Newtonian bodies and consciousness - Hierarchical Construct Theory

Over thirty years before the first journal devoted to complex systems was to publish its first paper, Bertalanffy introduced his General Systems Theory (1950; 1951). Adopting Bertalanffy's lead, Kuhn (1974) proposes that all systems tend toward equilibrium through communication (where communication translates as the exchange of information) and transaction (involving the exchange of "matter–energy"), and that a prerequisite for the continuance of a system, by controlled or uncontrolled means, is its ability to maintain a steady and stable state. In this essay, I develop the ideas of Kuhn and explain how the acquisition and maintenance of stability following interaction is a physical principle that leads to a hierarchy of emergent constructs and evolving forms that possess consciousness with qualitative experience and purpose. However, the roots of the idea lie in Newton.

Newton

Newton's First and Third Law of Motion state, an object either remains at rest or continues to move at a constant velocity unless acted upon by a force, and, when a body exerts a force on a second body, the second body simultaneously exerts a force equal in magnitude and opposite in direction on the first body. One way of looking at this is to say alternatively that interaction can be interpreted as a 'negotiation', of sorts, and that the consequence is an equitable compromise; it leads to a new state of equilibrium. If one is to interpret this further in terms of the inclination of bodies during interaction, it is that they *redefine equilibrium through negotiated compromise*. Furthermore, when two independent bodies interact with one another, the ensuing reaction is always related to their initial physical state; there must be some informative relationship between the initial condition and the response (for a quantum mechanical extension of this, consider Rovelli's relational quantum mechanics interpretation, 1996).

Now consider the concept of 'bodies' not as material spheres occupying space, but in a broader more abstract sense. As such, 'a body' is redefined as an singular interactive entity whose constituent components may be fluidly dynamic. In this manner, we are effectively replacing the Newtonian term 'body' with the term 'construct', where the term 'construct' incorporates the concept of a physical and interacting entity that need not specifically be solid in construction or define a temporal 3-dimensional space.

In sum, we have the following:

i) Newtonian bodies can be interpreted as a metaphor for any dynamic construct that forms a coherent singular identity.

ii) Interaction between constructs can be interpreted as a form of negotiation.

iii) Negotiation leads to a compromise which establishes an alternative stability or equilibrium state that incorporates all interactive parties.

iv) Interaction, negotiation, and compromise is an evolving informational mechanism.

Next we have to ask, how could this possibly relate to consciousness? Hierarchical Construct Theory (HCT)

provides the answer. Articulating this is the intention of the remainder of the paper.

As a starting point, let us consider the proposition that perception, consciousness and awareness are each examples of a class of construct and that they are related hierarchically. Recognizing that there are many different definitions of these terms we simply consider the proposal *a priori* that they correspond with different non-material entities that institute a particular kind of mechanism of environmental interaction. Individual forms pertaining to each construct class interact with their environment and in doing so negotiate and re-establish their stability through the institution of a compromising equilibrium state. This process endows the forms from each construct class with a certain informational stance toward their environment. This informational stance is qualitatively relevant to the maintenance of their stability. The basic proposal is that during the reacquisition of stability following environmental interaction, new and increasingly complex forms tend to evolve in each class.

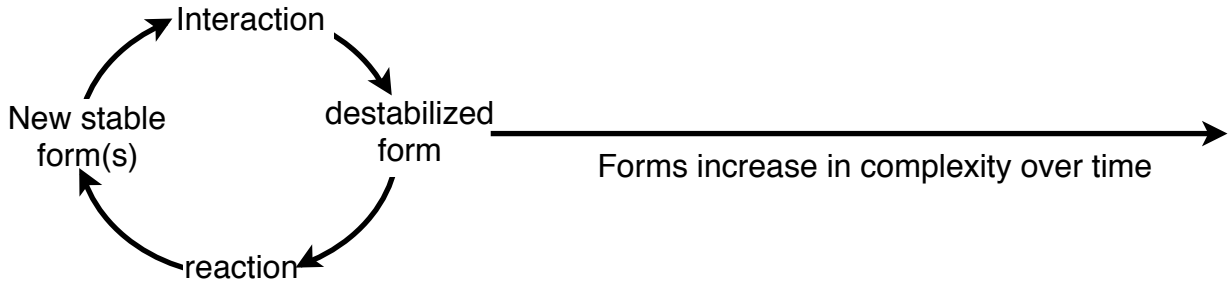

Figure 1 - Equilibrium Cycle

This increase in the complexity of forms eventually leads to the emergence of a transcendent interactive mechanism that characterizes the dynamic of the subsequent construct in the hierarchy whose forms evolve tangentially to those of the former construct class.

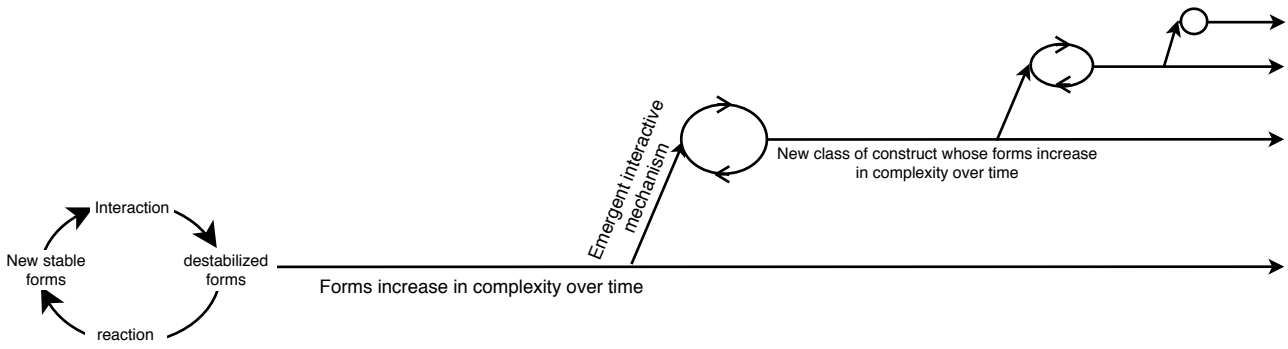

Figure 2 - Emergent construct hierarchy

Hierarchical Construct Theory exposition

Perception

It is often said of atomic elements and compounds that they *react.* But before reacting they must first *interact,* for how else is a reaction to be qualified if there is not initially some determinate informing interactive process? Consider the following: The interaction between a form (such as, an atomic element or compound) and its environment is a process 'through which' (*per*) the form 'embraces' the environmental exchange (*capere*, to seize or to take hold) and which then qualifies the character of its subsequent reaction.

This does not appear to be a particularly controversial statement, that is, until one considers that *per* and *capere*, are the etymological origins of *per-ception*. In this context, the term 'perception' accurately characterizes the interactive process that precedes reaction. Of course, this alternative application of the term is far-removed from its contemporary populist usage; controversially, it appears to apply in equal measure to inanimate forms as to living organisms. But a distinction is determined when one considers that there are two types of perception, namely, passive and active.

The distinction between passive and active perception states

***Passive perception*:** When an atomic element or compound interacts with its environment its subsequent reaction might alter its atomic or subatomic dynamics. One can view this altered state as equating to a new equilibrium: before the interaction there was an equilibrium and following interaction a new equilibrium acquired. Whether interaction takes place inside a star or a planetary environment, the acquisition of a new equilibrium may realize a novel element or compound with a structural resilience that is more stable in that particular environment. Consequently, the renewal of atomic stability and acquisition of alternative equilibria tends to lead to the evolution of increasingly complex and persistent elements and compounds. But atomic elements and compounds themselves, do not control this evolutionary process. Their interactive involvement in the evolution of stable atomic forms is passive: for any given atomic form, interaction takes place, a reaction ensues, and there concludes the existence and influence of that particular form in the history of evolving form. Surprisingly however, there is an interactive mechanism that does enable an atomic compound to exert some control over this evolutionary process. It is a mechanism that eventually emerged due to increases in the evolved complexity of compound atomic forms. Constructs whose forms possess this mechanism are *actively* perceptive, or one might say, *proactively* perceptive.

***Active perception—A new transcendent construct emerges*:** A complex atomic form that is capable of replication has the potential to extend its interactive influence beyond the boundaries of the individual compound. Replication places a controlling influence by creating a feedback between the consequences of reaction and the quality of interactive engagement. In other words, reactive consequences are linked, in perpetuity, to the interactive process due to their impact on the survival of the replicating lineage. The construct, therefore, is not the individual compound but is the replicating lineage. The lineage transcends the individual replicant form by perpetuating the construct *through successive generations* even after individual members of the lineage have dissipated and ceased to exist. Environmental interactions do not happen and then just end as is the case with passively perceptive constructs. Instead, a replicating construct transcends its individual structures' environmental interactions through successive generations, in virtue of its replicants. Consequently, the replicating construct acquires stability following interaction through *adaption*, whereas non-replicating matter acquires its stability following interaction merely through *reaction*. Whilst a passively perceptive construct acquires structural equilibrium immediately following environmental interaction, the structure of a replicant represents a snapshot in time of an evolving 'body' whose constitutional impetus is to

maintain a stable physiological adaptation over generations.

Passive consciousness

Replication enables generational *adaptation* whilst non-replicating forms merely *react.* Mutant variations are the coincidental means by which a lineage's equilibrium adjusts, *vis a vis* adapts, as a response to its interaction with a changing environment over generations (via its individual component replicants). Inevitably, mutant forms ensure that increasingly sophisticated and resilient physiological adaptations evolve because the quality of the interactive engagement of any given physiology is relevant to the survival efficacy of the lineage.

Consider the following statement: An individual replicant from a lineage possesses a physiology that represents its lineage's acquired understanding of the merits and qualitative relevance on survival of environmental particulars. Clearly, in the context of this statement, understanding is not of the kind that one might typically associate with such things as thinking or reasoning. Rather, the term 'understanding' is used here to acknowledge the meaningful correspondence that exists between environment and physiologies. For instance, the complex nature of creating sugars from light, water and carbon dioxide, indicate that the evolved biochemical mechanisms of plants exhibit an understanding of how the sun's energy can be stored; or, a heliotropic plant that follows the sun as it traverses the sky demonstrates a biochemical correspondence with an environmental event that is relevant and of survival merit (Dennett, 1995 and Wiener, 1961 argue that adaptation is a form of knowledge). As with the definition of perception above we can refer to the etymology and state that it is with (*con,* with) its biochemical physiology that a replicant possesses an understanding (*scire*, to know) of the qualitative relevance of environmental particulars. Alternatively, the replicants of a lineage demonstrate environmental *con-sciousness* through their environmentally responsive biochemical mechanisms. This definition is emphatically not a call to panpsychism; it is not saying that such organisms possess some diminished sentience or lived experience, or such like. Rather, what it says is that the physiologies of organisms possess a correspondence with their environment that demonstrates an understanding of their qualitative relevance. This definition requires a conceptual leap from our commonplace ideas. The proposal is that a replicating lineage evolves physiologies that demonstrate understandings of the relevance of environmental particulars and that these understandings are acquired passively due to mutant variations, which coincidentally facilitate progressive physiological adaptation. Furthermore, physiological adaptations are qualitatively delineated; replicating lineages evolve biochemical mechanisms that provoke the qualitative characterization of environmental particulars because *it is through qualitative characterization that the respective merits of environmental particulars become biochemically*

assimilated and, henceforth, meaningful to the function and survival of the organism.[1]

If one is open to this foundational thesis, the obvious question becomes how we might thereby extrapolate an account of the mental characteristics more typically associated with sentient consciousness. Doing this, entails drawing a distinction between passive and active consciousness.

The distinction between passive and active consciousness states

***Passive consciousness*:** A replicating lineage's physiology tends to evolve in a way that bears a correspondence with environmental particulars, each particular being characterized biochemically in a manner that is qualitatively relevant to survival. As such, the lineage can be viewed as a single construct that interacts, through its individual constituent replicant members, over a generational timeline; the interactive dynamic of replicating members ensures that the stability of the lineage is maintained over generations through physiological adaptation. However, it is not its replicating structure but environmental selection that determines the nature of the understanding that a construct's replicants acquire over generations: a replicating organic structure does not have the capability to dictate the means by which it acquires complex environmental understanding. Thus, when referring to the previous definition of consciousness, that it is with (*con,* with) its biochemical structure that a biological construct expresses its understanding (*scire*, to know) of the qualitative relevance of environmental particulars, we can clarify that the environmental understandings that a replicant possesses in virtue of its physiology have been acquired coincidentally, that is, in an indirect or passive manner at the behest of survival pressures.

However, innately acquired adaptations inevitably become increasingly sophisticated in their capacity to assimilate environmental particulars. The consequential increase in physiological complexities leads, inevitably, to the emergence of a new interactive mechanism that creates a distinct class of construct where consciousness becomes a proactive endeavour of individual replicants.

***Active consciousness—A new transcendent construct emerges*:** Neural networks have the capability to rapidly weight and prioritize biochemical assimilations of the environment. This facility confers survival benefits which inevitably prompts the evolution of increasingly sophisticated neural network mechanisms that enhance those evaluative capabilities. These mechanisms thereby come to define a unique class of construct whose processes lead to realtime *behavioural* adaptations, where previously, interaction with the environment led to mere *physiological* adaptation over generations.

As discussed, a key characteristic of any given construct class is that its interdependent parts must maintain stability through the continual acquisition of an equilibrium state for the construct to exist as a

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[1] The extent to which qualitative relevance can be biochemically assimilated is contestable. In my view, replication evinces a novel ontology where the physical particulars of environment mean something qualitatively and quantitatively to 'living' existential forms. Significantly, this view provides an answer to Chalmers (1995) that can be empirically tested (Inagaki, *et al.,* 2014, Wang, *et al*,. 2011).

singular identity. Applying this principle here, there is a continual realignment of the equilibrium of evaluated understandings in response to environmental interaction. What this means in practice, is that understandings, concerning the relationship between the evaluation of qualitative experience and the environment, become altered with each new interactive engagement. During every awake moment, constructs of this class that evince active consciousness continually seek an all-embracing behavioural adaptation and stable evaluated stance toward experience. As the stability of that equilibrium fluctuates with ongoing experience, the individual is compelled to balance its evolving experiential preferences and behavioural priorities. This balancing process thereby comes to characterize the organism's behaviour and its learning capacity. Inevitably, a construct whose interactive mechanisms evaluate a qualitatively assimilated world on a realtime basis *necessarily possesses an individuated and embedded subjective stance*. In this regard, this class of construct transcends objectivity through its evolving individuated phenomenal world-perspective.

The individual that is actively conscious, therefore, expresses itself in a manner that reflects that changing phenomenal worldview. Nevertheless, for such individuals, there remain no defined realizations as to the significance of any given expression, no interpretation of the expressions of others, and no insights regarding the relationship between an expression and learnt associations. In other words, there is no systematic thinking *about* understanding and, as a consequence, no conception of what understandings mean in the context of reality. While subjective reality is experienced by these individuals, it is not thought about in itself. In a letter to Herz, Kant describes what it is like to experience and yet be incapable of introspecting about reality. In the context of this paper, what he describes is the viewpoint of an individual who possesses only active consciousness:

> [If I had the mentality of a sub-human animal, I might have intuitions but] I should not be able to know that I have them, and they would therefore be for me, as a cognitive being, absolutely nothing. They might still… exist in me (a being unconscious of my own existence) as representations…, connected according to an empirical law of association, exercising influence upon feeling and desire, and so always disporting themselves with regularity, without my thereby acquiring the least cognition of anything, not even of these my own states. (Bennett, 1966, p. 104).

Passive Awareness

Active consciousness entails the realtime weighting and prioritization of multiple qualitatively relevant assimilations. This process of evaluation leads to the constant evolution of an individuated experience phenomenon, which is fundamentally qualitative, and which is responsive to the biochemical imperatives of the organism. A construct with this kind of subjective embedded relationship to the world seeks to maintain a stable phenomenal understanding as a response to environmental interaction. In doing so, it may gain novel insights but it does so coincidental, such insights being acquired passively. Nevertheless, cognitive mechanisms that evaluate environmental assimilations do tend to evolve in sophistication over generations,

where they confer a survival advantage. This gradual increase in cognitive sophistication inevitably leads to the emergence of a new construct class whose interactive mechanism generates insights proactively. This mechanism standardizes its insights concerning its phenomenal worldview by developing foundational principles about its perceived world. This subsequently qualifies its conceptual view of reality, which tends to align with its phenomenal consciousness. Under their construction, a network of ideas about existence and about the realization of the existential self become subject to active and purposeful manipulation.

***Active awareness—A new transcendent construct emerges*:** The interactive cognitive mechanisms that generate this conceptualized worldview constituent a singular construct. It is a construct whose singular identity depends on the maintenance of a stable conceptual stance (or ideology) whose state of equilibrium is continually moderated by introspection and discourse.

The formation of a conceptual stance has profound implications on an individual's relationship to the world for it must include an existential concept to account for its own subjective individuated perspective, embedded within an objective world. To deny this concept, which emerges during infancy, would be to deny the self; indeed, its emergence and evolution in the infant leads to the active development of the individual's awareness of their ego-centric conscious state. In the grand scheme of a individuated identity, an emerging conceptual stance must include the recognition that phenomenal experience is a conditional aspect of 'the self'. Once again, it is helpful to quote Kant (1781/8):

> …the original and necessary consciousness of the identity of oneself is at the same time a consciousness of an equally necessary unity of the synthesis of all phenomena, according to concepts, . . . which render them not only necessarily reproducible, but assign also to their intuition an object, . . . in which they are necessarily united. (p. 108)

Individuals that are actively seeking awareness of the conscious state have exceptional communicational intent. Such individuals are compelled to formulate any suitable framework that can effectively communicate their conceptualization of the world. That universally suitable framework, for all languages, is a grammar that adequately differentiates the character of the concepts that the individual seeks to impart. Consequently, from infancy, an individual's languages develop *as a response* to its maturing concepts. In evolutionary terms, the desire to communicate through language was the motivational impetus that would have led to the evolution of specialized language centres in the brain: *the compulsive desire to speak came first, and the physiology gradually evolved to realize the potential benefits of that discursive capability*. Here in lies an alternative to Chomsky's 1988) suggestion that language arises through a realization in the brain of an innate "language acquisition device" that switches on during language development. Instead, Hierarchical Construct Theory indicates that languages are a *by-product* of active awareness. Language arises in individual infants through their compulsion to persuasively communicate their 'revelatory' conceptual realizations. It is then, through discourse, that an individual's concepts begin to influence and be influenced by those of family and tribe. When an individual subscribes to a community, they subsequently become

advocates of the community's rule-based, belief-based, ideological and cultural concepts. Such concepts become incorporated into the individual's conceptual worldview to the extent that they will be compelled to protect them to maintain their own stable conceptual worldview, even when those stances may be contrary to rationale and logic. This indicates that the desire to maintain stable communal concepts is the key overriding motivation to intolerance, prejudice, bias and conflict.

Summary

Hierarchical Construct Theory advances the thesis that the maintenance of stability through the reacquisition of an equilibrium state is fundamental to the interaction of physical forms. It proposes that Newton's application of this principle to material bodies of mass is limited in scope and can be further applied to other classes of physical interaction and classes of body (called 'constructs'). The consequence of exploring this thesis is that it indicates that interaction leads to the evolution of form due to the reacquisition of equilibria, and subsequently to the emergence of transcendent dynamic physical constructs that instantiate contrasting types of environmentally interactive mechanisms. Ultimately, these mechanisms inevitably evolve in a way that qualifies the qualitative significance of environmental particulars and, eventually, to individuated identities with a subjective qualitative worldview.

Perception

The unintended emergence of active perception began on earth with complex replicating compounds about 3.5 to 4 billion years ago during the Eoarchean Era. It signifies a point when compounds began to evolve environmentally informed biochemical mechanisms. The potential benefits were realized in a passive manner through incidental mutant variations and selective pressures that impacted the survival of individual replicating lineages. The consequential adaptations bear an environmental correspondence and must be of qualitative relevance to be of merit to the survival of the lineage. The communicative behaviours of actively perceptive constructs are confined to innate responses that are of survival merit, and therefore which must correspond agreeably to the particulars of the environment.

Consciousness

The emergence of mechanisms capable of rapidly evaluating qualitative assimilations of environmental particulars occurred about 540 million years ago. These evaluative capabilities evinced adaptive behaviours and, as they increased in sophistication due to the survival benefits, instituted the Cambrian evolutionary explosion. The cognitive mechanisms that generate realtime evaluation instantiate individuated forms with a continually evolving qualitatively differentiated and subjective experience of the world. The communicative utterances and gestures of a construct that generates active consciousness are indicative only of that changing phenomenal response to experience.

Awareness

An active awareness of the conscious phenomenon of qualitative experience emerged in the hominid brain during the late Pliocene, about 3 million years ago. It signifies when aware constructs began to

proactively formulate complex relational concepts about their phenomenal world. The potential benefits to survival, initially limited by cognitive capacity, were realized over tens of thousands of years by a rapid increase in cerebral sophistication and size. Any given singular construct that develops from an array of constituent concepts must maintain a stable interpretation of its world. As a by-product of that evolving dynamic conceptual worldview, an individual experiences novel insights. These insights motivate the individual to communicate conceptual ideas and creative realizations about the nature of experiences using any suitable medium and framework.

The future: the transcendent emergence of the next construct

Finally, by extrapolation, one can ascertain the nature of the mechanism that will emerge from the current human state of active awareness. This transcendent state is yet to emerge. One of HCT's most profound predictions is that the evolving and emergent cycle is not complete: a future transcendent construct class is yet to emerge from human awareness.

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