

Introduction to the Focal / Non-Focal Paradox

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Ever since I was a graduate student studying system dynamics and controls I've had an "outside of the box" way of looking at and trying to understand human behavior. I call it "the Lord of the Bio-Bots" (LotBB) perspective. If I were a higher level being designing biological robots to survive in the world, how would I make them work?

To start with, I was mostly just trying to make sense of myself. I found that I could shift the subjective experience of consciousness by using a simple breathing trick from Kundalini Yoga, a trick that probably shifts blood flow patterns slightly between the hemispheres of the brain. It seemed that my brain could produce either male or female consciousness, depending on this balance. Once I got married and started a family, I used this same LotBB perspective to understand development patterns which I encountered in others, patterns that are labeled "personality disorders", but which seem to me to be normal adaptations for survival.

In the LotBB perspective, there are two complementary skills that are necessary for survival in the world. One is the ability to detect exceptions. The other is the ability to generalize. These two skills are necessarily built into all successful biological entities, so they must be present in the core of our mental machinery.

As a human with this ability to notice patterns, the most over-arching pattern I have noticed in my life up to now is what I am calling the Focal/Non-Focal (F/N-F) Paradox. This paradox is present in the material world, in mathematics, and in consciousness, so I am really excited about the possibility of being able to integrate my understanding of myself and the universe by exploring this perspective. I'm hoping this could lead to a theory or understanding of how conscious intent can move physical muscles and how a temperature sensor in our skin can cause the conscious experience of pain. In other words, I want to know how to design feedback loops spanning the conscious/physical boundary with a deeper level of understanding than is currently available to me.

To the extent that I am a conscious robot, the function of consciousness appears to be to explore possibilities in an indeterminate “space”. The conscious choices I make in this indeterminate space then get coded, or learned, by the robotic part of me, a part that doesn’t require consciousness, what could just as well be a zombie.

This indeterminate space is the space of the F/N-F Paradox, a space between what is linearly computable and what is massively parallel, an incomputable space. Somehow we have evolved to navigate in this domain, somewhat adeptly!

From a Controls Engineering perspective, our neurological systems are adaptive control mechanisms. You could say brains are adaptive filter/controllers. Indeed, given the highly adaptive nature of mammalian brains with lots of neocortex, you could say our brains have evolved to be universal adaptive controllers, able to developmentally adapt to almost any local environment in one life cycle.

One aspect of Controls Engineering seems very important to me in understanding ourselves and neural systems in general. The structure of the system to be controlled must be modelled by an appropriately complex system of differential equations with the right modelling form, and then the coefficients of the variables in those equations must be discovered via some method. An example would be a PID (Proportional-Integral-Derivative) controller, which has adjustments for each of Proportional (gain), Integral and Derivative parameters. This relatively simple controller can be tuned using a trial-and-error “cookbook” procedure to control a feedback loop with complex unknown dynamics. It has the right form to fit a general class of near-linear dynamical systems and the cookbook procedure discovers the coefficients needed to stabilize the controlled system.

The F/N-F Paradox is really interesting to me because it gives a way to dissect the totality of reality in a manner that should give a higher understanding of the adaptive control mechanisms within our neuronal systems. It seems to have the right form in which to model our reality. And it might even lead to better weather forecasts!

I've often wondered why I can often predict the local weather better than the best professional forecasters. I think it comes down to how information is being processed, on equipment designed from only the Focal side of things, linear processes which can be implemented on a Turing Machine (computer). The parallel/rotational aspects of weather systems just don't fit that model, but they fit into my brain naturally!

This attempt to better understand our internal modelling and control dynamics has led me to the opinion that consciousness is intimately related to the battle between these two information processing modalities.

The following pages include edited materials I prepared for a poster presentation at the 2016 Science of Consciousness conference in Tucson, AZ, plus an additional page exploring the F/N-F Paradox relative to the time domain. At this point I'm mostly trying to get people thinking about this divide in reality. To create a whole from the two sides is still left to the investigator's imagination. I see the need for complex tapestries across scales, fractal tapestries weaving the Focal and Non-Focal into a whole. Our reality!

I think each of the dualities mapped across the F/N-F Paradox on the following pages could be expanded into its own discussion, so there is a lot here! Also, it may not be obvious, but I view this as an exploration of something more fundamental than space-time or consciousness, whatever that means!

I would welcome any thoughts or feedback I can get regarding this approach to understanding ourselves and our world. I can be reached at vortex.beck@gmail.com.

FOCAL - NONFOCAL PARADOX

Uniting the Physical, Conscious and Conceptual Worlds

Particle
Serial
Translation
Left Brain?
Feed Forward Control
Odd Polynomial Terms
Maps
Deterministic
Finite
Zero
Non-Markov Process
Sequential
Instance
One
Casualty
Yang
Male
Active
Contained
Object
Logic
Word
Individual
Ego Self
Hierarchy/Vertical Organization
Focal Attention

F
↑
A
↑
S
↑
T

The Playground of Consciousness

P
A
R
A
D
O
X

The Undecided ~ Indeterminate ~ Irreducible

~~~~~CREATIVE~~~~~

Wave  
Parallel  
Rotation  
Right Brain?  
Feedback Control  
Even Polynomial Terms  
What the Map Tries to Capture  
Stochastic  
Infinite  
Infinity  
Markov Process  
Concurrent  
Gaussian Distribution  
Many  
Synchronicity  
Yin  
Female  
Passive  
Container  
Subject  
Intuition  
Meaning and Image  
Society  
Yahweh - God - Allah - Tao  
Anarchy/Horizontal Organization  
Nonfocal Attention

# COLLECTIVE CONSCIOUSNESS

Focal - Nonfocal Perspectives

Individual

Member

Leader

Corporation

Cell

Neuron

Local AI Agent

Predator

Criminal

Alone

Small Scale Neural  
Networks

Sheep/Bird

Society

Organization

Followers

Market

Body

Brain

Global AI Agent

Prey

Victims

Together

Large Scale Neural  
Networks

Flock

MEANING / IDEALS / NEEDS

# FOCAL - NONFOCAL PARADOX

IN THE TIME DOMAIN

Focal

Non-Focal

Past

Future

Causal?

Retro-Causal?

Copenhagen  
Interpretation

Many-Worlds  
Interpretation

Matter?

Consciousness?

Decided

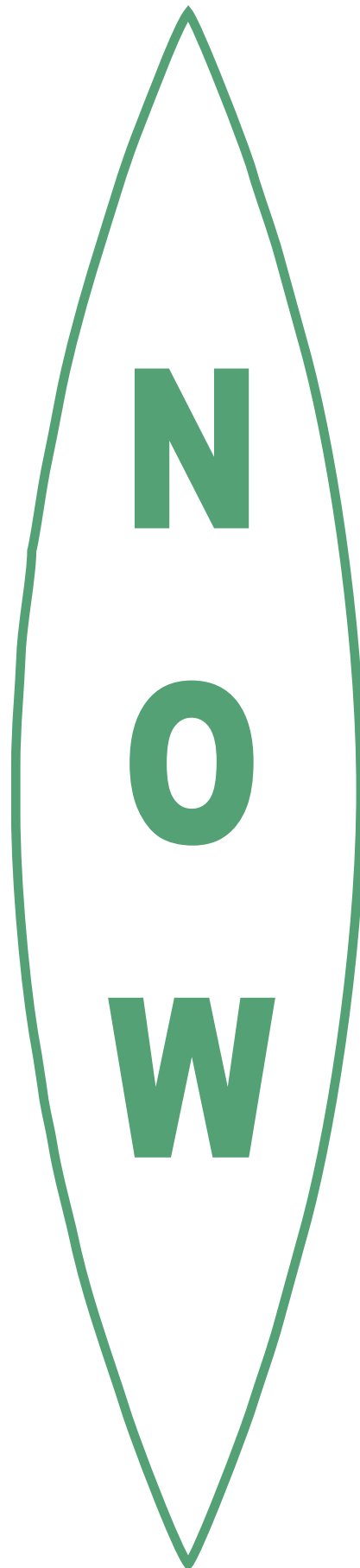
Undecided

Resources

Possibilities

Individual  
Free Will  
(Agency)

Collective  
Free Will  
(Agency)

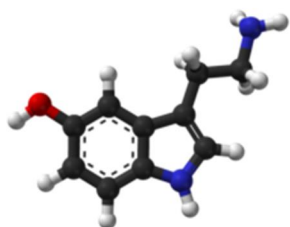


# Molecular Correlates of Consciousness

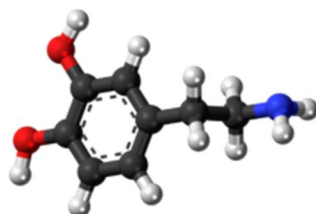
Based upon Focal / Nonfocal Paradox

Three molecular structure classes obviously span the Focal / Nonfocal Paradox and therefore could potentially be involved in conscious processes based upon this perspective.

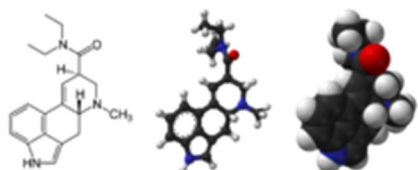
- 1) Organic molecules which possess both a circular and a linear part. Many psychoactive chemicals have this property.



Serotonin



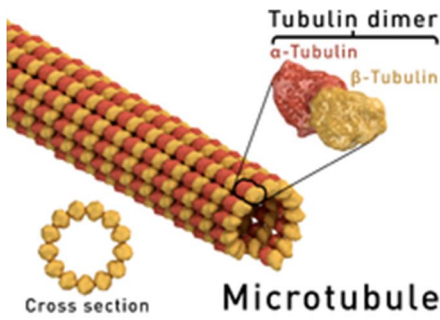
Dopamine



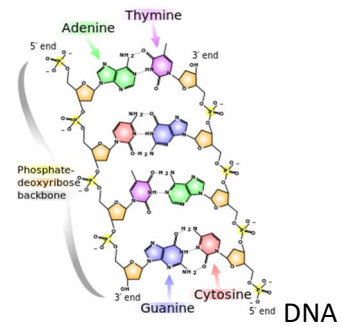
LSD-25 (Images from Wikipedia)

- 2) Microtubules, which are inherently circular on a plane and linear on the perpendicular axis to that plane. The double helix of DNA also fits this structure class, while the nucleobases from

which DNA is built conform to Class 1 above.



Images from Wikipedia



**3) Ionic pairing between charged ring structures and free ions, such as the structure proposed by Gerald Pollack in “The Fourth Phase of Water”.**

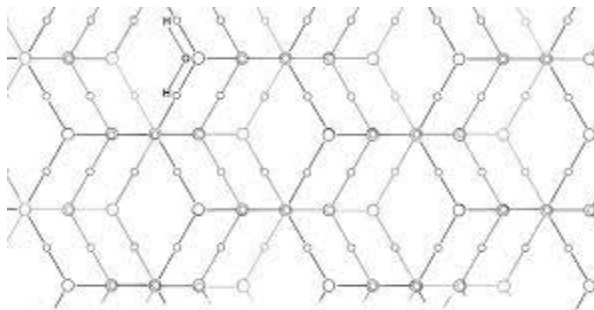


Image from westonaprice.org



## **Some Observations from within the Focal / Non-Focal Paradox**

There seems to be a structure at different levels, a hierarchy, which helps encode meaning in our brains. For instance, we learn words in an associative manner. A word is a focal element that arises against a background of auditory and contextual experience. Words exist in small-scale neural networks in our brain. To get meaning from words, they get context from large-scale neural networks in our brains. This is my interpretation of "The Aha! Moment: The Cognitive Neuroscience of Insight" by John Kounios and Mark Beeman, *Current Directions in Psychological Science* 2009 18: 210

Evolution has given us structures and functionality that optimize our chances of survival to reproduction in our historical environments. This is a feedforward system which is not necessarily adapted to our modern environment. It should be noted that this survival optimization is for a collective of genes within a group of individuals, not necessarily just the survival of individual genetics. What I mean by this is that there can be altruistic traits for individual sacrifice which enhance collective survival.

I have defined a hierarchy of drives based upon the intensity and urgency of the drive relative to survival-to-reproduction:

Attachment (safety)- this drive is strongest because it is about not being eaten by a predator, so it is of life and death intensity and fractions of a second can make a difference in the outcome, so it is more urgent than breathing. This is mostly an autonomic function, so mostly subconscious, and it can control consciousness.

Respiration - Breathing is secondary only to attachment in its intensity and urgency for obvious reasons. I feel it is closely connected to the attachment system because it seems the tricks we've come up with to self-regulate attachment involve breath control.

Sustenance and shelter - We have reserves of energy and heat that make these needs less urgent than respiration, but the intensity is still life or death.

Reproduction/Sex - At some point in the life cycle this becomes important. It is not life or death for the individual, and possibly not for the collective if there is an overproduction of offspring produced by those who do succeed in reproducing. There are brief periods of time when this drive dominates all others.

Purpose or Meaningful Existence - Conscious individuals and societies need a reason for enduring the suffering associated with the life cycle, at least once they develop to a sufficient level of self-awareness. Within individuals, the intensity of this drive can exceed that of reproduction, especially relative to collective needs.

Based upon the hierarchy of drives, I am arguing that the first order approximation to understanding human, or more generally, mammalian behavior, is to understand our attachment system. This has been explored to some extent by the work of John Bowlby and Mary Ainsworth. I tend to use the idea of "safe-zone" as a proxy for this attachment system because it is more intuitive for most people. The safe-zone approach loses a little, especially relative to pair bonding under the influence of oxytocin.

What I am saying here is that our entire individual conscious evolution can be best explained by how it relates to our need to safe and connected to/in our environment. This environment includes both our inner and outer worlds.

Barring psychopathology, our early development is driven by proximity to perceived strong figures, our caregivers. Hopefully these caregivers are also safe, and we imprint an emotional regulation system from them that helps us feel safe. We could be developing in an unsafe environment, and in that case we will likely imprint that instead. If for some reason the normal imprinting mechanism fails, we will not develop this internal imprint, and we will continue to need external regulators to help us feel safe in our local environment. As we become older, we develop peer relationships in a shame-guilt-fear driven mode that helps us socialize to the norms of our social environment. For some individuals, they will reach a point where they separate from the social conditioning and become driven by, or attached to, the collective welfare based upon their own sense of

values. The conditioning environment can shift from avoiding the qualia of shame to seeking the qualia of selfless or unconditional love.

From a holographic perspective, you can view the individual as a clip off a primordial or nonlocal hologram. In that way, we are low resolution local images of a nonlocal entity, and through our experience we refine our piece of the film, which perhaps then enhances the original.