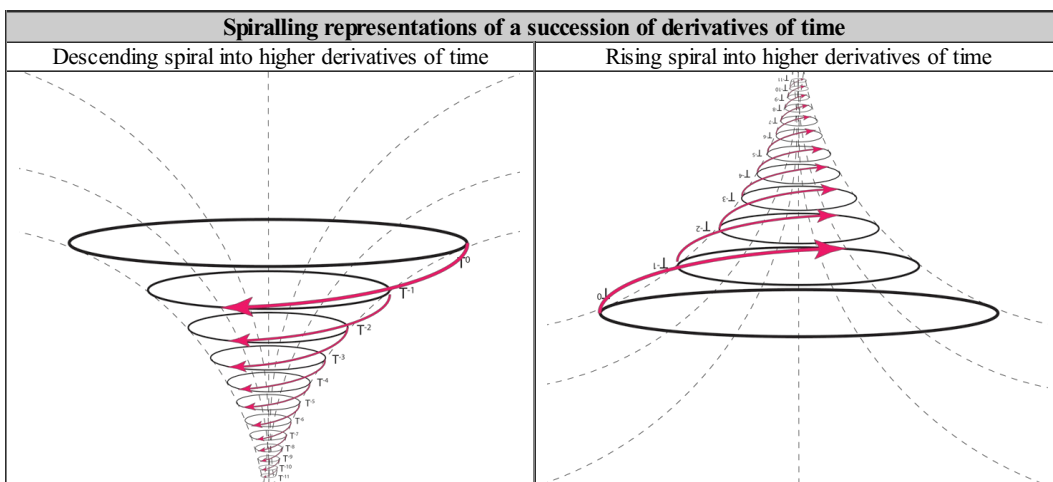
The question explored here is **what happens cognitively "after acceleration", namely the even greater intensity of experience associated with even higher derivatives of time** -- T^{-3} , T^{-4} , T^{-5} , and thereafter. How is that "direction" to be experienced cognitively, and how is that to be meaningfully communicated? The following images offer some indication of this.

The image on the left uses the convention of a "hole" into which one falls -- a "rabbit hole". How indeed could such a cognitive rabbit hole be usefully represented? That on the right uses the convention favoured by the sense of being "beamed up" -- or possibly of "being enraptured". Both frame ever higher orders of "acceleration". These are successively higher derivatives of time in response to what can be more generally framed as an "attractor".



As noted below, the powerful attraction of human values could themselves be explored in such terms (*Human Values as Strange Attractors*, 1993). The ever increasing intensity might be usefully framed in terms of "time-binding" -- anticipating the reference below to the set of "wrapped up" **extra dimensions** recognized by physics with respect to the increasing dimensionality of string theory.

As is well recognized in the case of the black holes of astrophysics, associated with "falling in" there is a spiralling motion -- rather than simply falling directly down. Arguably this also applies to the alternative metaphor of "rising up". This vortical motion is well recognized in whirlpools and cyclones. These suggest representations of "cognitive whirlpools" and "cognitive cyclones" with respect to ever more intense experience of time -- perhaps partially recognized in the psychodynamics of crowds.



The above schematics are necessarily only selections of possibilities -- whether with respect to use of the vertical dimension or to the chirality of the spiral. Other significance would be associated with the horizontal dimensions of the disks -- from larger to smaller or from smaller to larger (as suggested by animations below).

Cognitive mystery of the "hole": Valuable insights with respect to the requisite flow of attention are available from the design requirements of **nuclear fusion reactors** currently under development to recreate the "power of the sun". These call for avoiding any contact between what flows and what contains that flow (*Enactivating a Cognitive Fusion Reactor: Imaginal Transformation of Energy Resourcing (ITER-8)*, 2006; *Implication of Toroidal Transformation of the Crown of Thorns: design challenge to enable integrative comprehension of global dynamics*, 2011). The flow of plasma within the toroidal container recalls the form of the ouroboros and the possibility of its animation in 3D (*Complementary visual patterns: Ouroboros, MÖbius strip, Klein bottle; Circular configuration of cognitive phases framing toroidal experience?*).

Whether as a torus, an ouroboros, or a spiritual halo, what is the cognitive significance of the "hole" through which people are born and through which they "pass away" -- individually or collectively -- as suggested by the schematics above and below? There is clearly the implication that it is a multidimensional hole of some dynamic form -- rather than to be oversimplistically understood in static terms.

Of particular relevance is the remarkable exploration by [Roberto Casati](#) and [Achille C. Varzi](#) (*Holes and Other Superficialities*, 1994) -- with respect to the borderlines of metaphysics, everyday geometry, and the theory of perception (reviewed by Steven A. Gross, *What's in a Hole? The Harvard Review of Philosophy*, 1994; see [entry on holes](#) in the *Stanford Encyclopedia of Philosophy*). As discussed separately, they seek to answer two basic questions: Do holes really exist? And if so, what are they? (*Cognitive mystery of holes, lacunae and incompleteness; Nature of metaphysical and theological holes; Cognitive and experiential black holes*, 2014).

The subtlety of a "hole" can be recognized to some degree through the symbolism associated with a ring (*Engaging with Globality through Cognitive Circlets*, 2009). This is also evident in the choice of "ring" or "circle" to describe rather particular forms of psychosocial organization, especially those which are difficult to detect and whose relationships can only be inferred. The most obvious example is a criminal "ring".

There is a peculiar resonance to the phrase "a hole in time". This is reinforced by the fundamental challenge of time for physics (George Musser, *A Hole at the Heart of Physics*, *Scientific American*, 287, 2002). Strangely however, physicists now claim to have created such a hole using the temporal equivalent of an invisibility cloak (*Punching a Hole in Time*, *Skeptical Science*, 22 July 2011).

Paradox of linear versus circular time: strange loops

Time: linear versus circular? Reference is frequently made to the linearity of the "arrow of time". However as to whether time is to be understood as linear or circular remains a matter of continuing debate, as well as a cultural preference

- *Time (physics): Is time linear or circular?* (*Quora*, 2016)
- Mark Sundaram: *Linear and Cyclical Time: Time's Arrow or Boomerang?* (*The Endless Knot*, 11 June 2013)
- Jeff A. Benner: *Concepts in Time* (*Ancient Hebrew Research Center*)
- Miguel Angel Luque Fernandez, et al.: *Modelling Time as a Circular Scale* (Harvard School of Public Health, 2014)

The circularity of time is also fundamental to understandings of [eternal return](#), namely the theory that the universe and all existence and energy has been recurring, and will continue to recur, in a self-similar form an infinite number of times across infinite time or space. This recurrence has been traditionally depicted by an Ouroboros, as separately discussed (*Complementary visual patterns: Ouroboros, Möbius strip, Klein bottle*, 2017). That discussion highlights the toroidal hole which is thereby framed -- whose mysterious nature bears consideration in the light of the above-mentioned arguments of Roberto Casati and Achille C. Varzi (*Holes and Other Superficialities*, 1994).

Confusing negativity: time reversal versus time inversion? Much has been made of the irreversibility of time, despite theoretical recognition of [time reversal symmetry](#), the [time reversibility paradox](#), and exploration of its possibilities in fiction. It has recently been demonstrated that time can indeed be reversed (*'Arrow of time' reversed in quantum experiment*, *ScienceNews*, 27 November 2017; *Physicists Demonstrate How to Reverse the Arrow of Time*, *MIT Technology Review*, 22 December 2017; Kaonan Micadei, et al, *Reversing the thermodynamic arrow of time using quantum correlations*, *arXiv.org*, 9 November 2017). Such thinking also extends to [retrocausality](#) (Mike McCrae, *This Quantum Theory Predicts that the Future might be Influencing the Past*, *ScienceAlert*, 17 June 2018)

Such reversal can be explored in terms of understandings of "negative time" (*Does anyone know whether or not negative time exists. in any way shape or form*. *PhysicsForums*). For Paul Kiser:

The ramifications of Negative Time exceed what we can imagine and challenge our foundations of science, philosophy, religion, business, in fact, all aspects of life as we know it. It is a concept that is a long way from becoming provable in our experience of the universe, but the possibility of Time being a two-way phenomenon is exciting...even if it makes my head hurt. (*Negative Time: the self-fulfilling prophecy a scientific possibility?* PAULx, 27 September 2010)

Such understanding of negative time is readily confused with the implications of higher derivatives of time as indicated above. The confusion is highlighted by the argument of Jerry Davidson Wheatley *The Structure of Reality: Theory of Everything Equation Revealed : Scientific Verification and Proof of Logic God Is*, Research Scientific Press, 2001

The CPT theorem is the magic mirror needed to understand cosmic structure. However, its meaning has not always been clear. A puzzling problem for scientists has been difficulty in assigning meaning to temporal inversion. The difficulty is caused by two circumstances. One is confusion of temporal inversion with temporal reversion. Temporal reversion occurs in an inverted universe. The other circumstance is finding the "missing antimatter" exhibiting temporal inversion. Specifically, inversion allows a mirror image cosmos that balances the requirements of symmetry. When one cosmos is in Phase I, the other is in Phase II. Our anti-cosmos is always in an opposite phase from our own. This explains why a balancing of matter by antimatter has not been empirically determined.... Although intimately connected, temporal reversion and temporal inversion are different phenomenon. (p 190-1)

Temporal inversion is a common feature in narrative (*Which way you Going? : Some Examples of Temporal Inversion and Narrative Structure*, *Hap Stance Dep Art*, 28 February 2011). Curiously, despite the comprehensive scope of some studies of time, no consideration is given to higher derivatives of time as discussed here (Michael Lockwood, *The Labyrinth of Time: introducing the universe*, 2005; Philip Zimbardo, *The Time Paradox: the new psychology of time that will change your life*, 2008; Roger Penrose, *Cycles of Time: an extraordinary new view of the universe*, 2012).

Singularity: There is extensive comment on the variety of [forms of singularity](#) as an effective disruption of either linear or circular time. A singularity is discussed in relation to succeeding derivatives introducing units of increasing negative powers of time (Kent H. Lundberg,

Haynes R. Miller, and David L. Trumper, *Initial Conditions, Generalized Functions, and the Laplace Transform Troubles at the origin*, MIT)

Of relevance here is insight into the possible nature of psychosocial singularities, as may be variously discussed (*Cognitive singularities*, 2005; *Emerging Memetic Singularity in the Global Knowledge Society*, 2009; *Aesthetic singularity prior to Technological singularity?* 2014; *Jerusalem as a Symbolic Singularity: comprehending the dynamics of hyperreality as a challenge to conventional two-state reality*, 2017).

Circumscribed time and porous time: The notion of a temporal logic has recently been introduced to characterize sets of organizing principles that perpetuate particular orientations to the lived experience of time. (Melissa Mazmanian, Ingrid Erickson and Ellie Harmon *Circumscribed time and porous time: logics as a way of studying temporality*, 2015). For the authors:

We identify a dominant temporal logic, *circumscribed time*, which has legitimated time as *chunkable*, *single-purpose*, *linear*, and *ownable*. We juxtapose this logic with the temporal experiences of participants in three ethnographic datasets to identify a set of alternative understandings of time -- that it is also *spectral*, *mosaic*, *rhythmic*, and *obligated*. We call this understanding *porous time*. We posit porous time as an expansion of circumscribed time in order to provoke reflection on how temporal logics underpin the ways that people orient to each other, research and design technologies, and normalize visions of success in contemporary life.

The approach is explicitly framed in terms of a "temporal inversion" -- moving time from its usual position in the background up into the foreground of the research.

Paradoxical strange loops: Cybernetics has drawn attention to [positive feedback loops](#) and [negative feedback loops](#) -- fundamental to that discipline of control. (Magoroh Maruyama, *The Second Cybernetics: deviation-amplifying mutual causal processes*, *American Scientist* 51, 1963, 2, pp. 164-179). However, as argued by Timothy Morton (*Dark Ecology: for a logic of future coexistence*, 2016):

Yet there is another loop, the dark-ecological loop: a strange loop. A strange loop is one in which two levels that appear utterly separate flip into one another. Consider the dichotomy between moving and being still. In Lewis Carroll's haunting story, Alice tries to leave the Looking Glass House. She sets off through the front garden, yet she finds herself returning to the front door via that very movement. A strange loop is weirdly weird: a turn of events that has an uncanny appearance. And this defines emerging ecological awareness occurring to "civilized" people at this moment.

Alice: *Which way should I go?* / Cat: *That depends on where you are going* / Alice: *I don't know* / Cat: *Then it doesn't matter which way you go.* (*Alice in Wonderland*).

Leigh Van Valen coined the [Red Queen hypothesis](#) in the light of his interpretation that species have to "run" or evolve in order to stay in the same place, or else go extinct. The phenomenon's name is derived from a statement that the [Red Queen](#) made to Alice in her explanation of the nature of Looking-Glass Land:

Now, *here*, you see, it takes all the running you can do, to keep in the same place (*Through the Looking-Glass*).

The preoccupation with the acceleration of global growth might be usefully seen in this light. Is "sustainability" then to be framed in terms of growth or acceleration of growth? (Gregory Unruh, *Red Queen Sustainability*, *The Huffington Post*, 27 September 2011; Christian Rammel, *Sustainable development and innovations: lessons from the Red Queen*, *International Journal of Sustainable Development*, 6, 2003, 4).

Related inspiration has been used in the argument of Michael Hiscock (*Alice in Wonderland, NASA and Einstein: all have something very strange in common -- down the rabbit hole we go...The Loop*, 26 November 2015). That understanding has also been explored in fiction with respect to the construction of a vessel capable of spacetime travel (M. A. Foster, *The Game Players of Zan*, 1977), as discussed separately (*Converging preoccupations with time; Enabling the cognitive vehicle*, 2010).

As discussed elsewhere with respect to imaginal education, vital to sustaining [community 'renaissance'](#) (*Imaginal Education: game playing, science fiction, language, art and world-making*, 2003), the challenge of sustainability may in part be one of constructing a 'timeship' rather than a 'spaceship' (*Timeship: conception, technology, design, embodiment and operation*, 2003; *Embodying a Timeship vs. Empowering a Spaceship*, 2003). In contrast to 'standard operating procedure' -- and rather than an *Operating Manual for Spaceship Earth* (as articulated by R. Buckminster Fuller) -- the governance challenge may be simultaneously a case of spaceship, timeship, both-[spaceship-and-timeship](#), and neither-[spaceship-nor-timeship](#).

Being a strange loop: As author of a *magnum opus* on self-reflexivity (*Gödel, Escher, Bach: an Eternal Golden Braid*, 1979), Douglas Hofstadter, explored those insights as they applied to his sense of personal identity (*I Am a Strange Loop*, 2007). This can evoke fruitful reflection on the collective implications of strange loops (*Sustaining a Community of Strange Loops: comprehension and engagement through aesthetic ring transformation*, 2010).

A related approach is central to the work of Steven M. Rosen with respect to the cognitive paradoxes associated with the Mobius strip and the Klein bottle:

- *Topologies of the Flesh: a multidimensional exploration of the lifeworld* (2006)
- *Dimensions of Apeiron: a topological phenomenology of space, time, and individuation* (2004)

- *Science, Paradox, and the Moebius Principle: the evolution of a "transcultural" approach to wholeness* (1994)

Given the references above to the mysterious nature of "holes", it is especially intriguing to consider the nature of the "hole" framed by a strange loop.

Being a "walking wave function": The possible implications may be taken further in the light of the challenges to conventional understandings of identity emerging from considerations of quantum reality as articulated by [Alexander Wendt](#) (*Quantum Mind and Social Science: unifying physical and social ontology*, 2015; [video](#); [interview](#)). Wendt argues that [quantum consciousness](#) theory is speculative, but compared to the alternative its simplicity is hard to beat (p. 292). He concludes with a bold claim: "whatever their current force as explanatory virtues, the coherence, breadth, and simplicity of the quantum hypothesis make it *too elegant not to be true*". (p. 293).

Fortunately or unfortunately, speculation with regard to "quantum consciousness" has become fashionable in many domains -- seemingly to little effect with respect to understanding of global crises. Wendt offers a quantum model of man in sections on [quantum cognition](#) and rational choice, agency and quantum will, and non-local experience in time. The points made are remarkably argued.

Given the limitations of Newtonian mechanical models highlighted above, Wendt argues that:

The idea that people are just very complicated machines has a long pedigree, and became dominant in cognitive science and beyond with the advent of the computational theory of mind in the mid-twentieth century. In this picture we are walking computers, constantly crunching data from the environment to realize pre-programmed objectives. (p. 153)

As discussed separately (*On being "walking wave functions" in terms of quantum consciousness?*), Wendt imagines a contrasting perspective, variously stressing that humans are effectively **walking wave functions**:

In this book I explore the possibility that this foundational assumption of social science is a mistake, by re-reading social science "through the quantum". More specifically, I argue that human beings and therefore social life exhibit quantum coherence -- in effect, that we are walking wave functions. (p. 16)

Wendt develops this argument from various perspectives in response to existing schools of thought:

Quantum consciousness theory suggests that human beings are literally walking wave functions. Most quantum decision theorists would not go that far, and indeed -- perhaps wary of controversy -- they generally barely mention quantum consciousness, and then only to emphasize that they are making no claims about what is going on deep inside the brain (much less about consciousness), but are only interested in behavior. (p. 164)

With respect to how humans exist over time, beyond any patterned slice in the moment, Wendt argues:

If we are walking wave functions, then even though our experiences at each moment are actualities, at the quantum level of the unconscious, "there are many histories that are there as potentialities". (p. 211)

Clues to distinguishing "degrees of intensity"

The following clusters of distinctions are adapted from *Cognitive implication in contrasting modalities* (2018).

Degrees of learning: The sense of a learning cycle is fundamental to the piloting a helicopter in the articulation of Arthur M. Young (*The Geometry of Meaning*, 1976):

- To know the position of a body in space, we need *one* instantaneous observation...
- To know its velocity, which is computed from the difference in position of the body and the difference in time between the *two* observations, we need two such observations
- To know its acceleration, we need *three* observations
- To know that a body... is under control, and to distinguish it from one in which the controls are stuck, we need at least *four* observations...
- To know the destination, provided the operator does not change his mind or try to fool us, we need *five* observations
- To know the operator has changed his mind or is trying to fool us, we need *six* observations

Note that the fifth observation is to establish a position... and the sixth a change of position. Thus categories five and six repeat the cycle, the fifth falling into the position category and the sixth into the velocity category... the sufficiency of four categories is demonstrated. (p. 18)

Observer imbrication: A valuable interpretation of related distinctions is provided in the discussion of [Cadell Last](#) (*Towards a Big Historical Understanding of the Symbolic-Imaginary*, 2017):

- externally observed objects are modelled with an observer's noumenal view and voice that is systematically excluded from the "objective" model of the world to create the effect that the "true natural world" in-itself is looking and speaking at the subject [eg science]
- observer's noumenal view and voice of externally observed objects is included in the model thus creatively relativizing the

observer's "objective" world model to the subjective locus producing it in order to study its effects in the ideational field structuring the motion of subject-object [eg deconstruction]

- observer of externally observed objects reflectively incorporates its own and subjective-multiplicities as a (virtual, extimate) object of analysis structured by an a priori frame of desire that unconsciously filters orientation, intervention, and understanding of subject-object entanglement [eg psychoanalysis]
- observer reflectively incorporates noumenal view and voice model(s) structured by a priori frames of desire as capable of overdetermining the virtually narrated images of externally observed objects ("the world") through transcendental reflection and creation [eg historical subjectivity]
- observer identifies the virtual ideational field composed of a multiplicity of self-relating and desiring world views and voice models as a universal agency ("semiosphere") in-itself with asymmetrical and irreversible reflective and creative autonomy structuring the motion of subject-object entanglement [eg history itself]

Catastrophic distinctions and WH-questions? Comprehension of the set of 7 "elementary catastrophes" articulated by [catastrophe theory](#) merits exploration in terms of their increasing dimensionality (*Clues from catastrophe theory, force dynamics and manoeuvring*, 2002). Their potential relation to questions implying increasing dimensionality is also of potential relevance (*Conformality of 7 WH-questions to 7 Elementary Catastrophes: an exploration of potential psychosocial implications*, 2006). The relation of catastrophe theory to [contradictions](#) is noted and helpfully illustrated by Martin Zwick (*Dialectics and Catastrophe*, 2009).

Feedback loops and cybernetic orders: Young relates the learning considerations he identifies to the necessity of feedback. The shift, through learning, from observing to "knowing one knows" suggests exploring those distinctions in terms of different orders of cybernetics, as discussed separately (*Cybernetics of cybernetics: complex adaptive systems?* 2007; *Relevance to change, learning and creativity*, 2014):

- first order cybernetics: characterized by simple feedback loops
- second order cybernetics: understood as the cybernetics of cybernetics
- third order cybernetics: in which the observer is understood to be part of a coevolving system
- fourth order cybernetics: as may be variously understood, possibly with how multiple realities are shaped by, and impinge upon, power relationships within society. As proposed, for example, by M. Zangeneh and E. Haydon (*The Psycho-Structural Cybernetic Model, Feedback, and Problem Gambling: a new theoretical approach*, *International Journal of Mental Health and Addiction*, 1, 2, 2004)

The distinction between the "orders" of cybernetics is currently a matter of controversy, most recently addressed by [Maurice Yolles](#) and [Gerhard Fink](#) (*Generic Agency Theory, Cybernetic Orders and New Paradigms*, 2014) in the light of their earlier reflections. These could be understood in terms of degrees of self-reference or self-reflexivity although, as such, these distinctions are not especially highlighted ([Hilary Lawson](#), *Reflexivity: the post-modern predicament*, 1986; [Douglas Hofstadter](#), *Gödel, Escher, Bach: An Eternal Golden Braid*, 1979).

Dan ranking in martial art philosophy: Some martial arts attach great significance to the attitude required for the higher levels of competence, notably as denoted by -- "belts" and "dan ranking", especially in the elusive non-combatative understanding of [aikido](#) through which the relationship with any "other" is reframed to an ever higher degree (*Clues from the martial arts*, 2002).

The question to be explored is whether the distinctions correspond in any way to insight into higher derivatives of time enabling higher orders of control in engagement with an "other" (as [explored separately](#) to some degree). Appropriately the [game of go](#) has made use of [dan ratings](#), raising the interesting question as to whether levels of strategic thinking are now distinguished in programming algorithms for competitive play, as with [AlphaGo](#).

Temporal topology? There is a case for recognizing that the cybernetic "orders" above could be associated with distinct topological surfaces whether for representation, mapping or symbolic purposes:

- first order cybernetics with the circle (as suggested by the interlocking loops depicted on systems diagrams)
- second order with the sphere (as suggested by integrative global interlocking of [great circles](#) around a sphere)
- third order with paradoxical forms (as with the [Klein bottle](#))
- fourth order with yet more complex forms. The relevance of Klein bottle geometry is notably argued by [Steven M. Rosen](#) (*Topologies of the Flesh: a multidimensional exploration of the lifeworld*, 2006; *Dreams, Death, Rebirth: a topological odyssey into alchemy's hidden dimensions*, 2014).

Of potential interest is the cognitive relevance of higher dimensional polytopes, otherwise known as [polychora](#) (*Comprehending the shapes of time through four-dimensional uniform polychora; Four-dimensional requisite for a time-bound global civilization?; Five-fold ordering of strategic engagement with time*). In this context, reflection on such forms of higher "dimensionality" frames the intriguing challenge as to how significance might be associated with complexes of "distance" and "time" (derivatives) in configurations of higher degrees of symmetry.

As a challenge to comprehension, the objective clarity by which time and distance are conventionally defined is then called into question, as is implied by the "extra dimensions" of string theory and the very high order of symmetry/dimensionality of the so-called [monster group](#) (*Potential Psychosocial Significance of Monstrous Moonshine: an exceptional form of symmetry as a Rosetta stone for cognitive frameworks*, 2007; [Itzhak Bars](#) and [John Terning](#), *Extra Dimensions in Space and Time*, 2010). In particular, consideration has also been given to [multiple time dimensions](#).

"Geometry of meaning"? The implications of geometry for thinking were the primary focus of [R Buckminster Fuller](#) (*Synergetics: Explorations in the Geometry of Thinking*, 1975 and 1979), as discussed separately (*Geometry of Thinking for Sustainable Global Governance: cognitive implication of synergetics*, 2009).

The approach has been explored otherwise by Arthur Young (*The Geometry of Meaning*, 1976). His 12-phase learning / action cycles can be variously adapted (*Typology of 12 complementary strategies essential to sustainable development*, *Typology of 12 complementary dialogue modes essential to sustainable dialogue*). In this adaptation, the focus is on distinguishing 12 distinct "mixes" of past, present and future as they are experienced (*Varieties of experience of past-present-future complexes*, 2001). Each mix offers a different quality of experience.

Tabular adaptation of the Rosetta Stone of meaning of Arthur Young				
		Acts Abstract Schematic	States Motivated Considered	Relationships Application Follow-through Commitment
	Symbol	M ⁰ L	ML	ML ²
		L	ML	ML ²
Non-duration Timeless awareness	T ⁰	"Specious present" Observation; act of considering; position determination; reactive learning based on immediate registration of phenomena; assessment of distance; "sizing up"	"Matters of moment" Recognition of moment(-ousness), relevance (as related to leverage), significance ; weight of facts; bringing matters into focus	"Identification" Faith in paradigm of the moment; unexamined or habitual commitment to a process projection or understanding, irrespective of inconsistent disturbing factors. Moment of inertia.
Conscious adaptive response Awareness Calendar time Linear time Arrow-of-time	T ⁻¹	L/T "Calendar time" Adaptive change; reaction; passive adaptation or change of position in response to changing circumstances "Projections"	ML/T "Impulse" Recognition of the momentum (of an issue) resulting from a change, namely the consequential transformation of awareness or perspective	ML ² /T "Decision" to act or initiate a process determining the future. "Angular momentum"
Comparison with norms or memory of previous experience Self-awareness Initiating time	T ⁻²	L/T ² "Change of pace" Spontaneous initiation of transformative action; commitment to a new course of action	ML/T ² "Forcefulness" Engendered, experienced or embodied as a result of transformative action; constructive (or disruptive) action potential; enhanced sense of being	ML ² /T ² "Work / Energy" Achievement of a desired result by application of understanding (and adjustment of implicit beliefs) in response to external factors; working action on reality. "Torque"
Comparison with previous comparisons Patterns Awareness of self- awareness Transcendental discontinuity Cyclic time / Feedback	T ⁻³	L/T ³ "Feedback" Control of transformative action. Cybernetics / Systems ["Jerk"]	ML/T ³ "Discipline" Establishment of disciplined pattern of response; consolidated or harmonious control of action potential; holding forces in check	ML ² /T ³ "Power" of acquired knowledge; know-how; integrated or embodied experience; capacity (including that of not acting); non-action

The table above, especially in Young's original format, is a reflection of conventional thinking in Newtonian terms. Higher derivatives (as suggested by the following extension) are necessarily a challenge to what can be unambiguously named, explained and experienced. With respect to the rate of change of acceleration, Young notes:

But what name and what meaning can we give to this? The name given by aeronautical engineers is *jerk*, probably because when acceleration is changed by automatic control, it does so in an all-or-nothing fashion which results in a jerk. **But in the general case, as in human control, it need not be a jerk... a change in acceleration is what we mean by control...** (pp. 15-16) [emphasis added]

Even with respect to ML/T³ in the last row above, Young notes that: *Until recently there has been no conventional word for the third derivative of momentum, It is now recognized, however, and used in aeronautical engineering, where it is called power control. I would prefer to call it mass control (material extent of control)* (p. 33). This confusion is evident in the discussion below with respect jolt, jerk, jounce and snap. Thus some authors treat jolt, jerk and jounce as synonymous, and corresponding to L/T³. Jounce may more commonly be understood as the rate of change of jerk (L/T⁴). *Crackle* is assertively recognized as the fifth derivative (L/T⁵), with *pop* a the sixth derivative (L/T⁶).

The lack of clarity is especially relevant to the confusion in any psychosocial systemic analogue. Young's insight that, under human control, a jerk **need not be a jerk**, is fundamental to the argument which follows -- as with the implications in jargon usage of the term.

Jargon terms for the higher derivatives of time				
?	T ⁻⁴	L/T ⁴ --- [<i>Jounce</i>]	ML/T ⁴	ML ² /T ⁴
?	T ⁻⁵	L/T ⁵ --- [<i>Snap?</i>]	ML/T ⁵	ML ² /T ⁵
?	T ⁻⁶	L/T ⁶ --- [<i>Crackle?</i>]	ML/T ⁶	ML ² /T ⁶
?	T ⁻⁷	L/T ⁷ --- [<i>Pop?</i>]	ML/T ⁷	ML ² /T ⁷
?	T ⁻⁸	L/T ⁸ --- [<i>Lock?</i>]	ML/T ⁸	ML ² /T ⁸
?	T ⁻⁹	L/T ⁹ --- [<i>Drop?</i>]	ML/T ⁹	ML ² /T ⁹

The degree of confusion is compounded by how these distinctions may be experienced in relation to subtler interpretation of M and L, and with respect to whatever the "higher derivatives of time" are related, especially when termed "negative powers of time". The table as

extended above therefore corresponds to a higher degree of subjectivity, with whatever degree of objectivity its elements may be recognized. Of particular relevance is the greater ease with which disruptive forms may be experienced, rather than the "higher" forms of control which constrain their manifestation -- as recognized by Young with respect to jerk..

In that spirit, the framework adopted by Arthur Young is especially relevant through his preoccupation with cycles of learning -- and the cyclic framework he develops. His inspiration derived from the innovative insight he acquired in developing the original [Bell helicopter](#) with its unusual piloting challenges -- subsequently generalized by him in philosophical terms to include the speculative possibility of designing a "[psychopter](#)" (*The Bell Notes: a journey from physics to metaphysics*, 1979). For Young, the fourth derivative is unnecessary -- an understanding which may however have undermined his exploration of the operation of a psychopter in relation to gravity, otherwise understood. He argues with respect to control as the third derivative:

What causes us to turn the automobile, or to start it in the first place, or finally to stop it? The answer is "the destination". The destination is a place, or position. Thus the fifth step, the fourth derivative of position, that which determines control, *is the same as the first step*. This position is not the same position we started with but has the same category of measure (distance or length... (p.17).

This sense that there may be learning processes which could offer a new kind of overview (or integrative perspective) justifies a degree of speculation in that regard ([Engendering a Psychopter through Biomimicry and Technomimicry: insights from the process of helicopter development](#), 2011; [Intuited complementarity: environmental cycles and learning cycles?](#) 2018).

Dimensional compactification: There is a degree of metaphorical irony to any progression down the rows of Young's table to the extent that this is paralleled by a form of [compactification of dimensionality](#) when represented (as argued with respect to string theory in fundamental physics). The uppermost row (in "substantive" text form) is typically verbose in encompassing one or more themes (as with this text). The second is more experiential and with greater dimensionality, as with "one image is worth a thousand words" -- or "skimming a text to gain an impression". In characterizing the third row in terms of an idea or conceptualization, however multifaceted, this tends to be even more compact, however held or grasped. The excitement characteristic of the fourth row is even more experientially succinct -- whatever the potential it embodies.

There is a further irony to the progression in relation to what might be termed the "**trilemma of compactification**":

- greater succinctness potentially facilitates comprehension -- but may preclude it -- whilst increasing the probability of incommunicability
- greater (verbose) articulation potentially enables greater comprehension (especially of any part), but may well increase incomprehension and alienation (and especially from the whole)
- greater emphasis on communicability of the whole may inhibit comprehension of its subtlety and complexity

With respect to compactification, Young's tabular presentation highlights a progression in temporal [reciprocation](#) (or inversion) which features in an appropriately titled subsequent study ([Nested Time](#), 2004). Thus the first row, as production capacity, is effectively timeless as a product of $1/T^0$, the second identifies change over time as a product of $1/T^1$ (or T^{-1}), the third identifies rate of change as a product of $1/T^2$ (or T^{-2}), whilst the fourth is a measure of control as a product of $1/T^3$ (or T^{-3}).

Temporal inversion and higher derivatives of time

The following insights from physics regarding conditions beyond change and acceleration -- terms already used with regard to psychosocial dynamics -- help to frame insight into more radical forms of psychosocial change, whether shocks, paradigm shifts or revolutions of any kind (as discussed below). More surprising is use of the term "snap" (as in "snap election?") or "jerk" -- even as a term of deprecation in urban jargon. **Such terms could be considered to be of considerable relevance to revolution in psychosocial systems -- if not, more controversially, to revelation, whether with respect to innovation, creativity or spiritual insight.**

Higher derivatives of time? In the case of physics, the question has been simply framed as follows by David Mattingly ([Brilliant](#), 2014):

Newton's laws... state $\mathbf{F}=\mathbf{ma}$, where a is the second time derivative of the position. Why does this equation have a second time derivative and not, say, 1,3,4, etc. time derivatives? In particular, what are the physical reasons behind this?

In contrast with the restriction to Newton's laws (as implied in the table above), the question concerned the relevance of a "fourth derivative of time", namely $1/T^4$ or T^{-4} , or higher. The question resulted in a series of [answers and comments](#), leading Mattingly himself to provide "[an answer](#)".

In sum, we find that having a standard notion of force, the need to have here vs. there for static objects be meaningful, the principle of relativity, and the requirement that our solutions don't run off to infinity and violate energy conservation, constrain our equations for the motion of particles to be $\mathbf{F}=\mathbf{ma}$ and nothing else. These are the physical reasons behind this equation.

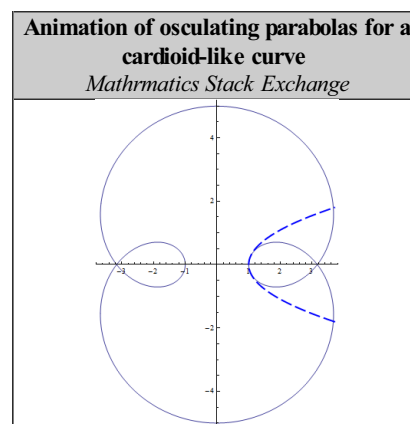
A related question evoked a variety of comments: [Einstein made general relativity by the properties of acceleration. Can we make another theory taking to account the 3rd and higher derivatives of time?](#) ([Quora](#), December 2017). [A convenient expression of the time-derivative of arbitrary order](#) (2016) is presented by Mario Bruschi as playing a key role in the identification of classes of solvable dynamical systems.

Jerk, jolt, jounce, snap and crackle? There is continuing [discussion of terms relating to the third derivative of position](#) with respect to time, and the fourth derivative of time ([Fourth derivative of position?](#) *PhysicsForums*; [What is the meaning of the third derivative of a function at a point](#), *Mathematics Stack Exchange*).

Seemingly there is no universally accepted name for the fourth derivative, i.e. the rate of change of acceleration -- which has been named as **jerk** (Steven H. Schot, *Jerk: The Time Rate of Change of Acceleration*, *American Journal of Physics* 46, 1978; Steven H. Schot, *Aberrancy: Geometry of the Third Derivative*, *Mathematics Magazine*, 51, 1978). Aberrancy is the asymmetry of a curve about its normal.

The term jounce has been used for the fourth derivative, but it has the drawback of using the same initial letter as jerk so it is not clear which symbol to use. In physics, **jounce**, also known as snap, is the fourth derivative of the position vector with respect to time, or the rate of change of the jerk with respect to time. Equivalently, it is second derivative of acceleration or the third derivative of velocity. Other variants are indicated ([Names of higher-order derivatives](#), *Mathematics Stack Exchange*, 2016),

Although aberrancy is held to be relatively abstruse, its significance is further developed by Steven H. Schot ([Geometrical Properties of the Penosculating Conics of a Plane Curve](#), *The American Mathematical Monthly*, 86, 1979) as noted in the [discussion](#) in the *Mathematics Stack Exchange*. This includes the following animation which could be seen as remarkably indicative of the fundamental attraction of the delights of "jouncing" (as suggested below).



The clearest discussion located is that of David Eager, Ann-Marie Pendrill and Nina Reistadd ([Beyond Velocity and Acceleration: jerk, snap and higher derivatives](#), *European Journal of Physics*, 37, 2016, 6) who note that:

The higher derivatives of motion are rarely discussed in the teaching of classical mechanics of rigid bodies; nevertheless, we experience the effect not only of acceleration, but also of jerk and snap. In this paper we will discuss the third and higher order derivatives of displacement with respect to time, using the trampolines and theme park roller coasters to illustrate this concept. We will also discuss the effects on the human body of different types of acceleration, jerk, snap and higher derivatives, and how they can be used in physics education to further enhance the learning and thus the understanding of classical mechanics concepts....

There is no agreement of the names of higher order derivatives. The term snap will be used throughout this paper to denote the fourth derivative of displacement with respect to time. Another name for this fourth derivative is jounce. The fifth and sixth derivatives with respect to time are referred to as crackle and pop respectively. [emphasis added]

As noted in an extensive entry on [jerk](#) in *Wikipedia* with respect to higher derivatives:

In classical mechanics of rigid bodies there are *no forces* associated with the higher derivatives of the path, nevertheless not only the physiological effects of jerk, but also oscillations and deformation propagation along and in non-ideally rigid bodies, require various techniques for controlling motion to avoid the resulting destructive forces. It is often reported that NASA in designing the [Hubble Telescope](#) not only limited the jerk in their requirement specification, but also the next higher derivative, the jounce.

For a recoil force on accelerating *charged* particles emitting radiation, which is proportional to their jerk and the square of their charge, see the [Abraham-Lorentz force](#). A more advanced theory, applicable in a relativistic and quantum environment, accounting for [self-energy](#) is provided in [Wheeler-Feynman absorber theory](#).

Valuable clarification is provided with respect to jerk and its measurement, in vehicles and in relation to seismic events, by A. Taushanov ([Jerk Response Spectrum](#), *Annual of the University of Architecture, Civil Engineering and Geodesy*, 51, 2018). This notes the use of a jerk meter in the aerospace industry.

In the *Wikipedia* entry on [jounce](#) it is noted that:

Jounce and the fifth and sixth derivatives of position as a function of time are "sometimes somewhat facetiously" referred to as *snap*, *crackle*, and *pop* respectively. However, time derivatives of position of higher order than four appear rarely. There is no formal designation for the seventh and eighth derivatives of position, although some authors use the convention "lock" and

"drop".

As originally articulated by Philip Gibbs and Stephanie Gragert (*What is the term used for the third derivative of position?* November 1998):

It is well known that the first derivative of position (symbol x) with respect to time is velocity (symbol v) and the second is acceleration (symbol a). It is a little less well known that the third derivative, i.e. the rate of change of acceleration, is technically known as jerk (symbol j). Jerk is a vector but may also be used loosely as a scalar quantity because there is not a separate term for the magnitude of jerk analogous to speed for magnitude of velocity. In the UK jolt has sometimes been used instead of jerk and may be equally acceptable.

Many other terms have appeared in individual cases for the third derivative, including pulse, impulse, bounce, surge, shock and super acceleration. These are generally less appropriate than jerk and jolt, either because they are used in engineering to mean other things or because the common English use of the word does not fit the meaning so well. For example impulse is more commonly used in physics to mean a change of momentum imparted by a force of limited duration... and surge is used by electricians to mean something like rate of change of current or voltage. The terms jerk and jolt are therefore preferred for rate of change of acceleration. Jerk appears to be the more common of the two.... **There is no universally accepted name for the fourth derivative, i.e. the rate of change of jerk,** The term jounce has been used but it has the drawback of using the same initial letter as jerk so it is not clear which symbol to use. [emphasis added]

Helicity, vorticity, and gravity: In concluding his own answer with respect to higher derivatives, David Mattingly notes proposals for a modification of [Newton's laws](#) to account for observed properties of [galaxies](#):

For the adventurous types, there was an idea a decade or so ago called MoND ([Modified Newtonian Dynamics](#)) which postulated that $F=ma+a^2/a_0$, where a_0 is an acceleration scale. This theory was proposed to explain the motion of stars at the edges of galaxies, and it actually worked well for spiral galaxies. Dark matter has gotten rid of the need for MoND, but it was an area of active interest not all that long ago... Which physical principle did MoND give up?

In that respect, there are now many references to higher derivatives in relation to gravity, for example:

- Leonardo Modesto, Tib erio de Paula Netto, Ilya L. Shapiro: *On Newtonian singularities in higher derivative gravity models* (*arXiv*, 1412.0740v2, 2014)
- Kellogg S. Stelle: *Classical Gravity with Higher Derivatives* (*General Relativity and Gravitation*, 9, 1978, 4, pp. 353-371)
- Simon Arthur Woolliams: *Higher Derivative Theories of Gravity* (Imperial College London, 20 September 2013)
- L. Giacchini: *On the cancellation of Newtonian singularities in higher-derivative gravity* (*Physics Letters B*, 766, 2017, pp. 306-311)

These typically note that **theories with higher order time derivatives generically suffer from so-called "ghost-like" instabilities**, known as [Ostrogradski instabilities](#) -- the challenge being to constrain or eliminate such "ghosts". One such discussion has, for example, been provided by Tai-jun Chen (*Constrained Dynamics and Higher Derivative Systems in Modified Gravity*, University of Cambridge, 2015):

In this thesis, higher derivative theories and constrained dynamics are investigated in detail. In the first part of the thesis, we discuss how the Ostrogradski instability emerges in non-degenerate higher derivative theories.... We show that the instabilities can only be removed by the addition of constraints if the original theory's phase space is reduced. We then generalize this formalism to the most general higher derivative gravity theory where the action is not only linearly dependent on the Ricci scalar but also the quadratic curvature invariants in four-dimensional spacetime.... We find the spherically symmetric static solution of the theory with an exponential potential. However, when we investigate the stability issue of the solution, the perturbation with the odd type symmetry is stable, while the even modes always contain one ghostlike degree of freedom.

The argument is introduced by Tai-jun Chen with the comment:

Since Newton decided to write the second law of motion as $F=ma$, all theories of fundamental physics are based on equations of motion with, at most, second order time derivatives.... The reason why the higher derivative theories are not adopted is because of the accompanying instability, which can be summarized by [Ostrogradski's theorem](#): *Any non-degenerate theory whose dynamical variable is higher than second order in time derivative there exist linearly unstable degrees of freedom.*

If we consider a theory based on an equation of motion in fourth order time derivatives, since we need four initial conditions to solve the equation, the phase space in the Hamiltonian formalism is four-dimensional. Ostrogradski's theorem states that the extra degree of freedom is a linearly unstable one... The theorem is very powerful and can be easily applied to all non-degenerate higher derivative theories. Even though the powerful Ostrogradski's theorem exists, higher derivative theories have been studied in an attempt to modify the fundamental theories in order to render them compatible with the phenomenology or invent theories with better characteristics.

Tai-jun Chen concludes:

We emphasize that adding constraints to remove instability is only valid in the linear theory. A full non-linear extension of this methodology is beyond the scope of this dissertation, and we have made no attempt to produce a covariant formalism. However, even in the linear theory, some features of a stable higher derivative gravity can be gleaned. Although the full non-linear extension of this procedure is not yet known, we would like to point out several directions for potential future research... It will be very interesting to check whether this result can be extended to the full non-linear regime.

Psychosocial implication of jerk, jolt, jounce and snap?

One framework indicative of such implications is provided by the articulation by [Kevin Kelly](#) (*The Inevitable: understanding the 12 technological forces that will shape our future*, 2017), especially when these "forces" are experienced problematically:

- **Becoming:** Moving from fixed products to always upgrading services and subscriptions
- **Cognifying:** Making everything much smarter using cheap powerful AI that we get from the cloud
- **Flowing:** Depending on unstoppable streams in real-time for everything
- **Screening:** Turning all surfaces into screens
- **Accessing:** Shifting society from one where we own assets, to one where instead we will have access to services at all times.
- **Sharing:** Collaboration at mass-scale.
- **Filtering:** Harnessing intense personalization in order to anticipate our desires
- **Remixing:** Unbundling existing products into their most primitive parts and then recombining in all possible ways
- **Interacting:** Immersing ourselves inside our computers to maximize their engagement
- **Tracking:** Employing total surveillance for the benefit of citizens and consumers
- **Questioning:** Promoting good questions is far more valuable than good answers
- **Beginning:** Constructing a planetary system connecting all humans and machines into a global matrix

Being jerked, jolted or jounced? Further insight is offered in commentaries on a question: *What are some real-world applications of jounce, the fourth derivative of position -- any ideas? And for the fifth, sixth, and seventh?* (Reddit). One blog offers a valuable summary with implications for music, distinguishing the terms **absement** and **presement** of relevance to flow-based instruments (*Derivatives of position, The Spectrum of Riemannium*, Log#053)

In a period characterized by "shocks" of many kinds, it is especially valuable to draw attention to jounce in relation to "shock absorption" in the light of extensive understanding of it in mechanical systems, if not in biological and psychosocial systems (Donald Jones, *Suspension Systems Jounce and Rebound Center of Gravity Ride*, November 2011; Jim Anderton, *Compression, Jounce or Bump*, *AutoServiceWorld*, 1 July 2001). **Could such insights into "jounce" be adapted to new understanding of life's shocks and those of any society** -- as suggested by the above-mentioned argument of [Jim Brosseau](#) (*Jounce: crafting a resilient life in an increasingly chaotic world*, 2014)?

As one [review](#) writes of the latter argument:

Jounce is a real physics term -- it's the fourth derivative of position over time. Though the term "jounce" is seldom encountered in science class, we often go through life being jounced: jerked around in several directions at once. From a traffic ticket to bad news from your doctor to a global catastrophe, the sources for being jounced are all around us. This book is about dealing with being jounced.

Unconscious associations of significance? For a discipline renowned for its framing of sexuality as meaningless -- perhaps "**not even wrong**" -- there is a delightful irony to use of jounce (as "jouncing") and jerk (as "jerking") in contexts which no Freudian would fail to appreciate.

There is no lack of references to "jouncing breasts" and "jerking off", presumably contributing to the intuitive semantic associations of this argument with respect to higher orders of temporal experience. This offers a reminder that the static nature of substantives may obscure significance embodied in the dynamics they imply (*Freedom, Democracy, Justice: Isolated Nouns or Interwoven Verbs? Illusory quest for qualities and principles dynamically disguised*, 2011).

Correspondences to cosmology? As indicated above, higher derivatives of time are clearly of concern in relatively unknown known technical applications -- with the possible exception of shock absorbers and the resilience they offer (Sean Joyce, *Resilience: the cyber-shock absorber businesses need*, 18 October 2017). Resilience is then usefully to be recognized as the psychosocial analogue to their operation, as implied by the title of the study by [Jim Brosseau](#) (*Jounce: crafting a resilient life in an increasingly chaotic world*, 2014). However the major focus of studies with respect to such derivatives is on their implications for cosmology and understanding of gravity on a galactic scale, notably with respect to black holes and dark matter.

Curiously the "ghost-like" instabilities (noted above) would seem to bear a strange resemblance to the "snake-like" instabilities long-recognized as a challenge to the current design of viable nuclear fusion reactors -- on which such great hopes are now placed (Kathy Kincaid, *Taming Plasma Fusion Snakes: supercomputer simulations move fusion energy closer to reality*, *Berkeley Lab Computing Sciences*, 24 January 2014; A. Y. Aydemir, et al, *Snakes and similar coherent structures in tokamaks*, Institute for Fusion Studies, 5 September 2015). As noted above, use of the term provocatively recalls critical use of the phrase "**ghost in the machine**" -- in this case the "Newtonian machine".

In the quest for insight into the psychosocial relevance of higher derivatives of time, the arguments with regard to cosmology and gravity on a galactic scale might be considered obscure and irrelevant. It is however appropriate to recall the importance of so-called [gravity-models used in various social sciences](#) to predict and describe certain behaviours that mimic gravitational interaction as described in Isaac

Newton's law of gravity. Generally, the social science models contain some elements of mass and distance, which lends them to the metaphor of physical gravity. Examples include: [gravity model of trade](#), [gravity model of migration](#), and [trip distribution](#). An obvious question is whether there are conditions under which such models call for consideration of higher derivatives of time.

There is a nice irony to use of the acronym [AQUAL](#) as a theory of gravity based on Modified Newtonian Dynamics (MOND), but using a Lagrangian. "AQUAL" then stands for "A QUAdratic Lagrangian". The irony is evident in the use of the acronym [AQUAL](#) standing for "All Quadrants All Levels", a model of [integral theory](#) suggesting that all human knowledge and experience can be placed in a four-quadrant grid, along the axes of "interior-exterior" and "individual-collective".

Use of metaphors relating to the cosmology of the social system, even its black holes, are of course common. The latter is frequently used in relation to public debt. Examples include:

- Ilanit Tof: *As above, so below: Modern Cosmology as Psychological Metaphor* (Little Tree, 1996)
- Joseph Campbell: *The Inner Reaches of Outer Space: metaphor as myth and as religion*. (1986)
- Thomas Moore: *The Planets Within: the astrological psychology of Marsilio Ficino* (1990)
- Henryk Skolimowski: *The Participatory Mind: a new theory of knowledge and of the universe*. (1995)
- V. Mansfield: *Modern Cosmology as Psychological Metaphor* (Hamilton, 1996)

Other examples can be explored ([Entering Alternative Realities -- Astronautics vs Noonautics: isomorphism between launching aerospace vehicles and launching vehicles of awareness](#), 2002; [Being the Universe : a metaphoric frontier](#), 1999; Ursula Le Guin, [Subjectifying the Universe: science and poetry as complementary modes of comprehending and tending to the natural world](#), *Brain Pickings*, 8 April 2018).

Catastrophic disruption to governance processes -- experienced as a "jolt": An obvious challenge for such models is how they encompass the kinds of abrupt discontinuity which might well be intuitively recognized using such terms as "jerk" or "jolt". More obvious is the question of how any understanding inspired by the smooth continuity of "gravity" is challenged by "catastrophe" -- and the understandings offered by [catastrophe theory](#) and its dependence on higher derivatives (Tim Poston and Ian Stewart, *Catastrophe Theory and Its Applications*, 2014; C F Chan, et al, *Perturbation Methods, Instability, Catastrophe and Chaos*, 1999). The commentary on the osculating parabola (above) in the [discussion](#) in the *Mathematics Stack Exchange*, makes the further point:

Further, one could also give a geometric interpretation for the *fourth* derivative; what one now considers is the osculating *conic* (the limiting conic through five neighboring points of a curve when those five points coalesce), and one could classify points of a plane curve as *elliptic*, *parabolic* or *hyperbolic* depending on the nature of the osculating conic. In this respect, the discriminant of the osculating conic depends on the first four derivatives.

Arguably many conventional mindsets (whether lending themselves to description in terms of gravity models or not) can now be understood as being subject to "jolt", however catastrophic -- or as being "jerked" into a new mode. The assumptions underlying the business-as-usual of the international community and the rule of law over many decades can be seen in these terms -- most notably as jolted by a wave of populism ([Italy Faces Political Paralysis After Populist Jolt](#), *The Wall Street Journal*, 5 March 2018; [Italy Sends a Jolt Through Europe](#), *Spiegel Online*, 1 June 2018). Ironically the term "snap" is favoured for [snap elections](#) which such populism may engender.

It is readily argued, especially in the current period, that people experience their leaders as "jerking them around" through the arbitrary nature of governance processes unable to encompass the higher dimensionality in terms of which jolts and jerks are perceptible. Should it be considered surprising that people "snap"? Indeed the very nature of such a surprise to the conventional models of "business-as-usual" merits reflection in terms of the arguments of [black-swan theory](#) as articulated by Nassim Nicholas Taleb (*The Black Swan: the impact of the highly improbable*, 2007).

Correspondence to nuclear fusion? As noted above, the constraints of higher derivatives of time suggest that valuable insights with respect to the requisite flow of attention are available from the design requirements of [nuclear fusion reactors](#) currently under development to recreate the "power of the sun".

These call for avoiding any contact between what flows and what contains that flow ([Enactivating a Cognitive Fusion Reactor: Imaginal Transformation of Energy Resourcing \(ITER-8\)](#), 2006; [Implication of Toroidal Transformation of the Crown of Thorns: design challenge to enable integrative comprehension of global dynamics](#), 2011). The flow of plasma within the toroidal container recalls the form of the ouroboros and the possibility of its animation in 3D ([Complementary visual patterns: Ouroboros, Möbius strip, Klein bottle; Circular configuration of cognitive phases framing toroidal experience?](#)).

Arrogance as a gravity analogue: Given their attractive power, potentially irresistible in some instances, there is a case for [Understanding models otherwise -- as centres of "gravity"](#) (2015). In that sense gravity models are not only relevant to explanations offered by the social sciences, the models offered by those sciences (as with any belief system) may function as centres of gravity.

Of particular interest is the mysterious manner in which arrogance is associated with belief systems, as discussed separately ([Arrogance as an analogue to gravity -- equally fundamental and mysterious](#), 2015). There it is noted that:

Little attention is however accorded to arrogance in psychosocial systems, and specifically with respect to that associated with the promoters of particular models in which others are called to believe. A valuable exception with respect to arrogance and "cultural gravity" is extensively discussed by Rajiv Narang and Devika Devaiah (*Orbit-Shifting Innovation: the dynamics of Ideas that create history*, 2014). Another with respect to business cycles -- recalling the understanding of gravitational collapse -- is that of Michael Farr (*Avoiding the Arrogance Cycle: Think You Can't Lose, Think Again*, 2012). It has been a concern since its

articulation as [hubris](#) in Ancient Greece (Ariston, *On Arrogance*; Michael Dewilde, *Hubris: The Psychological and Spiritual Roots of a Universal Affliction*; Valerie Tiberias and John D. Walker, *Arrogance*, *American Philosophical Quarterly*, 1998)

Arrogance (perhaps framed as [egotism](#)) is frequently cited as a factor undermining global initiatives. Military arrogance is an ever-present phenomenon, perhaps to be usefully recognized as a characteristic phenomenon of the security and intelligence services in general (Alistair Horne, *Hubris: The Tragedy of War in the Twentieth Century*, 2016).

There is considerable irony to the extent to which arrogance functions as an "invisible" force in the sciences, as exemplified in a commentary on a [proposed revision](#) by the American Physical Society of its 2007 [statement on climate change](#) (Arthur Smith, *The Arrogance of Physicists*, 13 October 2009). He remarks:

But sometimes that arrogance and self-assurance and collection of intuitions lead us, or at least a few of us, astray. We forget that there are other smart people in the world, who have been thinking about their limited problem for a lot longer and perhaps have a deeper understanding than we give them credit for. We jump in with our simplified models and ideas and then wonder why they don't find them helpful. Or we too deeply trust the intuition of a colleague who has been often right before or who we trust for other reasons, but in a particular instance has not put in the effort to properly understand the problem, and ends up only embarrassing themselves, and us by association.

Given the mysterious nature of gravity, it is perhaps no surprise that there is considerable difficulty for the sciences to address its role in the elaboration and promulgation of systems of knowledge (*Knowledge Processes Neglected by Science: insights from the crisis of science and belief*, 2012). A strange relationship is recognized between arrogance and creativity (Neel Burton, *Bad Genius: The Link Between Arrogance and Creativity*, *Psychology Today*, 6 September 2017; Tom Jacobs, *The Focused Arrogance of the Highly Creative*, *Pacific Standard*, 8 July 2011).

Comprehending the potential significance of higher derivatives of time in relation to gravitational models is necessarily challenged by their subtlety -- however this is understood in relation to subjective experience. As "non-sense" within a Newtonian framework, this suggests a valuable challenge to the contempt of physics for the psychosocial sciences, as notably framed through the [Sokal Affair](#) (Alan Sokal and Jean Bricmont, *Fashionable Nonsense: postmodern intellectuals' abuse of science*, 1999).

From sociophysics to learning to jounce?

Sociophysics? It is appropriate to note that the different studies of the controversial field of [sociophysics](#) do not consider derivatives greater than acceleration, despite their potential relevance to the modification and control of public opinion (Paris Arnopoulos, *Sociophysics: Cosmos and Chaos in Nature and Culture*, 1993; Serge Galam, *Sociophysics: a physicist's modeling of psycho-political phenomena*, 2016).

A commentary with respect to the framework offered by Arthur Young features in the work of [Paris Arnopoulos](#) (*Sociophysics: Cosmos and Chaos in Nature and Culture*, 1993):

Since power is the rate of applying force, controlling this rate is of utmost importance. Control has been identified as the capacity to modify the rate of change, ie to speed it up or slow it down. Therefore, power control is a necessary ingredient of any orderly social change. The mathematical definition of power, and its algebraic equivalents show that:

$$P = W/t = Fv = ma(s/t) = m(s/t^2)(s/t) = ms(s/t^3) = msc$$

This last parenthesis (s/t^3) has been defined by Young as control (c), and translates as the rate of change of acceleration. It will be recalled that since $v=s/t$ and $a=s/t^2$, control becomes the third derivative of velocity...

Since power is directly proportional to the rate of energy conversion or information flow, dynamic systems require a great degree of control. As people become more energetic or informed, they tend to get out of control; so in order to avoid that, dynamic societies must become more regulated. It may therefore be said that the kind of government that a system has depends on the amount of power it disposes. (p. 82)

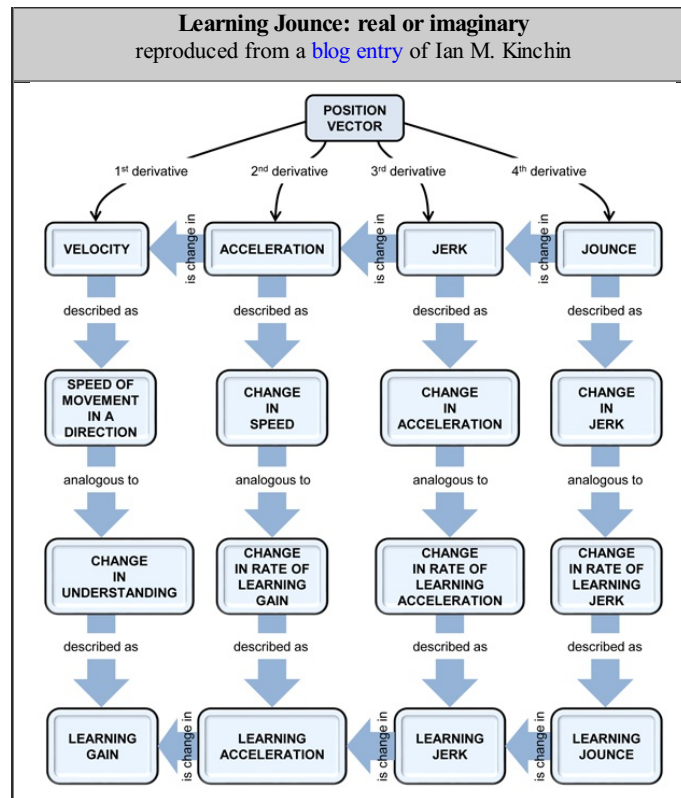
More recently there have been a large number of social science papers that use mathematics broadly similar to that of physics, and described as "[computational social science](#)". However, given the recent [data mining scandals in use of profile data](#) in manipulation of democratic elections, the proponents of other flavours of "sociophysics" as a discipline merit a degree of challenge in claiming paternity of it, as with [Serge Galam](#) (*Modeling the Forming of Public Opinion: an approach from sociophysics*, *Global Economics and Management Review*, 18, 2013). The issue also merits attention in the light of the so-called [Sokal Affair](#) and related commentary (Alan D. Soka and Jean Bricmont, *Fashionable Nonsense: postmodern intellectuals' abuse of science*, 1998). This is especially the case with the progressive development of algorithms of relevance to aspects of governance by [artificial intelligence](#).

Clearly it could be argued that the failure of systems of governance to encompass effectively the challenges of the times could be attributed in part to reliance on assumptions inspired by Newtonian understandings of force -- despite their limitations. Hence the multiplicity of essentially simplistic references to "change" and the quest for growth "acceleration". The obvious instabilities which become evident merit reframing in the light of higher derivatives of time. There is a nice irony in the terminology of physics in that their

emergence as "ghosts" needs to be constrained by more insightful models. To the extent that these are equivalent to "snakes" undermining viable nuclear fusion, these bear comparison with the "animal spirits" famously identified by John Maynard Keynes.

Learning jounce -- rather than being jounced? The dynamics of psychosocial systems are related to those of physical systems -- if only metaphorically through identical terms (change, acceleration, inertia, etc). The question is then how the above explorations by physics might be fruitfully "mined" or "decoded" for their psychosocial relevance to new modes of thinking, and especially to render their insights comprehensible.

The clearest exercise in this respect is that of Ian M. Kinchin (*Visualising Powerful Knowledge to Develop the Expert Student: a knowledge structures perspective on teaching and learning at university*, 2016).



This schematic helps to frame questions regarding the experience of jounce -- with its cognitive implications for even higher orders of control required to anticipate and encompass the instability with which it is potentially associated. However, following Arthur Young, it is not "jerk" which needs to be learnt but rather the higher order of control which avoids its problematic manifestation. Rather than "control", the even higher derivatives of time may be more intimately related to a deeper comprehension of proactive anticipation.

Whilst this may have implications in social systems (jouncing market prices?), there is the delightful possibility that other insights might be gained from the cognitive challenge to celibate monks of "jouncing breasts".

*To jounce, or not to jounce, that is the question:
Whether 'tis nobler in the mind to suffer
The slings and arrows of outrageous fortune,
Or to take Arms against a Sea of troubles,
And by opposing end them: to die, to sleep
No more; and by a sleep, to say we end
the heart-ache, and the thousand natural shocks
that Flesh is heir to?*

Varieties of recognition in practice of an elusive missing dimension

This concern is complemented and further justified by the work of the biological anthropologist Terrence Deacon (*Incomplete Nature: how mind emerged from matter*, 2012; *The Symbolic Species: the co-evolution of language and the brain*, 1997). The fundamental value of focusing on what is "absent" from conventional explanation is introduced by Deacon by comparing it to the vital role of zero in the number system -- itself a great discovery (cf. Charles Seife, *Zero: the biography of a dangerous idea*, 2000; Robert Kaplan and Ellen Kaplan, *The Nothing that Is: a natural history of zero*, 2000). Appropriate to this argument, as explored below, the integrative multiverse explanation offered by Bernard Carr is schematically presented through the form of the traditional **Ouroboros** -- readily perceived as a kind of zero.

For Deacon:

Basically, it means that our best science -- that collection of theories that presumably comes closest to explaining everything -- does not include this one most defining characteristic of being you and me. In effect, our current "Theory of Everything" implies

that we don't exist, except as collections of atoms. So what's missing? **Ironically and enigmatically, something missing is missing.** (p. 1) [*emphasis added*]

He uses this analogue to zero to demonstrate how a form of causality dependent on specifically absent features and unrealized potentials can be compatible with the best of science. Deacon sees this approach as offering a *glimpse of the qualitative outlines of a future science that is subtle enough to include us and our enigmatically incomplete nature, as legitimate forms of knotting in the fabric of the universe* (p. 17)

In his concluding paragraph he notes:

In the title to one of his recent books, [Stuart Kauffman](#) [*At Home in the Universe: the search for laws of self-organization and complexity*, 1995] succinctly identifies what has been missing from our current blinkered metaphysical worldview. Despite the power and insights that we have gained from this powerful way of conceiving of the world, it has not helped us to feel "at home in the universe". Even as our scientific tools have given us mastery over so much of the physical world around and within us, they have at the same time alienated us from these same realms. **It is time to find our way home.** (p. 545) [*emphasis added*]

With respect to the encounter with another person, how are the following understood, distinguished, clustered and valued in different contexts, if at all?

- integrity
- maturity
- seriousness
- commitment / dedication
- inspiring
- authenticity
- holiness / spirituality
- stillness, and related qualities
- respectability / respect worthy
- intentionality
- stimulating / exciting
- person for all seasons -- versus a "*man without qualities*"?

These can be variously recognized in terms of any process of individuation, possibly framed in terms of [perfectibility](#) (John Passmore, *The Perfectibility of Man*, 1969). Particular examples include:

- **presence and charisma:** experienced in contrast to absence, and the sense that there was "no one there" or "behind the eyes". It is notably recognized and valued in leaders and actors. It is also recognized in "[presence of mind](#)". Charisma is distinguished as a compelling attractiveness or charm that can inspire devotion in others. Both presence and charisma have spiritual connotations valued by religions. Related qualities distinguished are inspiring, imposing and impressive
- **soulfulness:** experienced in contrast to any sense of soullessness. This may be recognized in places and experiences (*Soulless organization: deliverability as the dream; Wining and dining without soul or spirit; Wining and dining with soul and spirit*, 2015). With respect to the dynamics of attention in relation to excitement, it is appropriate to recognize the understanding of *duende* -- loosely translated as "having soul", a heightened state of emotion, expression and [authenticity](#), often connected with flamenco dancing (*Daimon, Djim, Muse and Duende: variations on a timeless experience*, 2007). It is associated with *saudade*, as engendered by a related art form (*Duende and saudade as transformative animation of intercourse*, 2015). Both terms elude conventional communication (Tom Schnabel, *Saudade and Duende: two elusive words that defy translation*, *KCRW Rhythm Planet*, 11 June 2013). The subtlety of the associated experience might be fruitfully compared with the Chinese understanding of *wu wei* as indicating, with appropriate ambiguity. The quality is currently questioned with respect to Europe (Miguel Angel Moratinos, *A heartless and soulless Europe?* 14 September 2015; Stephen Baker, *Heartless U.S. vs. Soulless Europe*, *Bloomberg*, 5 April 2006; Sohrab Ahmari, *Europe's Soulless Liberalism*, *The Wall Street Journal*, 23 March 2017; *Why are most institutions of the EU based in Brussels, since it is such a soulless city in comparison to other European cities?* *Quora*).
- **meditative insight:** understood as relating to time in an unhabitual manner is, for the skilled, presumably a source of insight of relevance to this argument. Notable examples include the *zazen* practice of "sitting" and various forms of yoga, both calling for an unusual relation to time over extensive periods. Related sources of insight would include the cultivation of silence and quietness (Thich Nhat Hanh, *Silence: the power of quiet in a world full of noise*, 2016; Susan Cain, *Quiet: the power of introverts in a world that can't stop talking*, 2013; Sara Maitland, *A Book of Silence*, 2008).

Whether understood as sustained and enabled by individuals and/or a collective, such qualities may also be recognized in terms of:

- a "pregnant moment"
- dramatic moment
- significant moment
- "missing the moment"
- quality time
- "spirit of place"
- "good vibrations"
- "quality without a name" or a "place to be", as variously framed by Christopher Alexander (*A Pattern Language*, 1977; *The Timeless Way of Building*, 1979)

Clues to experience of higher derivatives of time

The following are potentially indicative of forms of temporal inversion, although the particular focus of each may be a form of misdirection.

Entelechy: Dating from the preoccupation of Aristotle, [entelechy](#) is considered to be an inherent regulating and directing force in the development and functioning of an organism, the actualization of form-giving cause as contrasted with potential existence (with which future orientation is strongly associated), as discussed separately (*Entelechy: potential and actuality*, 2001). There is a curious contemporary interest in entelechy, a term highlighted by Aristotle that has now been taken up by the human potential movement. Practices relating to this focus include: evocation of entelechy; opening to, affirming and talking to the underlying source/wellspring/ground of lived experience; a felt sense of good/fitting/appropriate timing in personal and social behaviour, both secular and sacred.

Holomovement as alternation between implicate and explicate order: This theme was a central focus of quantum physicist [David Bohm](#) -- with [implicate order](#) and [explicate order](#) articulated as ontological concepts for quantum theory (*Wholeness and the Implicate Order*, 1980). This notably framed the existence of [hidden variables](#) in quantum theory. As a key concept, [holomovement](#) brings together the holistic principle of "undivided wholeness" with the idea that everything is in a state of process or becoming (or "universal flux").

Hyperorder? Following the inspiration of [Alan Turing](#) regarding oracular computing, a mode of engagement with hyperreality can be envisaged through hypercomputing, as separately argued (*Imagining Order as Hypercomputing: operating an information engine through meta-analogy*, 2014). As Turing imagined, this would transcend the limitations of conventional logic (*Engaging with Hyperreality through Demonique and Angelique? Mnemonic clues to global governance from mathematical theology and hyperbolic tessellation*, 2016). Any implication of hyperreality, and associated compactification is provocatively suggestive of the nature and locus of angels. Rather than "[dancing on a pin head](#)", such entities might be better envisaged as associated with the hyperdimensional.

Outside/Inside? Given the incoherence of experience of external reality, the possibility of transformation of worldview from "inside-outside" to "outside-inside" can be explored (*World Introversion through Paracycling: global potential for living sustainably "outside-inside"*, 2013). So framed there is then a possibility of imagining a window of strategic opportunity for change through a form of inversion, necessarily implying engagement with spacetime.

Liminality: As with the previous point, rather than preoccupation with the externality of temporal experience, greater attention can be given to the interface between objective and subjective experience through (especially aesthetic) understandings of [liminality](#) (*Living as an Imaginal Bridge between Worlds: global implications of "betwixt and between" and liminality*, 2011). As an alternative to effort to "grasp" reality in a quest for closure, the experience of ignorance may be cultivated otherwise (*Living with Incomprehension and Uncertainty: re-cognizing the varieties of non-comprehension and misunderstanding*, 2012; *Beyond Harassment of Reality and Grasping Future Possibilities: learnings from sexual harassment as a metaphor*, 1996).

Rebirth: Extensive use is made of rebirth (and renaissance) whether as a one-off transformation or understood as a potential sequence of initiations into insight of an ever higher order, however this might be related to time. The distinctions may be associated with a cognitive hierarchy of "degrees", most notably as in freemasonry (*Varieties of Rebirth: distinguishing ways of being "born again"*, 2004). The latter clusters such understanding in terms of;

- [cultural rebirth](#) (renaissance, aesthetic birth, mytho-poiesis)
- [socio-religious rebirth](#) (birthright, destiny, reincarnation, social status, ceremony, ritual, group affiliation, games, sports)
- [psycho-behavioural rebirth](#) (sin-to-virtue, changing patterns of consumption, conversion)
- [developmental rebirth](#) (education, perspective, initiation, cultural creativity, individuation)
- [therapeutical rebirth](#) (release from trauma, mentors, self-help, discipleship)
- [cognitive perspective](#) (metacognition, critical thinking, philosophy, aesthetic sensibility, orders of thinking, systematics, orders of abstraction, disciplines of action)
- [experiential rebirth](#) (operacy, flow, embodiment of mind, speaking with God, born-again, possession, psychedelic experience, embodiment in song, spiritual rebirth)

The frequent calls for renewal and a "New Renaissance" are far from clear regarding what higher order of collective self-reflexivity this may imply (*Challenges of Renaissance: suggestive pattern of concerns in the light of the birth metaphor*, 2003).

Indwelling intelligence: Any suggestion of compactification of higher dimensions, as noted above, invites reflection on the possibility that some cognitive processes may themselves be characterized by compactification (*Implication of Indwelling Intelligence in Global Confidence-building: sustaining the construction and dynamic of psychosocial reality through questioning*, 2012). This suggests a curious contrast between a questionable degree of externality implied by "enlightenment" in contrast with a form of internality implied by the questionable use of "inlightenment" as a variant, if not a mistranslation (Immanuel Kant, *Foundations of the Metaphysics of Morals and What Is Inlightenment*, 1959; Max Horkheimer and Theodor W. Adorno, *Dialectic of Inlightenment*, 1972).

Epiterrestrial intelligence: In contrast to continuing speculation regarding the existence and nature of "extraterrestrials", such speculation could fruitfully focus on their embedding in terrestrial systems as "epiterrestrials" (*Sensing Epiterrestrial Intelligence (SETI): embedding of "extraterrestrials" in epistemic dynamics?* 2013)

Psychoactive drugs: Many studies have explored the [effects of drugs on time perception](#). These show that stimulants produce overestimates of time duration, whereas depressants and anesthetics produce underestimates of time duration (Ruth Ogden and Catharine Montgomery, *High Time, The Psychologist*, 2012; William J Matthews and Warren H Meck, *Time Perception: the bad news and the good*, *Wiley Interdisciplinary Reviews Cognitive Science*, 5, 2014, 4). Of particular relevance is the manner in which the sense of agency is associated with a subjective compression of time; namely when actions and their outcomes are perceived as bound together in time -- termed "intentional binding" (W. Moore, et al, *Time, Action and Psychosis: using subjective time to investigate the effects of ketamine on sense of agency*, *Neuropsychologia*, 51, 2013, 2.). The article was part of a special issue on *How Does the Brain Process Time?*

Aesthetic timing: The role of timing is recognized as fundamental in various processes, most notably humour, drama, and music. It is of course a primary feature of confidence trickery

Temporal violence: As noted above, this can be understood as consistent with any experience framed as being "jerked around", whether or not it takes subtler forms in the light of the indicated higher derivatives of time. Gross manifestations of temporal violence have been explored by Jeremy Rifkin (*Time Wars: the primary conflict in human history*, 1987). The theme has recently been taken up in a conference (*Time Wars, Thinking Together*-, Berlin, 2018) framed in the following terms:

Temporalities are at war. Less tangible, perhaps, than today's countless material and immaterial conflicts, but no less real. The systemic temporal violence unleashed by turbocapitalism; the proliferation of non-human, digital time; the slow violence of environmental degradation; the relentless speeds and spans of media attention; the terror of a permanent state of exception in the name of a mutated warfare without end; the dispossessed temporalities of migration - these are but some of the time-related forces operating at present.

The conference sought to probe the current state of affairs through the lens of time by collectively considering what today's "beings in time" experience on a daily basis, exposed as they are to diverging and colliding temporal forces: flexibilization, fragmentation and the maxing out of capacities; time horizons shrunk, stretched and warped; the vertigo of reciprocal speed and slowness; the loss of temporal claim and agency. It is suggested that maybe more than ever, time -- as a political category -- is of the essence when it comes to learning to read through, past and within the erratic commotions of the present.

Arguably such violence is associated with any "big lie" or any confidence to which the collective is subject, as can be variously discussed (*Existential Challenge of Detecting Today's Big Lie: mysterious black hole conditioning global civilization?* 2016; (*Global Economy of Truth as a Ponzi Scheme: personal cognitive implication in globalization?* 2016)

Other insights are offered by Eric J. Haanstadt (*Violence and Temporal Subjectivity*, *AnthroSource*, 34, 2009) and by Luc Reychler (*Time for Peace: the essential role of time in conflict and peace processes*, 2015). These notably highlight the consequences of temporal insensitivity -- with respect to how time is valued between different cultures. Of relevance is the process of **temporal encroachment**, is understood as an (unwelcome) action that affects the perception of time or that affects the ability to take action in the future.

Of particular interest, as noted above, is comprehension of terrorism in terms of temporal violence as articulated by Thomas Austenfeld, et al. (*Terrorism and Narrative Practice*, LIT Verlag MÜNster, 2011):

Literature, for reasons related to its formal development in the nineteenth century, captured something about terrorism that has gone largely unnoticed in scholarship, namely that terrorism is a fundamentally temporal violence. Terrorism's historical emergence is intimately connected to the sense of historicity that is characteristic of the modern age, and terrorists, indeed, are among the most temporally sensitive creatures this age has known. As variable as are the ways terrorists experience particular periods of history, they invariably understand their violence as able to intervene in historical time. The historical discipline is in fact aware of the link between terrorism and time, although this knowledge seems to linger at the level of the unconscious: it is noticeable mostly because of discursive ties that routinely describe terrorists as politically "impatient" without, however, ever exploring the notion. Impatience, as I have argued elsewhere, does capture something about the nature of terrorism, but something much more complex than historiography intimates. Moreover, as far as terrorism's temporality is concerned, it really only gets at the lip of the proverbial iceberg (p. 117)

Questioning otherwise: Irrespective of the academic controversy, learning can be suggestively understood as associated with higher orders of questioning -- increasing degrees of self-reflexivity, implication in what is observed, and forms of cognitive embodiment. This is argued by various authors (Henryk Skolimowski, *The Participatory Mind: a new theory of knowledge and of the universe*, 1995) and discussed separately, notably with respect to **constructivism** and **enaction** (*Existential Embodiment of Externalities: radical cognitive engagement with environmental categories and disciplines*, 2009; David Abram, *The Spell of the Sensuous: perception and language in a more-than-human world*, 1997; George Lakoff and Mark Johnson, *Philosophy In The Flesh: the embodied mind and its challenge to western thought*, 1999).

Rendering the future present: In the light of the work of Francisco Varela (*The Specious Present: a neurophenomenology of time consciousness*, 1997), the conventions of "presenting the future" as anticipated in a variety of official reports, can be understood otherwise as "rendering the future present" (*Engendering 2052 through Re-imagining the Present*, 2012; *Presenting the Future: an alternative to dependence on human sacrifice through global pyramid selling schemes*, 2001).

Varela's argument is usefully contrasted with **short-termism**, namely an excessive focus on short-term results at the expense of long-term interests.

Higher degrees of comprehension and their "compactification"?

This argument serves mainly to frame the question as to where insight into comprehension of higher derivatives of time is to be found and how such comprehension is to be recognized. Ironically, given the argument above relating "gravity" in a cognitive sense to arrogance, there is clearly a challenge to engaging with those who might be assumed to have such insight -- only emphasized by the association of **gravitas** with such gravity. There is also the suspicion that the associated cognitive skill could well be evident in processes which are already reasonably familiar: split-second decision-making and risk-taking, skilled repartee, adaptability to challenges on-the-fly, and kinetic intelligence (notably in the martial arts).

The insights associated with creativity and genius clearly merit consideration, especially those with remarkable calculating skills (including those characterized by **savant syndrome**). An obvious challenge lies in how wisdom is to be recognized in relation to higher

derivatives of time and its embodiment, as discussed separately (*The Isdom of the Wisdom Society: embodying time as the heartland of humanity*, 2003).

Such examples also serve to highlight how such capacities are "compactified" -- in a sense analogous to that framed so skillfully by fundamental physics in terms of "curled up" or "wrapped up" higher dimensionality. How is the "compactification of comprehension" to be understood -- given the degree of succinctness implied?

Compactified biological time? Following earlier research on biological time, rhythms and retention/protection a philosophical frame for proposed dimensions and mathematical structure of biological time are developed by Giuseppe Longo and Nicole Perret, *Rhythms, Retention and Protection: philosophical reflections on a geometry for biological time*, 2017). This enables the outlining of a geometry of specific biological time. To the usual dimension of an irreversible physical time they add a dimension specific to the internal rhythms of organisms, given the relative autonomy of biological rhythms with respect to physical time. This second dimension of time is "compactified" in a simple but rigorous mathematical sense.

"Grokking"? Given speculative anticipation of enlightened extraterrestrials, spiritual saviours or [superintelligent AI](#), reference can be made for emergence of a new "cognitive species" in the light of the science fiction theme of "grok" (*Authentic Grokking: emergence of Homo conjugens*, 2003). As noted there, the term was introduced into science fiction by [Robert Heinlein](#) (*Stranger in a Strange Land*, 1961) as meaning literally "to drink" and metaphorically "to be one with" -- connoting understanding in a global sense involving intimate and exhaustive knowledge, possibly akin to [synaesthesia](#). It is described by Heinlein as:

Grok means to understand so thoroughly that the observer becomes a part of the observed -- to merge, blend, intermarry, lose identity in group experience. It means almost everything that we mean by religion, philosophy, and science -- and it means as little to us (because of our Earthling assumptions) as color means to a blind man.

It has been taken up by cognitive scientists, philosophers and neuro-cosmologists -- as well by practioners of [zen](#). Its German origin as *verstehen* implies a special form of sympathetic, experiential and intuitive understanding. Milo Clark (*The Art of Grokking*, 2000) summarizes his use of it, in contrast to the unwitting perpetuation of conditioned thought, as:

For my purposes, to grok extends beyond ordinary and even extraordinary levels of comprehension moving far into the vestigial core of being human and possessing, as well as using qualities rarely engaged these days. We may grok more from our reptilian brain segments than from the later evolutionary lobes. As we move beyond transcendent experiencing to genuine transmutations of consciousnesses [plural intended] of being, we move from understanding to grokking -- and then stay there, leaving behind all which is behind without, in any fundamental way, negating the qualities of knowing personally, individually and collectively the histories of humankind on this planet -- now quite lost, barely available through ordinary processes, education, etc. to most. Meditation practices pursued to realization, first levels of samadhi, for example, provide some sensing relevant to and transferable to ordinary, daily life which helps to break, to free from the lulling dualities dominating most.

Also spelt as "groking", Bill Hayashi has explained it as "moving from a merely conceptual, mental understanding to a personally felt and experiential knowing" (*Groking: Transformational Knowing*, 1997). For Obafemi Adewumi:

Groking occurs naturally when we practice whole body listening. To grok something is to grasp it: to get the marrow, the inner meaning, the crux, or the gist of it. It is to get the essence of a communication or sharing such that we are able to recreate it in our own language. By practising groking, we can all become contributors to the planetary evolution. Groking enables us to learn quickly and to share what we have learned with others. [[more](#)]

Homo conjugens? The earlier argument suggested that beyond *Homo sapiens* lies a species, *Homo conjugens*, that is fecund in ways that *Homo sapiens* could only project into biological reproduction. The emergence of *Homo conjugens* would then signal a new way of engaging and joining with the world (*Emergence of Homo undulans -- through a "grokking" dynamic?*, 2013). The characteristics of that species were described there under the following headings:

- Paradox and ambiguity | Dualism and polarity | Intercourse | Consummation | Enactivism
- Reflection-within | Reflection-without | Environment | Instrumentalism | Possession
- Inter-personal relationships | Group activity | Commitment | Paradigm shift
- Time-binding | Language | Self-constraint | Dynamic | Playfulness | Humour

Homo undulans? The argument can be developed further in the light of the case variously made for quantum consciousness (as noted above), or even the reframing of human identity as wave forms of some kind (*Being a Waveform of Potential as an Experiential Choice: emergent dynamic qualities of identity and integrity*, 2013; *Being Neither a-Waving Nor a-Parting*, 2013; *Encountering Otherness as a Waveform: in the light of a wave theory of being*, 2013).

In the quest for a more appropriate species qualifier -- beyond "*conjugens*", "Undulans" (deriving etymologically from "wave") is currently used in the distinction of a range of species. Of far greater relevance to the above argument is the description of *Homo undulans* as the theme of a penultimate chapter of the very detailed study by Daniel Dervin (*Creativity and Culture: a psychoanalytic study of the creative process in the arts, sciences, and culture*, 1990). Appropriately he relates this to a "third birth" of "self-creation", discussed at length in his final chapter. For Dervin, with respect to *Homo undulans*:

On his most rudimentary level, Einstein has taught us that, even more than vacuums, nature abhors straight lines. At least Relativity abhors them... So a straight line put under pressure, as it were, of scientific observation is recreated as a curve. Does the awareness of curvature also mark the beginning of creativity? One can be grateful, in any case, to Einstein for locating in the bending of light and the curving of space some faint correspondence to that "vain, diverse, and undulating object" that [Michel de] Montaigne described as man, adding "tis hard to find any constant and uniform judgment on him" (p. 244)

Through the appropriate emphasis on "undulating" (as a characteristic of "wave language"), and through a sense of **embodied cognition**, this usefully suggests cognitive implication in the body in movement -- most obviously dance, as noted above. This is consistent with the arguments of Mark Johnson (*The Meaning of the Body: aesthetics of human understanding*, 2007; *The Body in the Mind: the bodily basis of meaning, imagination, and reason*, 1987), and with George Lakoff (*Philosophy in the Flesh: the embodied mind and its challenge to western thought*, 1999). **Undulatory locomotion** is the type of motion characterized by wave-like movement patterns that act to propel an animal forward and is the most primitive of vertebrate locomotor patterns.

"*The Law of Undulation*" is the title of a chapter in a work of C. S. Lewis (*The Screwtape Letters*, 1942, chapter 8) with respect to the Christian experience of life. It has been creatively visualized by Dani Herman (*Law of Undulation*, Prezi, 20 November 2012). It is a theme for numerous Christian commentaries (R. Penman Smith, *The Law of Undulation, Morning by Morning*, 21 March 2013; *Deeper Waters, The Law of Undulation*, *ubfriends.org*, 4 July 2010; William Femi Awodele, *The Law of Undulation*, 2011). The chapter notes:

Humans are amphibians -- half spirit and half animal... As spirits they belong to the eternal world, but as animals they inhabit time. This means that while their spirit can be directed to an eternal object, their bodies, passions, and imaginations are in continual change, for to be in time means to change. Their nearest approach to constancy, therefore, is undulation -- the repeated return to a level from which they repeatedly fall back, a series of troughs and peaks.

The "law" also features as central to the work of Japanese architect Ikuro Adachi at the Institute of Form-Undulatory Energy (*The Law of Undulation: contemporary Earth culture and its future*, 2007). "Undulation" is an explicit feature of a wide variety of fitness exercises.

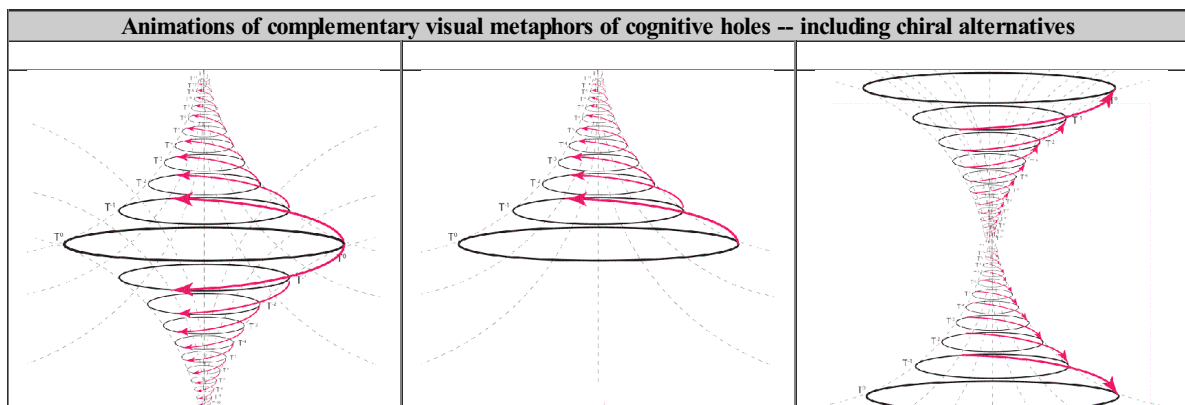
Alternation: *Homo undulans* is also appropriately consistent with earlier arguments for recognition of the neglected role of "alternation" in sustainable development of any kind. These were presented in a collection of papers (*Policy Alternation for Development*, 1984). That on *Metaphors of Alternation* (1984) effectively offers further examples of "wave language" for which a case had been previously made (*Liberation of Integration, Universality and Concord -- through pattern, oscillation, harmony and embodiment*, 1980). It is also consistent with a more speculative development of the argument (*Sensing Epiterrestrial Intelligence (SETI): embedding of "extraterrestrials" in epistemic dynamics?* 2013). Of interest is the reconciliation in French of "otherness" with "alternation" through "alterité" and *alternance* -- the latter being upheld as basic to the democratic process.

Homo undulans suggests the emergence of a human species that may effectively "dance with reality" in cognitive terms, in contrast with what would be perceived by that species as the current "harassment of reality", as previously argued (*Beyond Harassment of Reality and Grasping Future Possibilities: learnings from sexual harassment as a metaphor*, 1996). The metaphor has been explored by Gary Zukav (*The Dancing Wu Li Masters: an overview of the new physics*, 1979).

Jouncing and *homo undulans*? This argument suggests the possibility that jouncing, and the higher derivatives of time, might offer a means of exploring the nature of grokking and *Homo undulans*. Combined with the indications offered by wave theory, do these provide comprehensible clues to compactification -- ironically rendered comprehensible to a degree through dance?

Beyond the terminology offered by physics -- snap, crackle, pop, lock, drop -- what terms from other frameworks would offer suggestive insight into those modalities beyond jounce? The study by Douglas Hofstadter and Emmanuel Sander of the role of analogy in relation to creativity, notably with reference to Einstein, presumably provides guidance for such an any exploration (*Surfaces and Essences: analogy as the fuel and fire of thinking*, 2013).

The schematic by which this argument was introduced invites complexification in order to hold the implied cognitive parameters. One understanding in cognitive terms is promoted in terms of "spiral dynamics" (Don Edward Beck and Christopher C. Cowan, *Spiral Dynamics: mastering values, leadership and change*, 1996). As indicated above, various alternatives to the spiral and motion within it evoke complementary consideration -- suggested by the animations below.



Triple helix and jouncing? Other than time dimensions, the fundamental implication of M (mass) and L (distance) can be understood as combining to frame the "cognitive hole". Of further potential relevance is the sense in which there are multiple intertwined spirals, inspired by DNA. Three spirals feature in the [Triple Helix thesis](#) (Henry Etzkowitz (*Triple Helix: a new model of innovation*, 2005). In that framing of triadic thinking interrelating government--academia-business as a vital key to innovation.

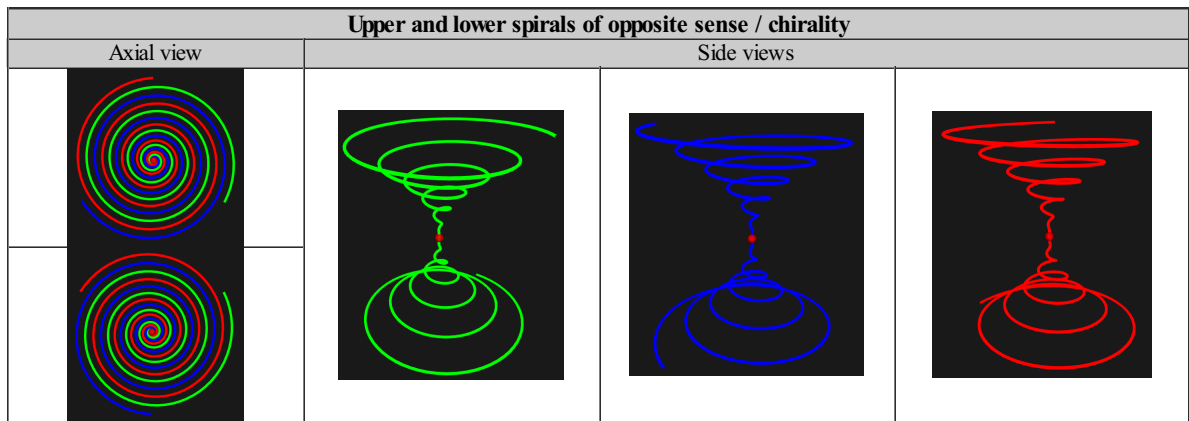
The question is whether triadic cognition can be generalized to a far higher degree as discussed separately (*Triangulation of Incommensurable Concepts for Global Configuration*, 2011; *Cognitive Implications in 3D of Triadic Symbols Valued in 2D: representations of the triskelion in virtual reality and implications for quantum consciousness*, 2017).

Further to his articulation of sociophysics (mentioned above), Paris Arnopoulos develops the argument otherwise as a means of engaging with the Triple Helix thesis (*Braiding the Triadic Codex and Triple Helix: the sociophysics of nature-culture-nurture and academy-industry-polity*, 2000). There he notes:

... this short paper interfaces with the triple helix paradigm by weaving its triadic social focus-locus with the power-wealth-data flows among its state-market-school centers. In this way we can concentrate on the most significant influence-finance-science transactions of the polity-industry-academy triangle.... In doing any job, force performs work: $W = Fs = mas = mv^2$. This means that some work must be done in order to bring about social change. If that change is needed fast then one must exert a lot of power: $P = W/t = mav = Fv$. By this mathematical transformation, we have arrived at this crucial notion of power politics as well as physics. Social power however, unlike physical power, does not move inanimate objects but human masses to act far and fast.... Informative societies are negentropic because they increase systemic organization and decrease environmental degradation. Accumulating human knowledge also improves social control ($C = a/t$), since it regulates social change in a more enlightened manner. For that reason the exercise of responsible social power requires strict political control ($P = msC$)....

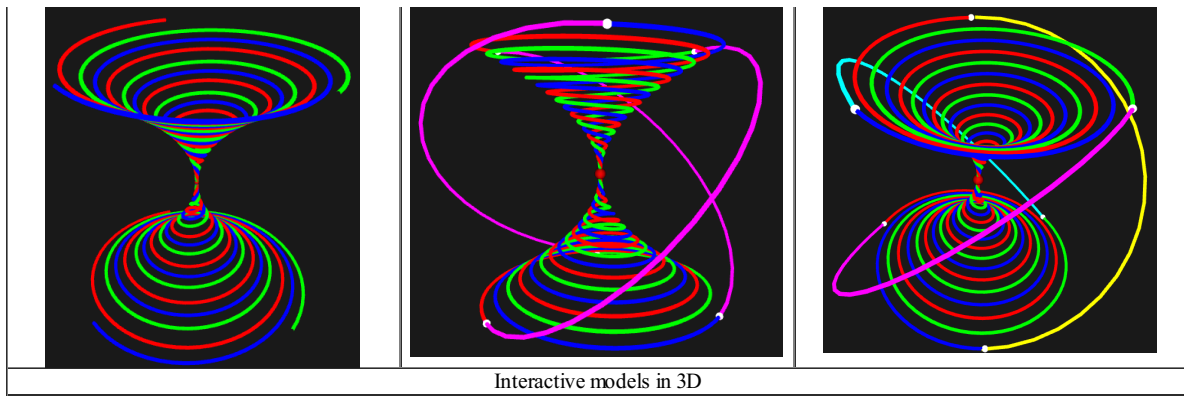
Insightful possibilities of representing the Triple Helix in 3D are discussed separately (*Cognitive osmosis through topological eversion and interlocking tori -- framing outside-inside otherwise*, 2017; *Psychosocial Learnings from the Spiral Form of Hurricanes: implications of the triple helix and the 3-fold triskelion as "cognitive cyclones"?* 2017). The former includes a triple helix representation in 3D compared with a visual rendering of colliding black holes.

Strategically, with respect to the integrative challenge, **does the relevance of Triple Helix model for governance and innovation depend on the capacity to "encompass jerk" through the kinds of control associated with jounce -- or higher derivatives of time?**



Given the focus on time in this argument, this is naturally complemented from a scientific perspective by mass and distance. The concern here is whether, under the extremes implied by the higher derivatives of time, both mass and distance then acquire other cognitive significance through their "generalization" -- as with time. It is in this sense that schemaics can be used to evoke reflection on their relationship -- as in a triple helix. As with the continuing mystery of gravitational attraction, especially with respect to any "black hole", how is extremely powerful attraction to be understood -- given the nature of the experience of it and the so-called [reality distortion field](#) that it engenders?

Combining upper and lower helices of different chirality		
Same sense/chirality (precluding "external" links)	Opposite sense/chirality (addition of "external" links)	Opposite sense/chirality (distinguishing "external" links)



Sustainability and resilience -- beyond jouncing? As argued, these terms point to the possibility of higher orders of governance -- suggestively framed by higher derivatives of time, however these are to be understood. As such they call into question any simplistic framing of growth given the challenges to its control. Whilst resilience is readily framed in terms of the adaptive cycle, the cognitive skills required for its navigation are themselves a challenge to any conventional framing of control. Presumably a degree of subtlety is required, perhaps exemplified by the traditional Chinese recognition that the role of the emperor is to "do nothing" -- however that is to be otherwise understood. Current understandings of "oversight" would seem to be fundamentally inadequate in those terms.

The need for other understandings of control and time is implied by tentative aspirations to a [circular economy](#) in a context of surrealistic breakdown of mutual confidence. Through the cultural significance of the complex circularity of the *Wu Xing*, this may provide particular advantages to the global leadership of China. Is that 5-fold dynamic to be recognized as a higher order cybernetic feedback system to be understood from the perspective of jouncing -- or beyond?

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