

## Twitter Thread by Carlos E. Perez



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### **Genes are to Evolution, Memes are to Culture, Dicenes are to General Intelligences.**

Open-ended generative processes like evolution and human culture have a thing that is replicated and propagated by the process. For evolution, these are known as genes. For culture, these are known as memes.

It became obvious to me that there isn't an equivalent for individual brains. Is there something that is equivalent to this in general intelligent systems or biological brains?

I have come up with a term that describes these. The word I've invented is 'dicene'. This word is inspired by C.S. Peirce's dicent sign or dicisign. It is the combination then of dicent and gene, and thus dicene.

But why dicene over so many other possibilities like schemes, themes, intuitions, patterns, schemas, embeddings, attention, habits, explanations, ideas, meanings, representations, concepts, analogies, and lekta?

Although all these words refer to some important aspect of thought, none of them capture why a gene or a meme are mechanisms of a generative process. What do genes and memes have in common?

Genes and memes are both codification of expressions. They replicate through a collective of interpreters. For genes, these are the host cells and for memes these are the language speakers.

Snippets of information are disseminated in genes via viruses (note: there are also other mechanisms) and in genes by an analogous viral process.

The process that I am seeking to elucidate is that viral process that should exist in the minds of general intelligence. To understand this, let us deconstruct the mechanism of a virus and a meme.

A virus is a non-living information propagation mechanism. It consists of the vessel (or container) and the code as a fragment of RNA instructions. A virus propagates itself in a host by deceptively fooling its way into its host's cells.

Once in a cell, the virus replicates itself using the host as a factory. A meme is also a two stage process, the bait and the hook. The bait is the surface expression that makes it alluring to a listener. The hook is the encouraged use of the

expression if subsequence speech.

Genes and memes thus have two kinds of information. Information that encourages its assimilation and information that encourages its dissemination.

A dicent sign or dicisign as formulated by Peirce also has two pieces of information. It involves two signs, an icon and an index. Peirce uses a weathervane as an example of a dicisign:



Analogous to a virus and a meme, a dicisign facilitates understanding through its icon. This icon is also an index that conveys another concept. In the case of the weathervane, it indicates the direction of the wind.

A dicene is that mechanism in the mind that encourages its adoption and also its subsequent propagation. As previously discussed, the core of cognition resides in neuroglia cells known as astrocytes.

Astrocytes are territorial and thus reflect a kind of behavior that is analogous to social behavior. The dicene is that information object that is shared by collectives of astrocytes to achieve coordinated behavior.

Complex emergent cognitive behavior is a consequence of the dicene that is shared across the astrocytes. Contained in the dicene are the imperative instructions as to how an astrocyte behaves. The collective interactions of the astrocytes leads to other rich cognitive behavior.

A good analogy of this is the vMeme concept introduced by Spiral Dynamics to explain complex social organizational behavior.

# Spiral Dynamics

## the eight-stage spiral of development

### Second Tier "Being" valueMEMES

#### TURQUOISE Holistic MEME – starting 30 years ago

- Basic theme:** Experience the wholeness of existence through mind and spirit
- The world is a single, dynamic organism with its own collective mind
  - Self is both distinct and a blended part of a larger, compassionate whole
  - Everything connects to everything else in ecological alignments
  - Energy and information permeate the Earth's total environment
  - Holistic, intuitive thinking and cooperative actions are to be expected

#### YELLOW Integrative MEME – starting 50 years ago

- Basic theme:** Live fully and responsibly as what you are and learn to become
- Life is a kaleidoscope of natural hierarchies, systems, and forms
  - The magnificence of existence is valued over material possessions
  - Flexibility, spontaneity, and functionality have the highest priority
  - Differences can be integrated into interdependent, natural flows
  - Understands that chaos and change are natural

"What I am proposing is that the psychology of the mature human being is an unfolding, emergent, oscillating, spiraling process, marked by progressive subordination of older, lower-order behavior systems to newer, higher-order systems

### First Tier "Subsistence" valueMEMES

#### GREEN Communitarian/Egalitarian MEME – starting 150 years ago

- Basic theme:** Seek peace within the inner self and explore, with others, the caring dimensions of community
- The human spirit must be freed from greed, dogma, and divisiveness
  - Feelings, sensitivity, and caring supersede cold rationality
  - Spreads the Earth's resources and opportunities equally among all
  - Reaches decisions through reconciliation and consensus processes
  - Refreshes spirituality, brings harmony, and enriches human development

#### ORANGE Achievist/Strategic MEME – starting 300 years ago

- Basic theme:** Act in your own self-interest by playing the game to win
- Change and advancement are inherent within the scheme of things
  - Progresses by learning nature's secrets and seeking out best solutions
  - Manipulates Earth's resources to create and spread the abundant good life
  - Optimistic, risk-taking, and self-reliant people deserve success
  - Societies prosper through strategy, technology, and competitiveness

#### BLUE Purposeful/Authoritarian MEME – starting 5,000 years ago

- Basic theme:** Life has meaning, direction, and purpose with predetermined outcomes
- One sacrifices self to the transcendent Cause, Truth, or righteous Pathway
  - The Order enforces a code of conduct based on eternal, absolute principles
  - Righteous living produces stability now and guarantees future reward
  - Impulsivity is controlled through guilt; everybody has their proper place
  - Laws, regulations, and discipline build character and moral fiber

#### RED Impulsive/Egocentric MEME – starting 10,000 years ago

- Basic theme:** Be what you are and do what you want, regardless
- The world is a jungle full of threats and predators
  - Breaks free from any domination or constraint to please self as self desires
  - Stands tall, expects attention, demands respect, and calls the shots
  - Enjoys self to the fullest right now without guilt or remorse
  - Conquers, out-foxes, and dominates other aggressive characters

#### PURPLE Magical/Animistic MEME – starting 50,000 years ago

- Basic theme:** Keep the spirits happy and the tribe's nest warm and safe
- Obeys the desires of the spirit being and mystical signs
  - Shows allegiance to chief, elders, ancestors, and the clan
  - Individual subsumed in group
  - Preserves sacred objects, places, events, and memories
  - Observes rites of passage, seasonal cycles, and tribal customs

#### BEIGE Instinctive/Survivalistic MEME – starting 100,000 years ago

- Basic theme:** Do what you must just to stay alive
- Uses instincts and habits just to survive
  - Distinct self is barely awakened or sustained
  - Food, water, warmth, sex, and safety have priority
  - Forms into survival bands to perpetuate life
  - Lives "off the land" much as other animals

The mechanism proposed for neural networks is an unimaginably crude algorithm. It is called the Hebbian rule. "Neurons that fire together, wire together."

The Hebbian rule is also different from Deep Learning's backpropagation mechanism. This is where the synaptic weight most responsible for an error are the ones perturbed in the direction of least error. Backpropagation is a "fit to nature" algorithm.

The backpropagation algorithm has been shown to be unimaginably useful in learning complex behavior. One useful artifact of DL systems is known as embeddings. These are information objects that appear to capture hidden semantics.

Embeddings are essentially high dimensional icons, to use Peirce's semiotic classification. When you use an embedding as input to a neural network, the network acts as an interpreter of the icon and the output is its indexical relationship between input and output signs.

In a network like GPT-3 that performs sequence to sequence transformations, the intermediate layers can be considered as its embeddings. GPT-3 takes pieces of words, transforms it to an embedding and transforms that embedding to pieces of other words.

In effect, treating sequence of words as a complex information object and then generating (or indexing) to another sequence of words that represents another complex object.

What you begin to notice is that genes, memes and language models like GPT-3 all perform sequence to sequence transformations. Thus you have an in-silico analog of how genes and memes might be interpreted.

You also realize that all complex openended processes appear to use the same mechanism for distributing information. That is through sequences of digital information. This is the 'language-turn' that was first proposed by biosemiotics to understand biological complexity.

This is a divergent view from the more conventional view of treating complex systems like dynamical systems. Biology and culture are semiotic systems. The apt level of interpretation and thus understanding is at the language level.

To conclude, my hypothesis is that dicenes are a necessary requirement for anything that purports to be a general intelligence (which our brain is a instance of). Note: hypothesis pre-registered on Twitter.

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