



A Quantum Brain Interpretation of Heideggerian Cognitive Science

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ABSTRACT

A Heideggerian version of cognitive science is found consistent with quantum thermofield brain dynamics.

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Prolegomena

Although Werner Heisenberg was at times part of Martin Heidegger's circle (Heelan 2013), which would convene at Heidegger's "hut" on the edge of the Black Forest (Sharr 2006), Heidegger was no *aficionado* of science. Indeed, he would scornfully "leave science to its mania for its own usefulness" (Heidegger 1999 p. 198). A fierce critic of technology, Heidegger (1977) would likely have found AI's contemporary identification of our cognition with machine computation to be despicable. It is surprising in what follows, then, to find it possible to meld the Heideggerian conception of cognition with neuroquantology.

Introduction

The possibility of a Heideggerian form of cognitive science—an existential version of cognitive science—has been considered in a collection of papers edited by Kiverstein and Wheeler (2012). Dreyfus (1979, 1992) had already shaped the discussion in the various editions of his well known *What computers can't do* and most of the writers in the K/W collection agree with Dreyfus that computers can't do what Dasein can. ('Dasein' is Heidegger's term for us, which I will unpack below.) The development of quantum brain theory and the surge in quantum computation, however, undermines the basis of that entire discussion.

I shall start afresh here by considering Dasein's characteristics and what Dasein is capable of, and then show that quantum brain dynamics in the development by Jibu and Yasue (1995), Umezawa (1993), and Vitiello (2001, 2003, 2004) is actually consistent with Dasein. That quantum computers currently under intense development (Metznoff 2017) might model Dasein's capabilities (albeit clumsily) would seem to follow.

Dasein

To begin to grasp Heidegger and the Heideggerian version of cognitive science it is essential to turn inward, to engage in the practice of phenomenology, rather than take an intellectually detached, objectivized meta-stance. Heidegger's account begins with the *Da-sein*, the human entity whose to be (*sein*) is to be "there" (*Da*). The "there" is not meant in the spatial sense of that chair over "there," but in the sense that we shake the sleepyhead in the morning and ask, "Are you 'there'? Are you open? Or are you still withdrawn into the worldless stupor of sleep?" The Dasein who is actually "there" *always* finds himself or herself *already* "thrown" amidst some world or other.

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“Thrownness” is a crucial Heideggerian concept. We cannot get prior to it phenomenologically; there is no thrower. The phenomenological bare fact is that we *always* find ourselves *already* amidst some world or other. (Note that “consciousness” is not part of the conception.) But our thrownness is not a bare passive event, like a ball being tossed. We *care* (*die Sorge*); we have values and *concerns*, which *situate* us in our thrownness. These are global operators on *Existenz*. A digital computer does not care, is unconcerned Following rules is not caring. *Nothing actually matters in digital computation.*

We care, things matter and we are *involved*. There is a *dynamical coupling* in real time between brain, body and world which are equal partners in the process.

We always find ourselves involved with the world, and things we encounter in the world show up as inviting actions that are appropriate to our projects, goals and interests. (Kiverstein, 2012)

Our caring and involvement *situate* us with respect to world. Accordingly “things are perceived in terms of the possibilities for action they offer” and “situations show up as offering possibilities for action that are keyed into our interests” (Kiverstein, 2012). Things are “ready to hand,” as Heidegger (1962) emphasizes, available for our use in accordance with what we care about, in accordance with our concerns. Gibson (1979) called world furniture “affordances.” Things not only afford certain actions but also solicit them, have allure, in relation to our situating projects. Kiverstein (2012) invites us to

think of the human agent as a swirl of dynamical, self-organizing distributed processes. There is no central executive ... just a play of dynamical forces out of which human activity erupts. (48)

I emphasize: *a play of dynamical forces.*

Living systems have a kind of *autonomy* or capacity for self-determination ... they are systems that generate and sustain their own organization The organism doesn't take in meaningless information from the world and transform this information into actions. Rather the organism is always making sense of the

environment in the light of its values and concerns ... (Kiverstein, 2012)

Digital computers are not thrown and are incompatible with dynamical *Existenz*!

Quantum Brain Dynamics

I now sketch a distinct version of quantum brain dynamics—which Vitiello (2001) calls “thermofield brain dynamics”—that is consistent with Dasein. The basic idea is that the quantum vacuum state of the brain is a water dipole field having dual modes. Encodings of sensory input within the brain dissipate their energy and fall into the vacuum state where they break the symmetry of the water dipole field. The lost symmetry is conserved by the formation of a condensate of Goldstone bosons which serves as a memory trace. The dual mode trace is of the form particles/anti-particles. If the sensory input is repeated, the particles of the trace are activated out of the vacuum state and the dual mode trace is converted to anti-particles/particles form, which is functionally a trace of recognition. When the sensory input is again repeated, there is a match with the recognition trace that is real, viz., world-thrownness. So paradoxically *recognition precedes perception*. The vacuum state is functionally a “between” dual modes, a between in which real matchings may take place.

Of course it is not only sensory input that dissipates its energy and falls into the vacuum state leaving traces. The brain itself generates many signals which do the same. These self-generated signals subserve what continental philosophers since Brentano (1973) call “intentionality.” Functionally these self-generated signals are situating, are expressions of caring and concern. So I propose that *the between is thrice-tuned*: by sensory input, by memory traces of recognitions and by intentionality, viz. other-tuned, past-tuned and self-tuned. The continually modulated best match is world-thrown Heideggerian *Existenz*. ***Existenz*** is the state of the *thrice-tuned between*.

Existenz is distinct from consciousness. Consciousness is “of” world—distinct from world—which leads to the mind/matter consciousness/brain problem of duality in ontology. *Existenz* is non-dual. *Existenz* is between. *Existenz* is real. Nothing could be more real than world-thrownness!



Ontological Considerations

Historically quantum theory has been highly successful with the very small—the *Microwelt*—with applications to the cosmos (the *Macrowelt*), whereas the *Mitwelt* of quotidian life has not been in as sharp focus and indeed, as highlighted by Schrödinger’s cat, controversial. However, quantum field theory has *Mitwelt* manifestations.

[p]article condensations create a rich variety of macroscopic orders in a system of quantum fields. (Umezawa, 1993)

This is not to be taken in the trivial sense that macroscopic systems have quantum components,

[b]ut in the sense that their macroscopic properties, accounted for by the order parameter field, cannot be explained without recourse to the underlying quantum dynamics. ... the *macroscopic* scale characterizing those systems is dynamically generated out of the *microscopic* scales of the quantum elementary components. Such a *change of scale* is understood to occur through the condensation of the Nambu-Goldstone boson quanta in the system ground [vacuum] state. (Blasone *et al.*, 2011)

Quantum theory applies at all scales from subPlanck to cosmological.

Once we disengage quantum theory from considerations of scale, a curious issue arises as to the ontological status of *world*, the seemingly transcendent world in which we always find ourselves already thrown. Could it be that there actually is no transcendent world “out there,” but only a physical reality under quantum description at all scales? Macroscopic worldly objects “out there” are superfluous if everything is quantum. Stimuli from macroscopic quantum objects to the brain’s sensory receptors (under quantum macroscopic description) incite an internal process in which the quantum brain hoists the existential state of thrownness in a seemingly transcendent world, hoists world-thrownness as a function of the vacuum state between. Why this would mean that we are windowless monads along the lines of Leibniz!

Even though the brain is a quantum macroscopic object, its internal dynamics in which its vacuum state is other-tuned, self-tuned and past-tuned, produce a real-appearing world such

that we are always already thrown in the match of the between. There is actually no such world “out there,” only a quantum physical reality which is imperceivable. That the world *looks* extensive is irrelevant. We know from the neurological disorders of micropsia (Schneck 1961) and macropsia (Schneck 1965)—so-called Alice in Wonderland syndrome (Weissenstein, Luchter & Bitmann 2014)—that the brain is capable of generating extensive-appearing Lilliputian and gargantuan worlds. Rather than bizarre pathologies, Alice in Wonderland syndrome shows world is a creation of the brain and its inner metrics.

Quite commonly, rather than obscure neurological disorders, our brains are capable of creating perfectly authentic-seeming worlds during dreaming. (This cannot be explained (Globus 2017) as a “composition of memory traces,” as Freud (1899) proposed and has been repeatedly claimed since (Allan and Robert, 1977).) We can also appreciate the brain’s creative capabilities in the case of visual illusions. As I drive down a steep hill every morning there is a curve on the edge of a cliff where depth cues such as binocular disparity and texture gradient fall away and the ocean below looks absolutely *vertical*, only to stretch horizontally to the horizon once the curve is rounded and depth cues recur. Thus dreams and visual illusions demonstrate we can perceive perfectly authentic worlds other than the quotidian world of mundane life.

It should be noted that Leibniz’s monadological proposal is not as extreme as the present one. Leibniz believed that beyond the monad there really is a transcendent world which God *thinks* into existence. (God would not be so cruel as to trick His beloved subjects!) Whereas I hold that physical reality is under quantum description at all scales and the closure of quantum ontology is dis-closed internally to Dasein’s brain.

The conception that we are actually monads (*sans* the beneficence of Leibniz’s God) is *prima facie* ridiculous. It goes against every moment that we waltz or plod or stumble through our quotidian world. Yet there is something intriguing, freeing and humbling about the idea that we are actually windowless monads moving through a physical reality under quantum description at all scales. At the least it makes the further development of “neuroquantology” an intriguing enterprise.



References

- Allan HJ, Robert M. The brain as a dream state generator: An activation-synthesis hypothesis of the dream process. *American Journal of Psychiatry* 1997; 134: 1335-48.
- Blasone M, Jisba P, Vitiello G. Quantum field theory and its macroscopic manifestations. London: Imperial College Press, 2011.
- Brentano F. *Psychology from an Empirical Standpoint*, A.C. Rancurello, D.B. Terrell, and L. McAlister, trans. London: Routledge, 1973.
- Dreyfus H. *What computers can't do*. New York: Harper & Row, 1979.
- Dreyfus, H. *What computers still can't do*. Cambridge: MIT Press, 1992.
- Freud, S. *The interpretation of dreams*. J. Strachey, trans. Standard Ed. V.4-5. London: Hogarth Press, 1953 (1900).
- Gibson JJ. *The ecological approach to visual perception*. Boston: Houghton Mifflin, 1979.
- Globus G. Quantum brain theory and the appearing of world. *Journal of Integrative Neuroscience* 2017(Preprint): 1-6.
- Heelan PA. Phenomenology, ontology, and quantum physics. *Foundations of Science* 2013; 18(2): 379-85.
- Heidegger M. *Being and time* (J. Macquarrie & E. Robinson, trans.). New York: Harper & Row, 1962.
- Heidegger M. *Contributions to philosophy: From enowning*. P. Emad and K. Maly, trans. Bloomington: Indiana University Press, 1999.
- Heidegger M. *The basic problems of phenomenology*. Bloomington: Indiana University Press, 1988.
- Heidegger M. *The question concerning technology and other essays*. W. Levitt, trans. New York: Harper & Row, 1977.
- Kiverstein J, Wheeler M, editors. *Heidegger and cognitive science*. New York: Palgrave Macmillan, 2012.
- Metznov C. Yale professors race Google and IBM to the first quantum computer. *New York Times*, Nov. 13, 2017.
- Schneck J. *Macropsia*. *American Journal of Psychiatry* 1965; 121: 1123-24.
- Schneck J. *Micropsia*. *American Journal of Psychiatry* 1961; 118: 232-34.
- Umezawa H. *Advanced field theory: Micro, macro, and thermal physics*. New York: American Institute of Physics, 1993.
- Vitiello G. *My double unveiled*. Amsterdam: John Benjamins, 2001.
- Vitiello G. Quantum dissipation and information: A route to consciousness modeling. *NeuroQuantology* 2007;1(2): 266-79.
- Vitiello G. *The dissipative brain*. In: G. Globus, K. Pribram & G. Vitiello, eds. *Brain and being. At the boundary between science, philosophy, language and arts*. Amsterdam: John Benjamins, 2004.
- Weissenstein A, Luchter E, Bittmann MS. Alice in Wonderland syndrome: A rare neurological manifestation with microscopy in a 6-year-old child. *Journal of Pediatric Neurosciences* 2014; 9: 303-04.