POLITECNICO DI MILANO

School of Industrial and Information Engineering
Campus Leonardo
Department of Electronics, Information and Bioengineering

project ANTICIPATION

First International Conference on Anticipation

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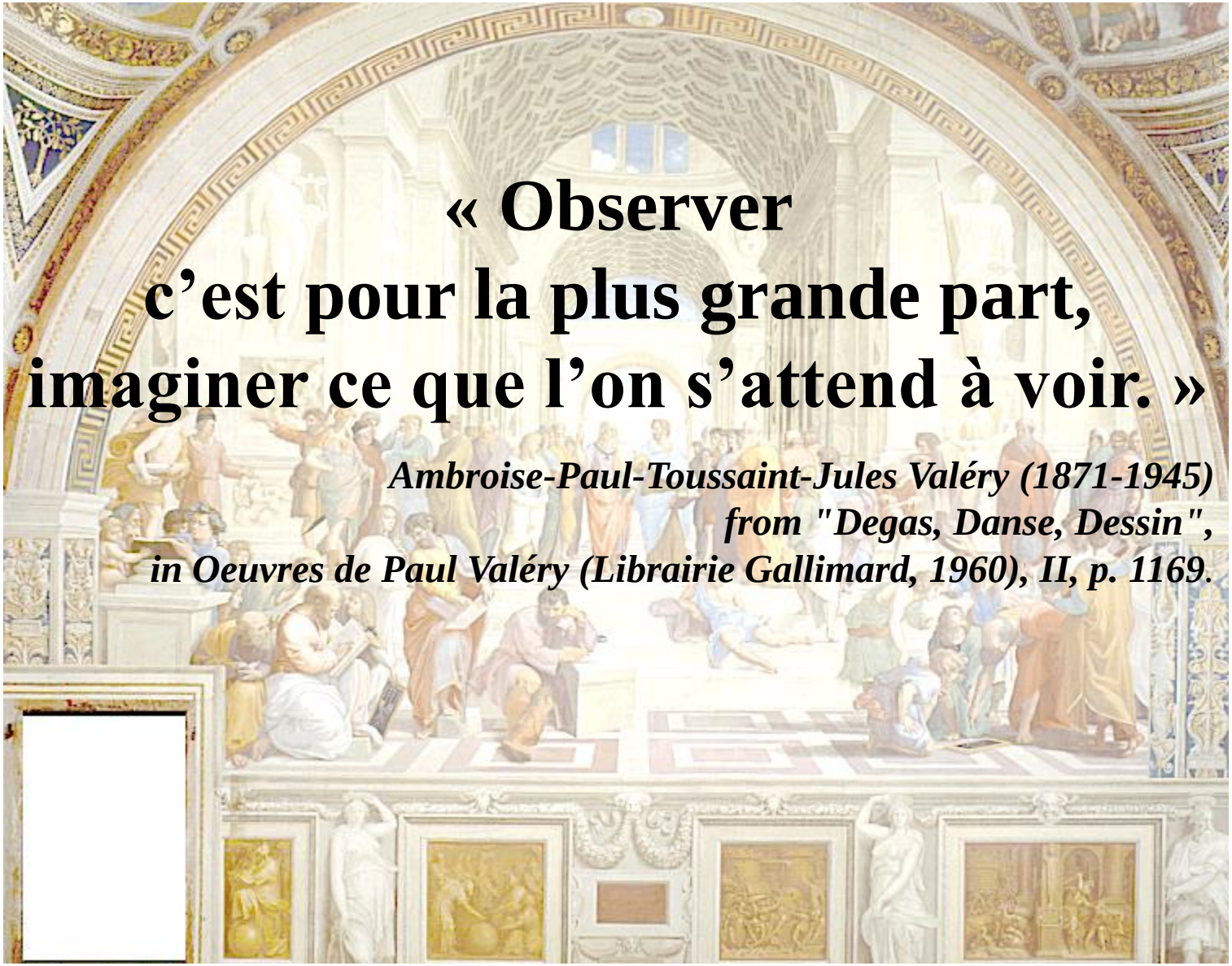
16-18 September, 2015

No Anticipation, No Wellbeing

Rodolfo A. Fiorini, DEIB-Politecnico di Milano, Italy

No Anticipation, No Wellbeing

No Anticipation, No Wellbeing



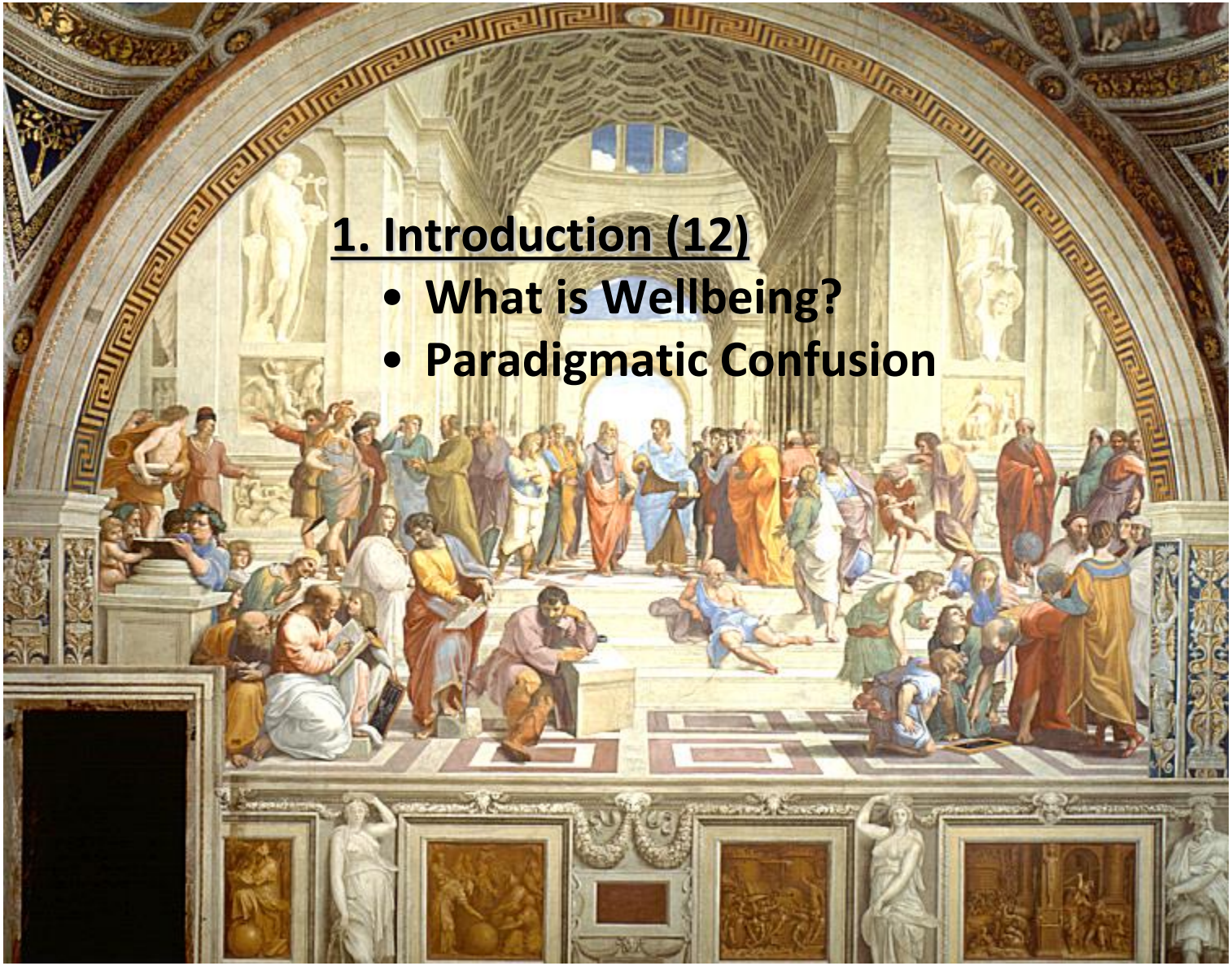
« Observer
c'est pour la plus grande part,
imaginer ce que l'on s'attend à voir. »

Ambroise-Paul-Toussaint-Jules Valéry (1871-1945)
from "Degas, Danse, Dessin",
in Oeuvres de Paul Valéry (Librairie Gallimard, 1960), II, p. 1169.

Presentation Outline

1. Introduction (12)
   - What is Wellbeing?
   - Paradigmatic Confusion
2. Creativity & Creative Thinking (12)
   - Eulogic Thought
   - Learning & Awarenes
3. Information & Learning (12)
   - Living System Theory
   - Rosen Fundamental Modeling Relation
4. Uncertainty As Resource (13)
   - Systems Thinking
   - Systemic Neuro-Axiologic Approach
5. Conclusions (04)
   - Creativity Mind
   - Work In Progress

1. Introduction (00)



What is Wellbeing?

well-being

noun

the state of being comfortable, healthy, or happy.
"an improvement in the patient's well-being"
synonyms: welfare, health, good health, happiness, comfort, security, safety, protection, prosperity, profit, good, success, fortune, good fortune, advantage, interest, prosperousness, successfulness
"the nurse's prime concern is the well-being of the patient"

Translations, word origin, and more definitions

What is Wellbeing?

Contrary to popular belief,
wellbeing is different from **'happiness'.**
Happiness can come and go in a moment**,**
whereas **wellbeing** is a more stable state of
being well, feeling satisfied and contented.

(Australian Unity Wellbeing Index, 2015)

What is Wellbeing?

- **Wellbeing** is often simply defined as **feeling good and functioning well.** This includes having **a fair share of material resources, influence and control, a sense of meaning, belonging and connection with people and place and the capability to manage problems and change.**
- There is abundant evidence to demonstrate that the **skills and attributes associated with wellbeing are a core asset, protecting and enhancing the lives of individuals and communities.**
- Improving your **wellbeing not only leads to the prevention of disease, but can lead to outcomes that include:**

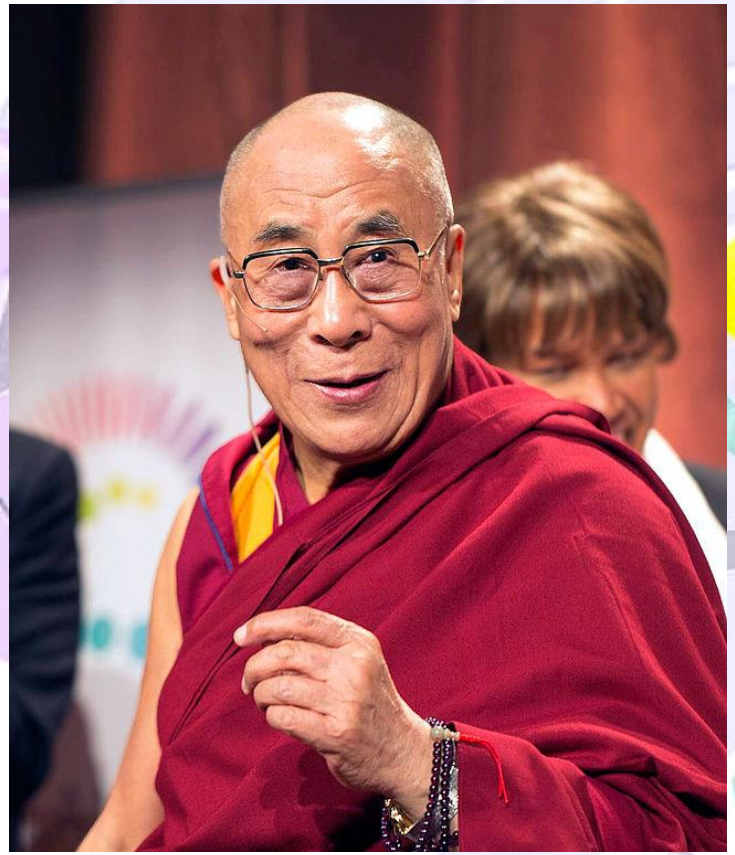
better physical health, healthier lifestyles, improved recovery from illness, fewer limitations in daily living, higher educational attainment, greater productivity, employment and earnings, better relationships with adults and children, more social cohesion and engagement, improved quality of life.

(L. Friedli, 2009)

The Challenge of Defining Wellbeing

(Dodge, Daly, Huyton, 2012)

The Challenge of Defining Wellbeing



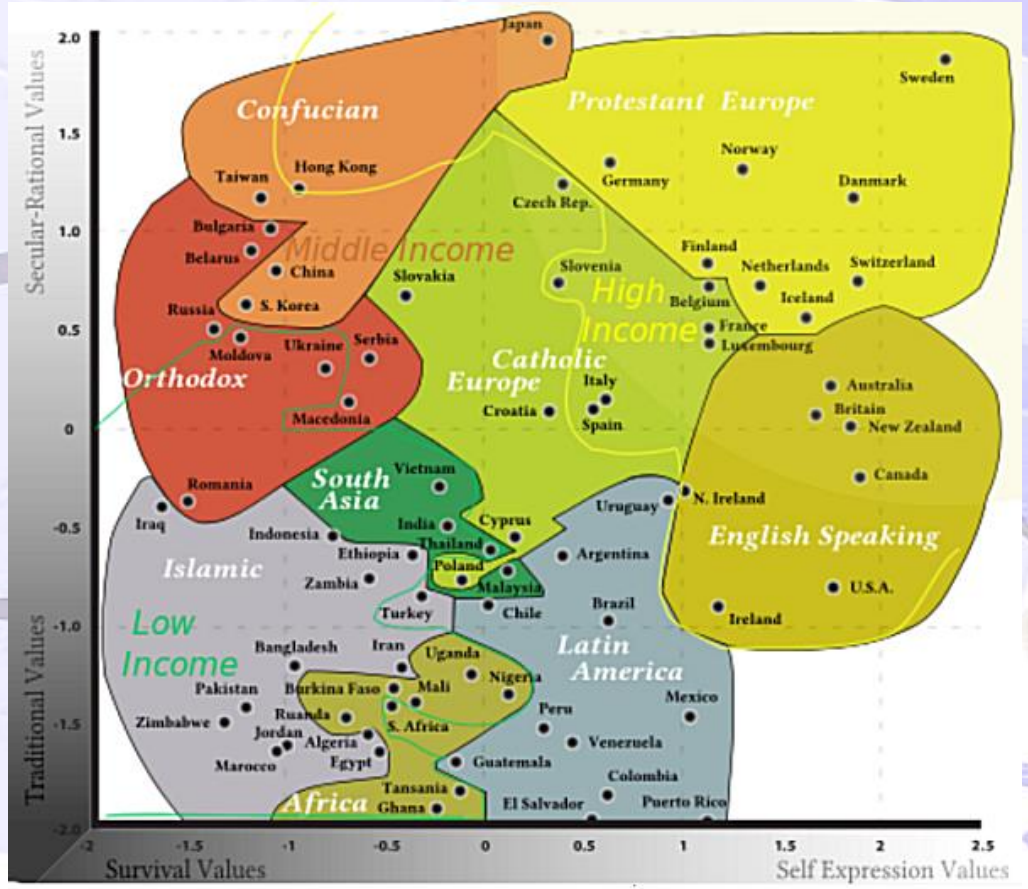
Learning according to Tenzin Gyatso, the 14th Dalai Lama (1935-)

Because we all share this small planet Earth, we have to learn to live in harmony and peace with each other and with Nature. That is not just a dream, but a necessity.

1. Introduction (06)

The Challenge of Defining Wellbeing

Fundamentalist vs. Evolutive



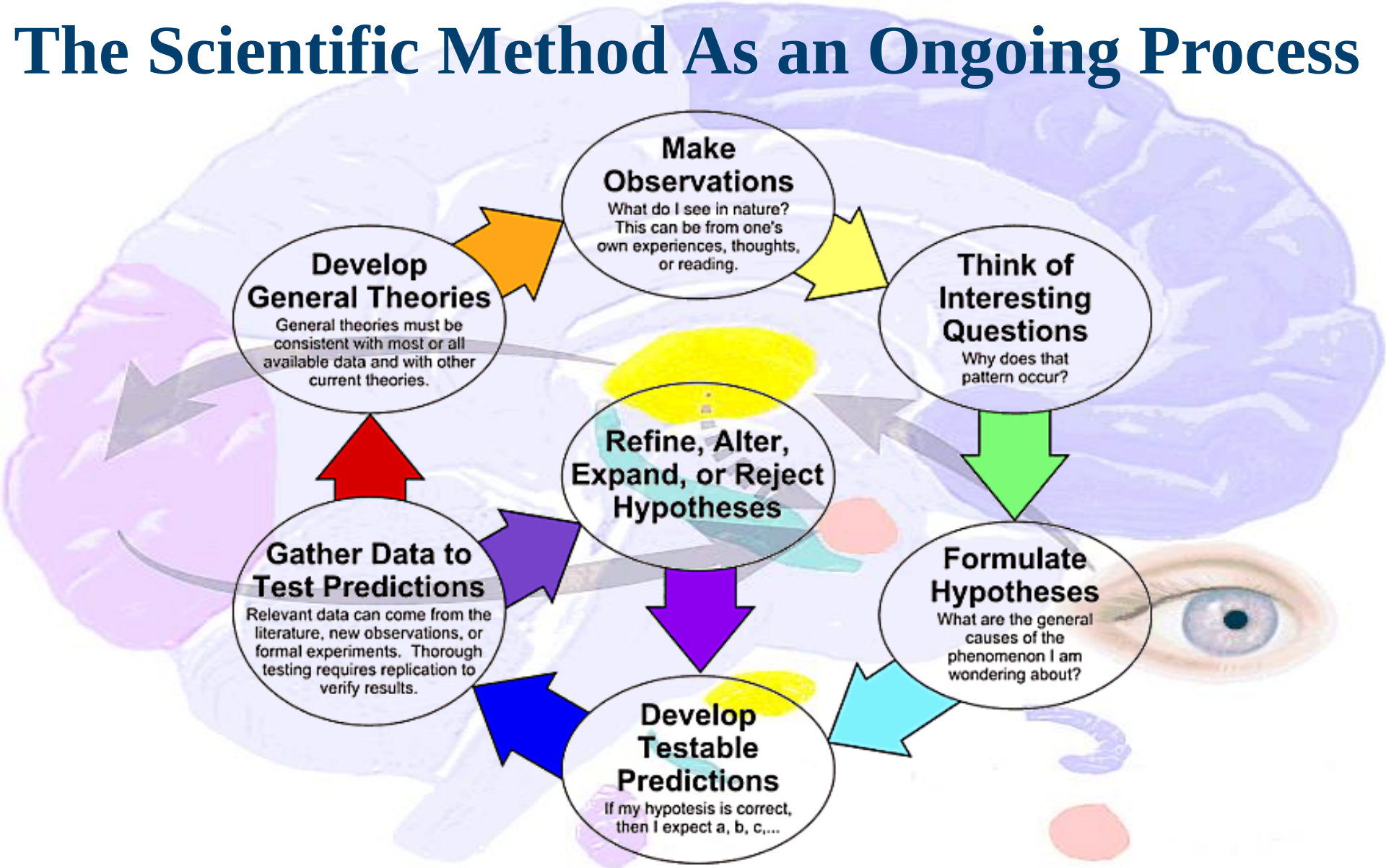
(Inglehart–Welzel cultural map of the world, 2010)

There are four keys to a science

- Based on observation shareable data which are independent of any one subject's perspective.
- Based on a mathematical measuring system.
- Universally applicable.
- Subject to empirical testing to confirm the observations.

As a result, the applications of science must be valid and reliable.

The Scientific Method As an Ongoing Process



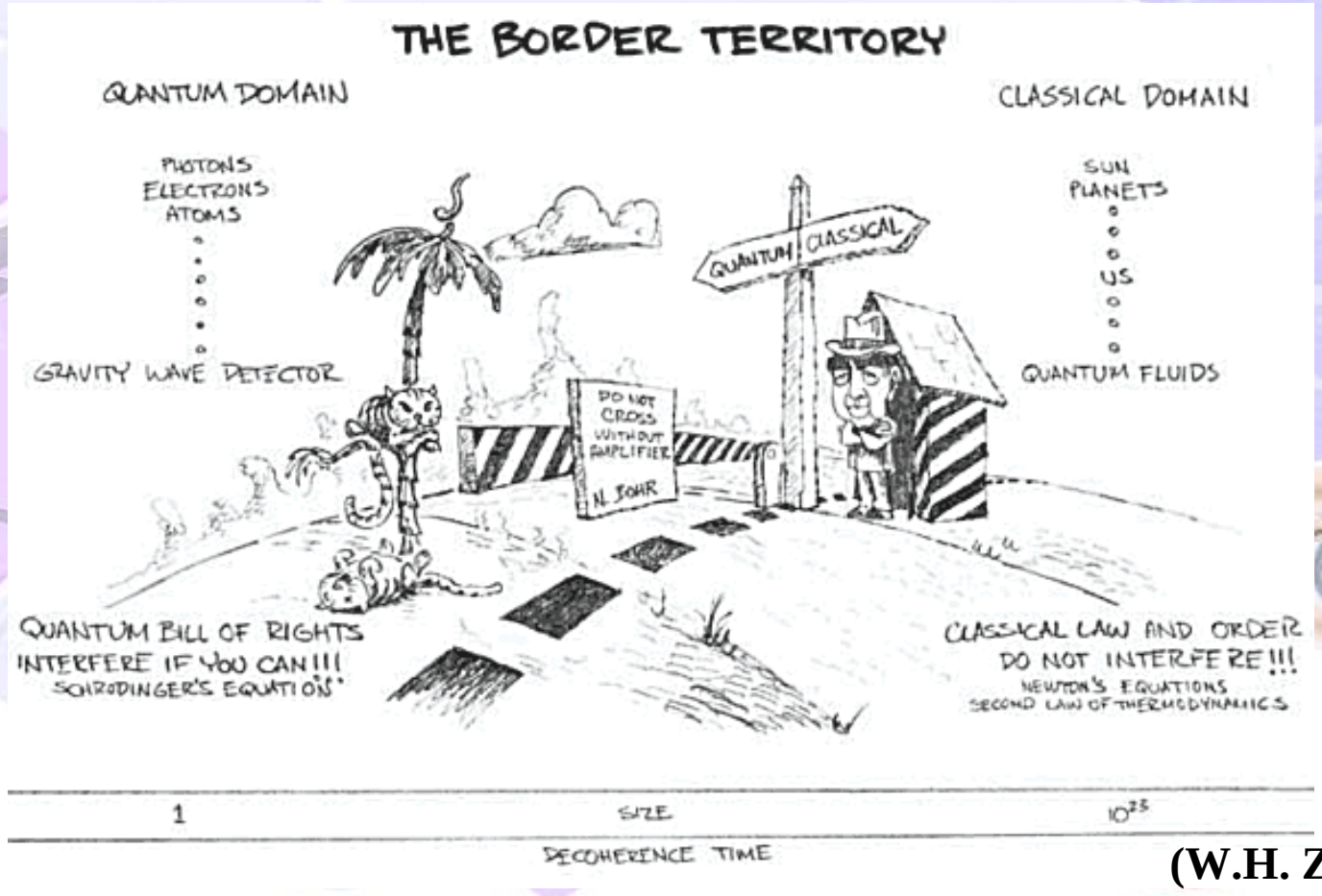
Systemic Reference Paradigms

- Naturalistic DaVincian (1478): sxt.
- Relativistic Galileinian (1632): t ≡ A; s ≡ R.
- Reductionist Positivist (1687): t ≡ A; s ≡ A.
- Relativistic Einsteinian (1921): sxt.
- Quantum Stochastic (1924–1927): E(f(sxt)).
  (The Copenhagen Interpretation: Niels Bohr, Werner Heisenberg.)
- Quantum Causal (1992): sxt (Open System).
  (The de Broglie–Bohm theory Interpretation: Louis de Broglie, David Bohm.)
- Quantum Transactional (1986-2013): (Open Systems).
  (TIQM: John G. Cramer, R. Kastner.)
- Quantum Relational (1994-1997): (Open Systems).
  (The RQM Interpretation: Carlo Rovelli, Basvan Fraassen and by Michel Bitbol.)

1. Introduction (10)

System Decoherence Modeling

Decoherence offers a way to understand classicality as emergent from within the quantum formalism.



(W.H. Zurek, 2005)

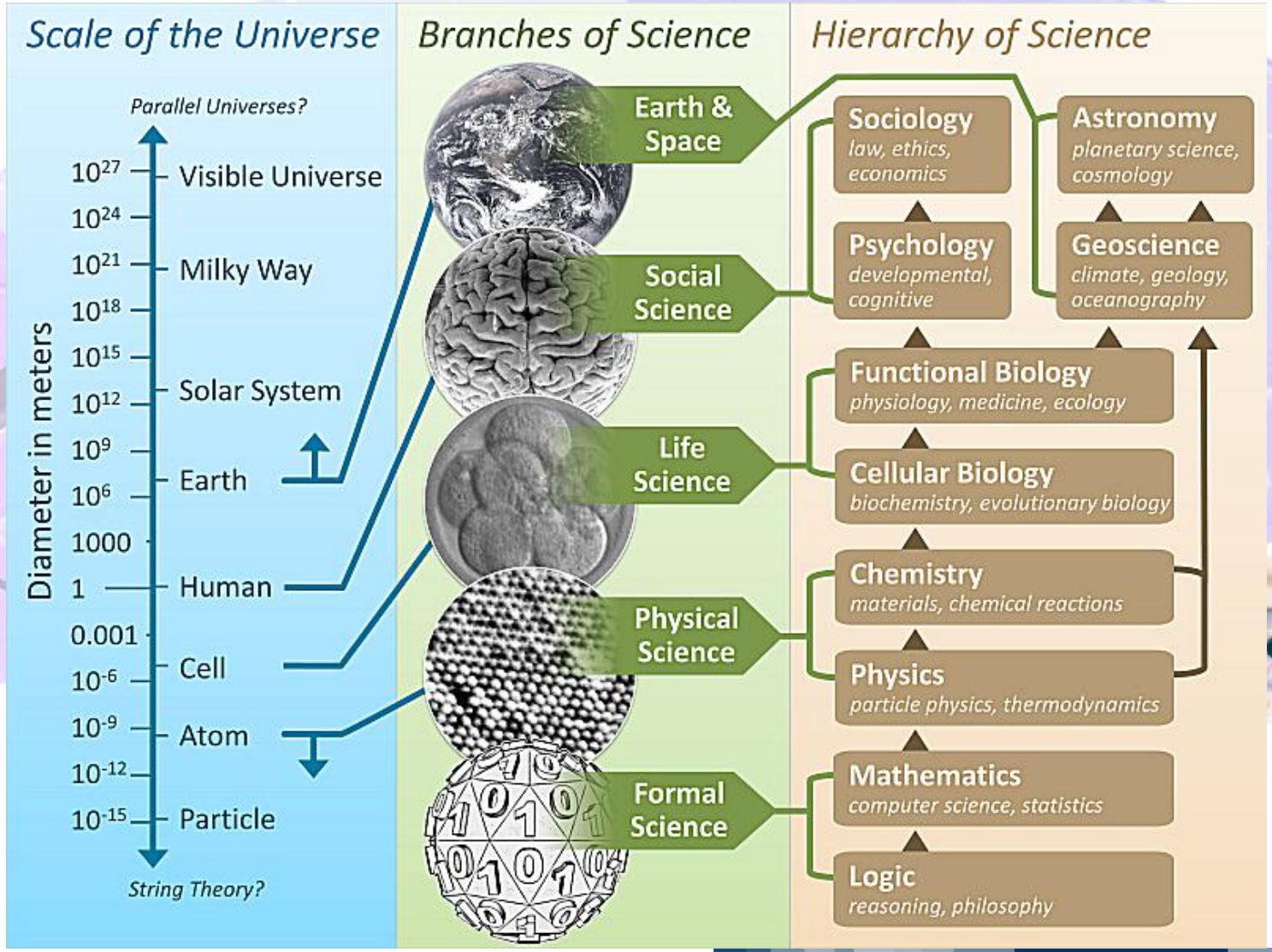
1. Introduction (11)

On Paradigmatic Confusion

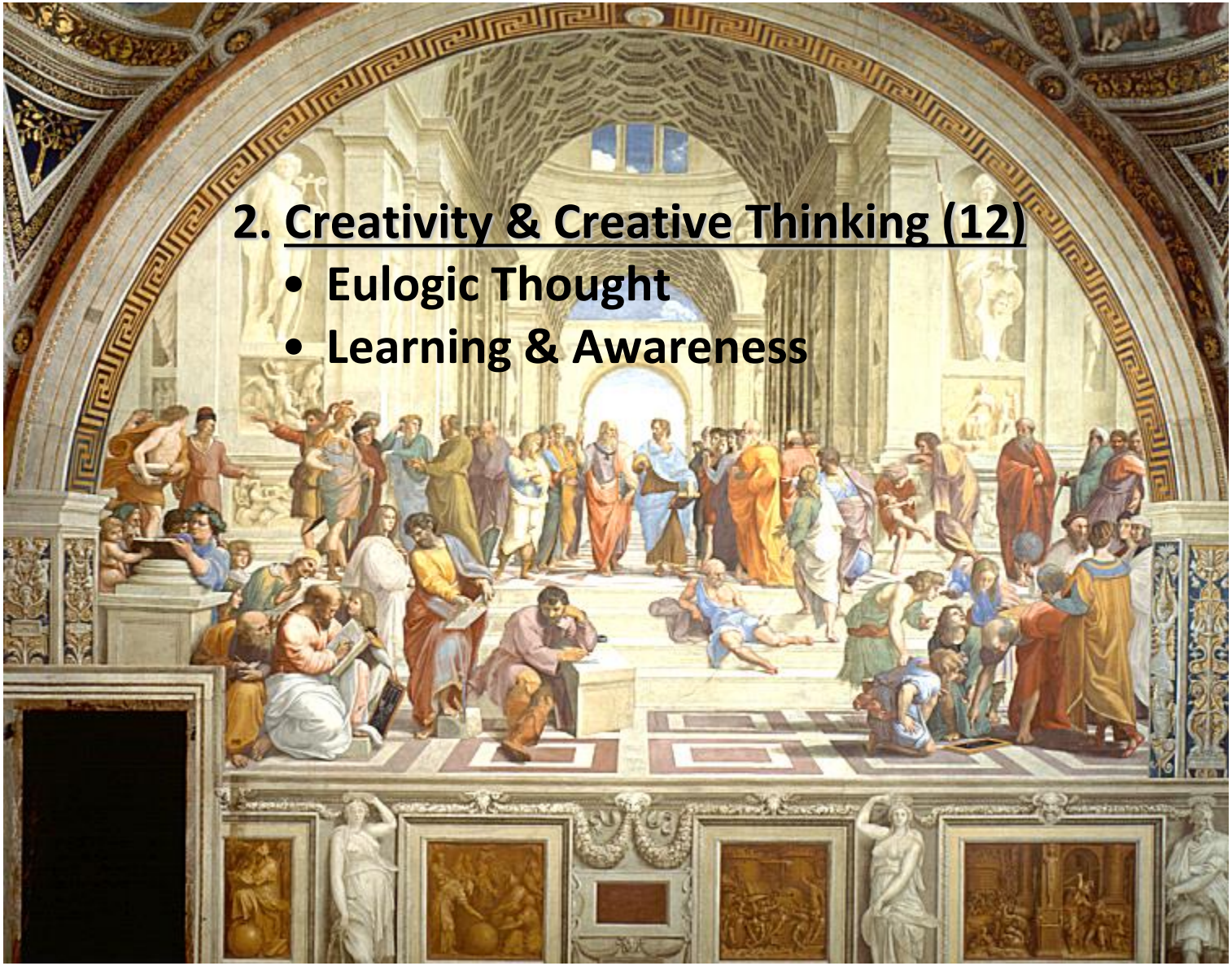
PARADIGMATIC CONFUSION
occurs when
incompatible epistemological assumptions
are
inadvertently mixed
in explanations and practice.

1. Introduction (12)

Example of Complex (Multi-Scale) System



2. Creativity & Creative Thinking (00)



Consciousness: Higher Levels

There are many ways that **human intelligence** differs from that of animals, but one of the most obvious is our level of **self-awareness**. In scientific literature, this faculty is often referred to as **Introspection** or **Metacognition,** in a wider meaning.

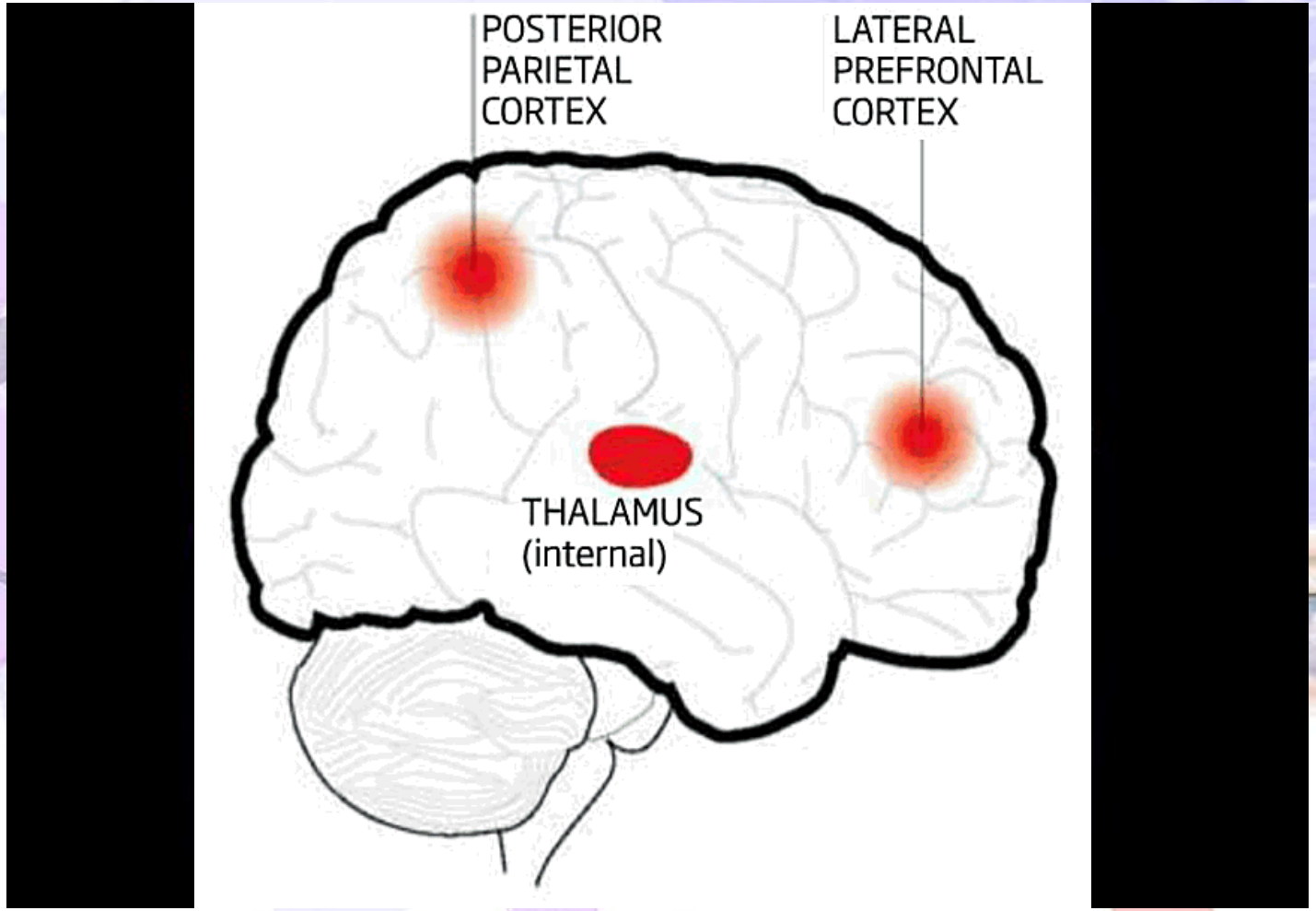
It is the ability to **self-reflect**, to know about yourself. **Introspection** seems **to be quite core** to who we are.

There have been hints of this capacity in dolphins and monkeys, for instance, although skeptics say there could be other explanations for the results.

Scanning the brain of humans while they carry out **metacognitive tasks** suggests the seat of this ability lies in part in our **prefrontal cortex**, at the front of our head, mainly.

(Steve Fleming, New Scientist, Vol.218, No 2917, 2013, p.35-37)

Consciousness: Main Centers of the Human Brain



(James Gorman's brain visualization, Washington University in St. Louis, 2014.)

2. Creativity & Creative Thinking (03)

Human Being is different from other living beings because can have **rational decision**.

2. Creativity & Creative Thinking (04)

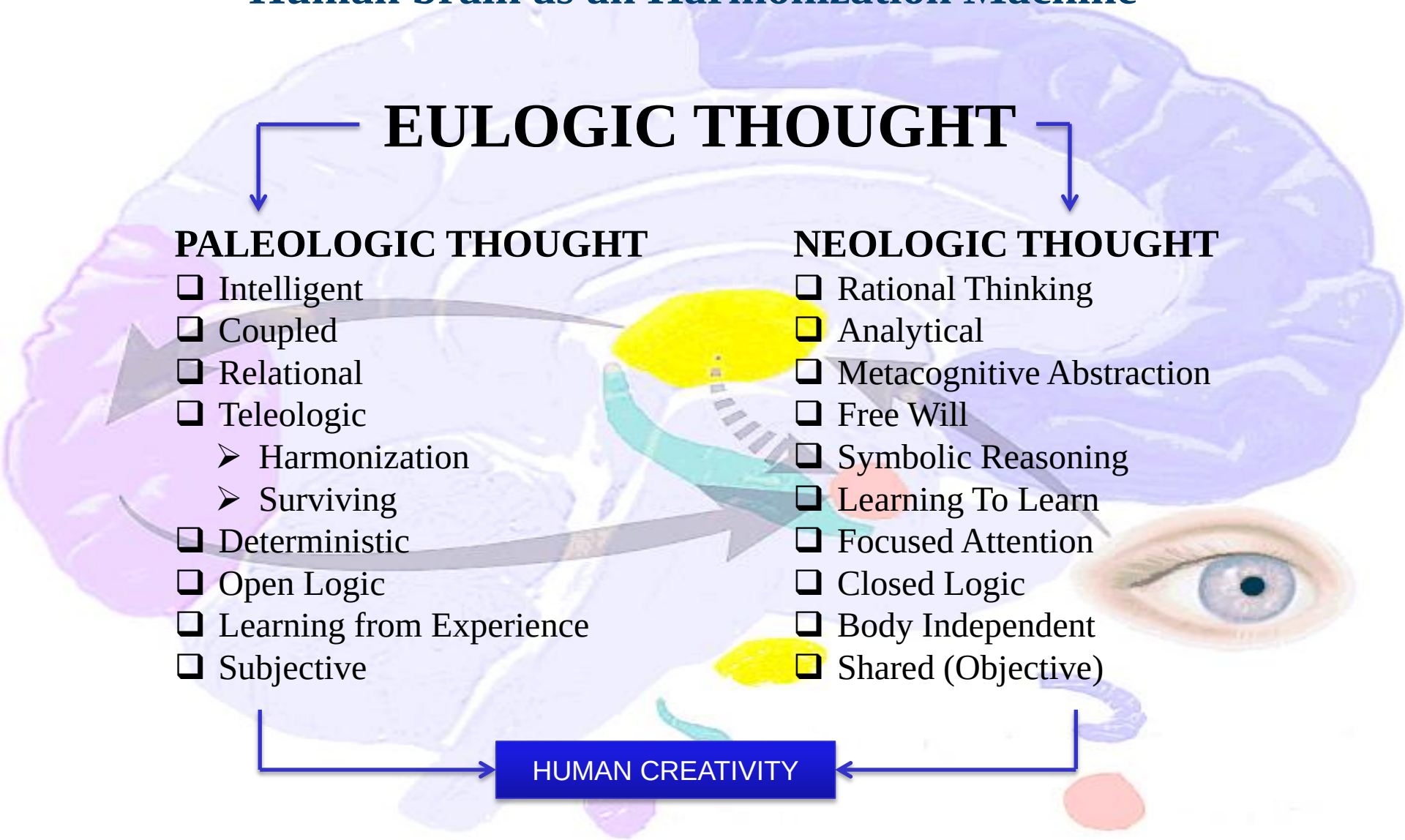
Rational Human Thinking is like a solid archipelago emerging from an ocean of intuitions.

2. Creativity & Creative Thinking (05)

Human brain is an **harmonization machine** fed by unaware intuitions **to produce learning and rational awareness**.

2. Creativity & Creative Thinking (06)

Human brain as an Harmonization Machine



EULOGIC THOUGHT

PALEOLOGIC THOUGHT

- Intelligent
- Coupled
- Relational
- Teleologic
  - Harmonization
  - Surviving
- Deterministic
- Open Logic
- Learning from Experience
- Subjective

NEOLOGIC THOUGHT

- Rational Thinking
- Analytical
- Metacognitive Abstraction
- Free Will
- Symbolic Reasoning
- Learning To Learn
- Focused Attention
- Closed Logic
- Body Independent
- Shared (Objective)

HUMAN CREATIVITY

Creativity is Value Driven

- The human mind-brain has a genetic disposition and desire to create value.
- The more value you can create the more success and happiness you can achieve.
- While value is a subjective judgment in our minds, in nature the relative value of all things (tangible and intangible) is concrete and shareable.
- The Central Question of Life, Love and Leadership is:

  "What choice can I make and action can I take, in this moment, to create the greatest net value?"

2. Creativity & Creative Thinking (08)

Learning and Awareness (EPM)

According to **Elementary Pragmatic Model** (**EPM**) Brain-Mind Model, **two coupled fundamental processes** are at the **core** of **human brain**:

Process A : Wiring and re-wiring of a **F**ocused **O**ptimal **P**ath (**FOP**) to creatively reach a planned goal.

Process B : **Process A** rational assessment and endorsement (checking + **FOP** updating if needed).

(Piero De Giacomo, 1982)

2. Creativity & Creative Thinking (09)

Learning and Awareness (EPM)

According to **Elementary Pragmatic Model** (**EPM**) Brain-Mind Model, **two coupled fundamental processes** are at the **core** of **human brain**:

Process A is fed by **definition doubting** and **compromising** mainly; the availability of an **environmental chaotic information redundant support is required** (RATL, Right Anterior Temporal Lobe)**:**

emotion→FOP (re-)wiring→sensation→action (survival oriented).

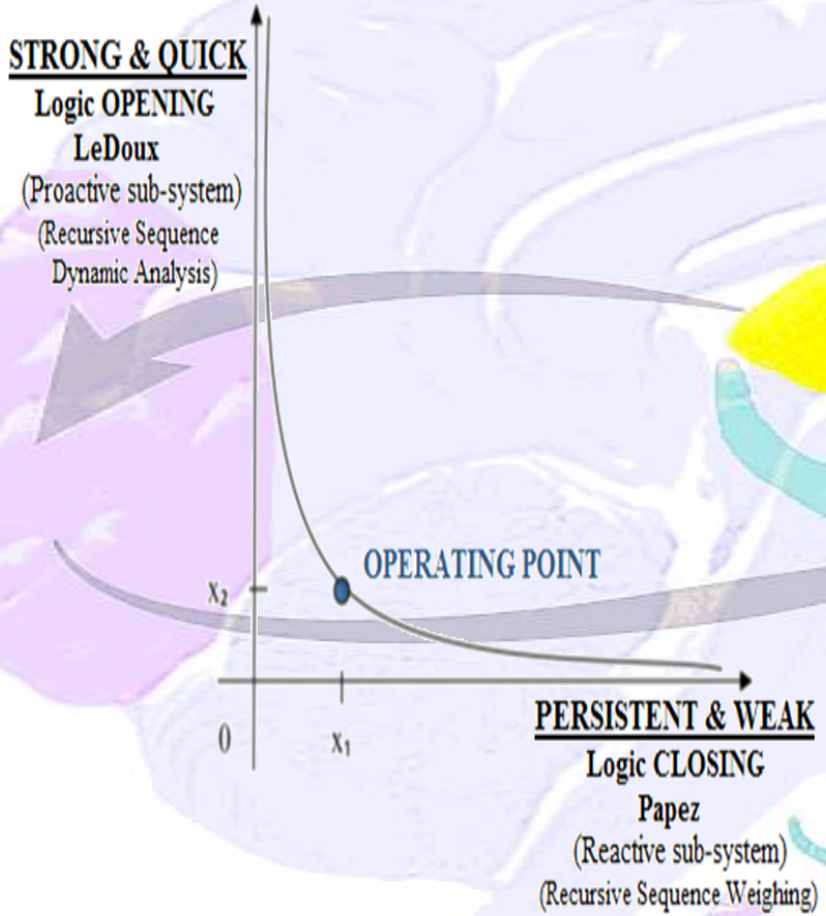
Process B is based on **opposing, complementing and commanding**; **clearly defined formal rules are required** to actively operate:

emotion→sensation→perception→action (learning oriented)
(i.e. solution path logical articulation→checking→difference learning).

(Piero De Giacomo, 1982)

2. Creativity & Creative Thinking (10)

Emergent Transdisciplinary Reality Level

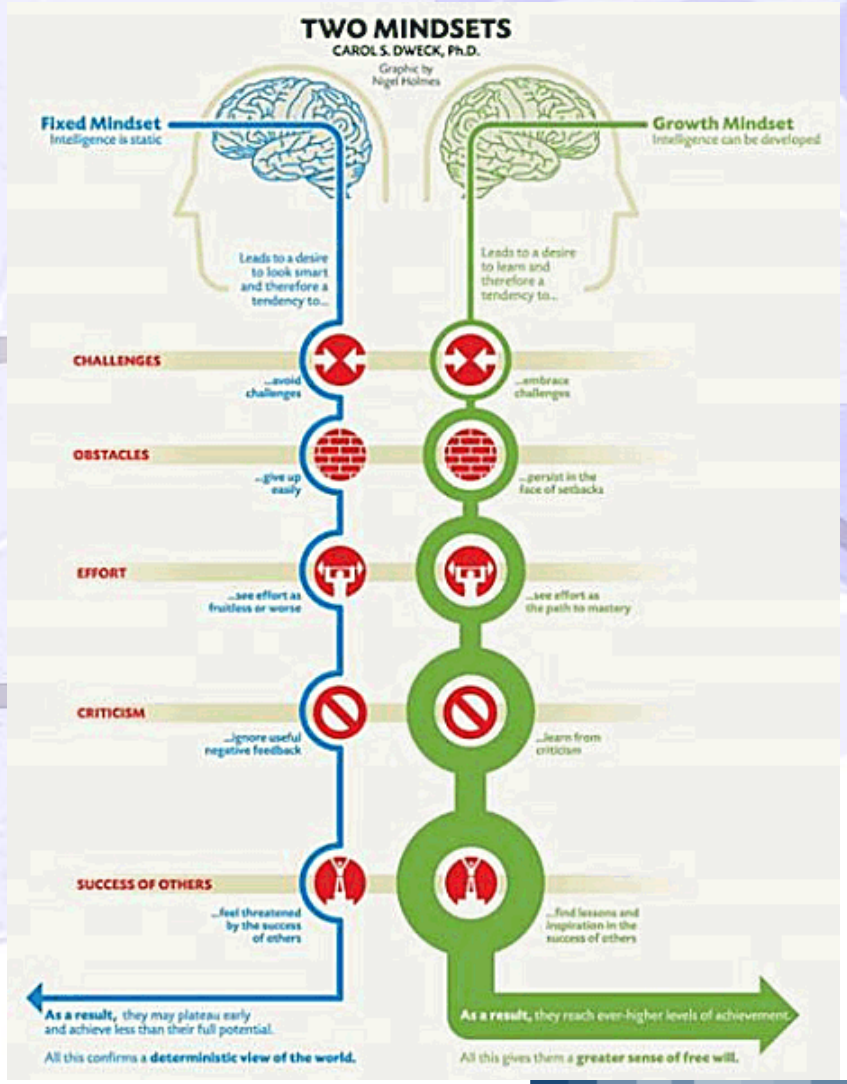


- ✓ **Emotional Intelligence (EI) and Emotional Creativity (EC)** coexist at the same time with **Rational Thinking**, sharing the same input environment information.
- ✓ **Value Operating Point** as a trans-disciplinary reality level can emerge from two complementary irreducible, asymptotic ideal coupled concepts.
- ✓ To behave realistically, system must guarantee both Logical Aperture (to get EI and EC, to survive and grow) and Logical Closure (to get Rational Thinking, to learn and prosper), **both fed by environmental "noise"** (better… from what human beings call "noise").

(R.A. Fiorini, 2014)

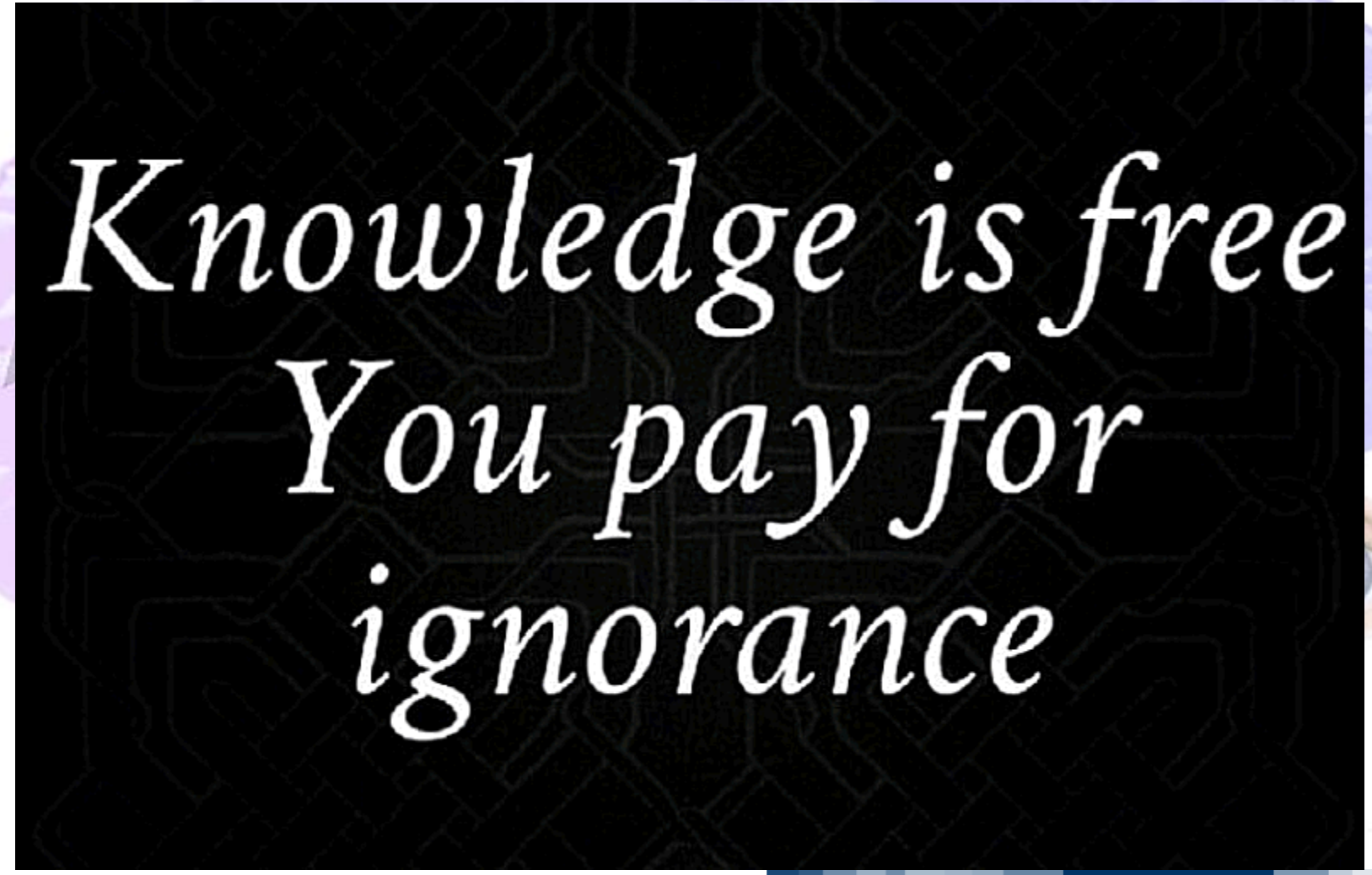
2. Creativity & Creative Thinking (11)

Fundamentalist vs. Evolutive

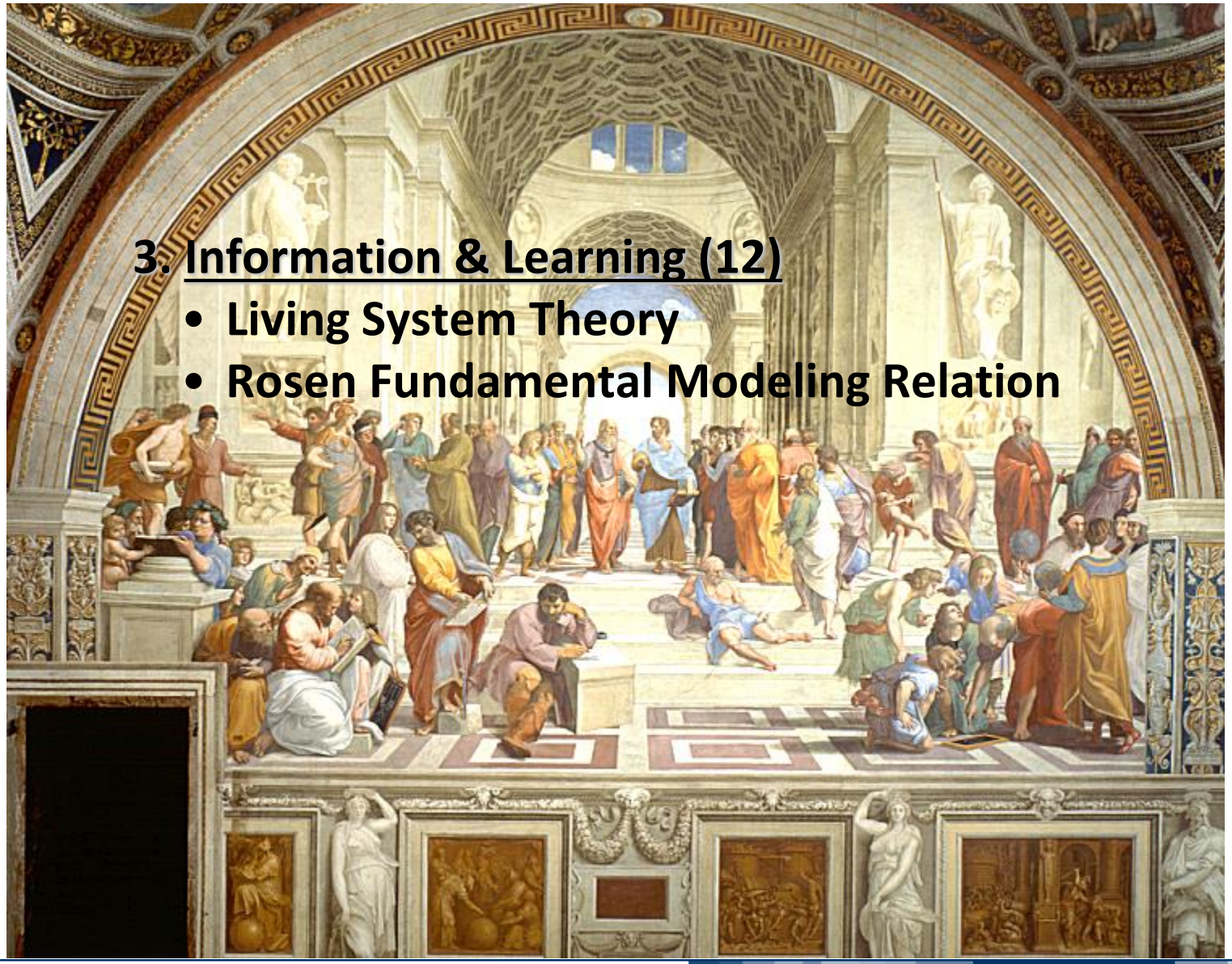


2. Creativity & Creative Thinking (12)

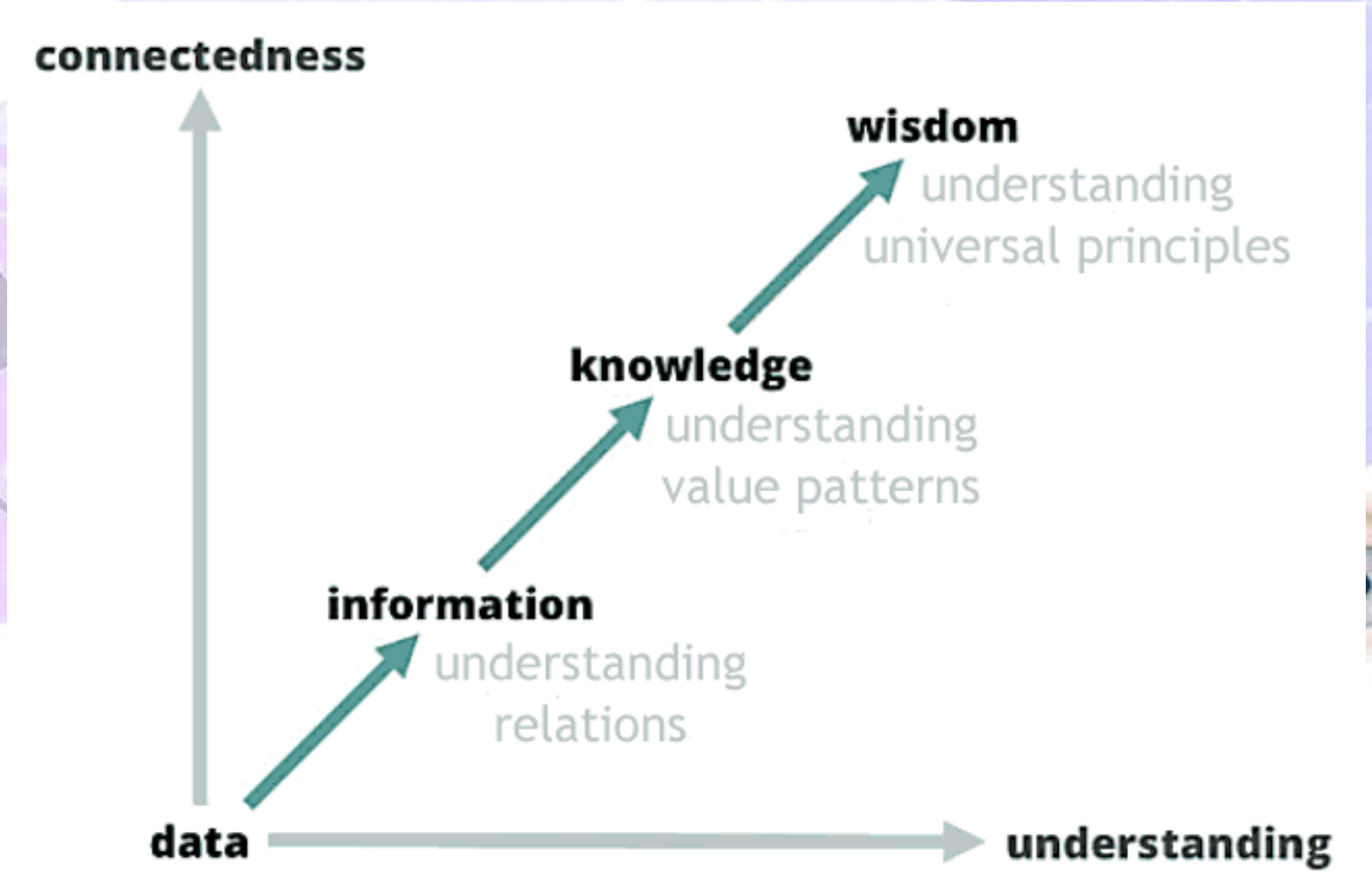
Fundamentalist vs. Evolutive



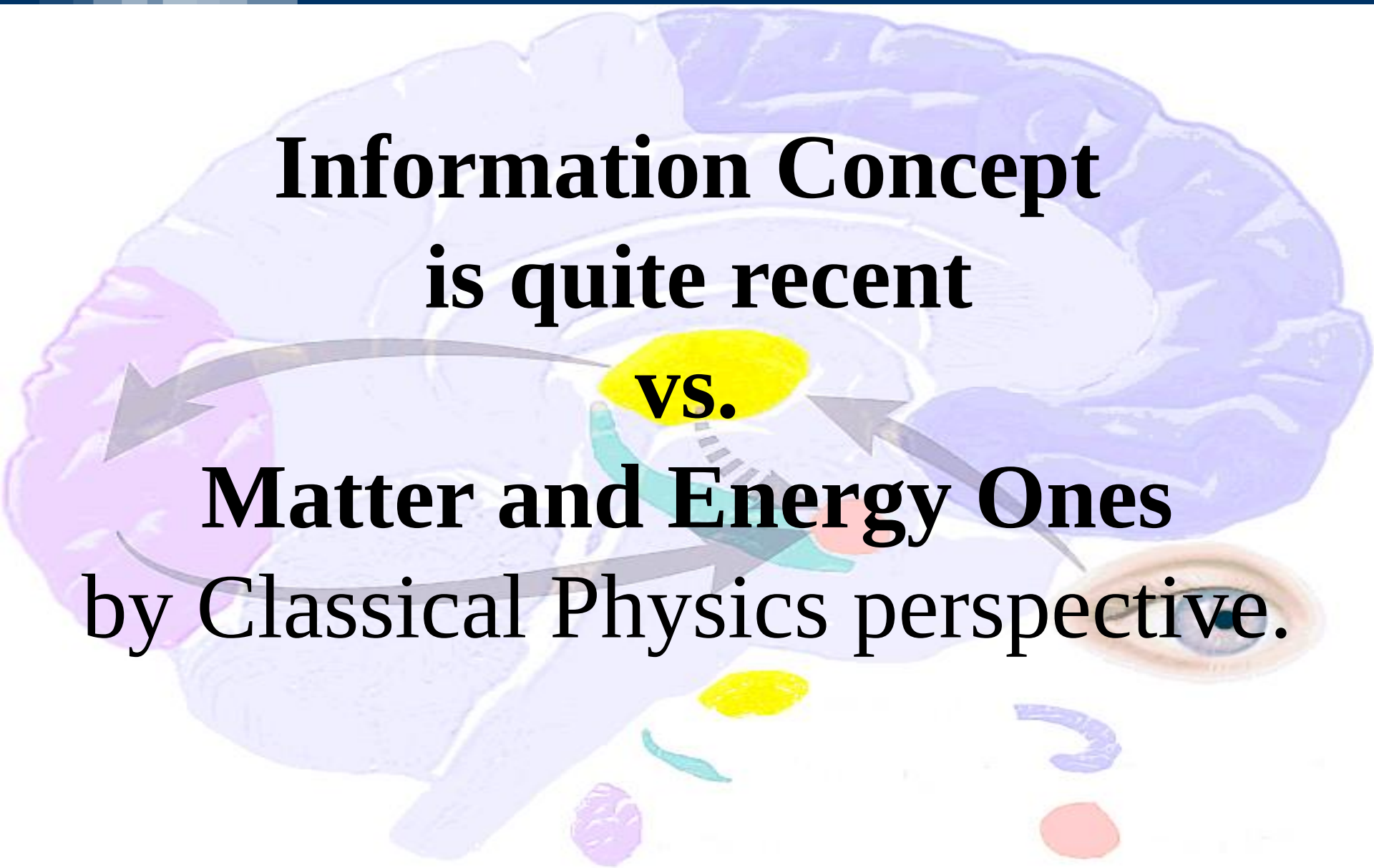
3. Information & Learning (00)



Information Evolutive Scale



3. Information & Learning (02)



Information Concept
is quite recent

vs.

Matter and Energy Ones
by Classical Physics perspective.

3. Information & Learning (03)

Value Knowledge Concept
is even quite more recent
than
Data Knowledge Concept
by Classical Information Science perspective.

3. Information & Learning (04)

Two Large Systemic Research Areas to Living System Theory

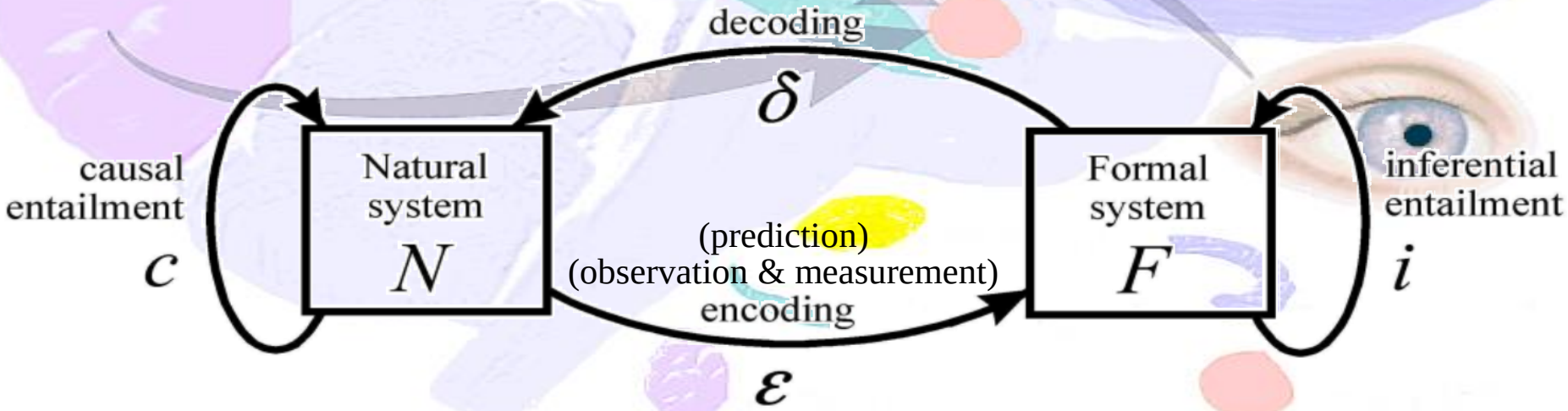
- **Formal Approach (What is Life?):**
  Erwin Rudolf Josef Alexander Schrödinger (1887 – 1961)
  Norbert Wiener (1894 – 1964)
  Ludwig von Bertalanffy (1901 – 1972)
  James Grier Miller (1916 – 2002)
  . . .
- **Substantial Approach (Why Life?):**
  Vladimir Ivanovič Vernadskij (1863 – 1945)
  Nicolas Rashevsky (1899 – 1972)
  Robert S. Hartman ((1910 – 1973)
  Robert Rosen (1934 – 1998)
  . . .

3. Information & Learning (05)

Robert Rosen's Systemic Awareness of Anticipation

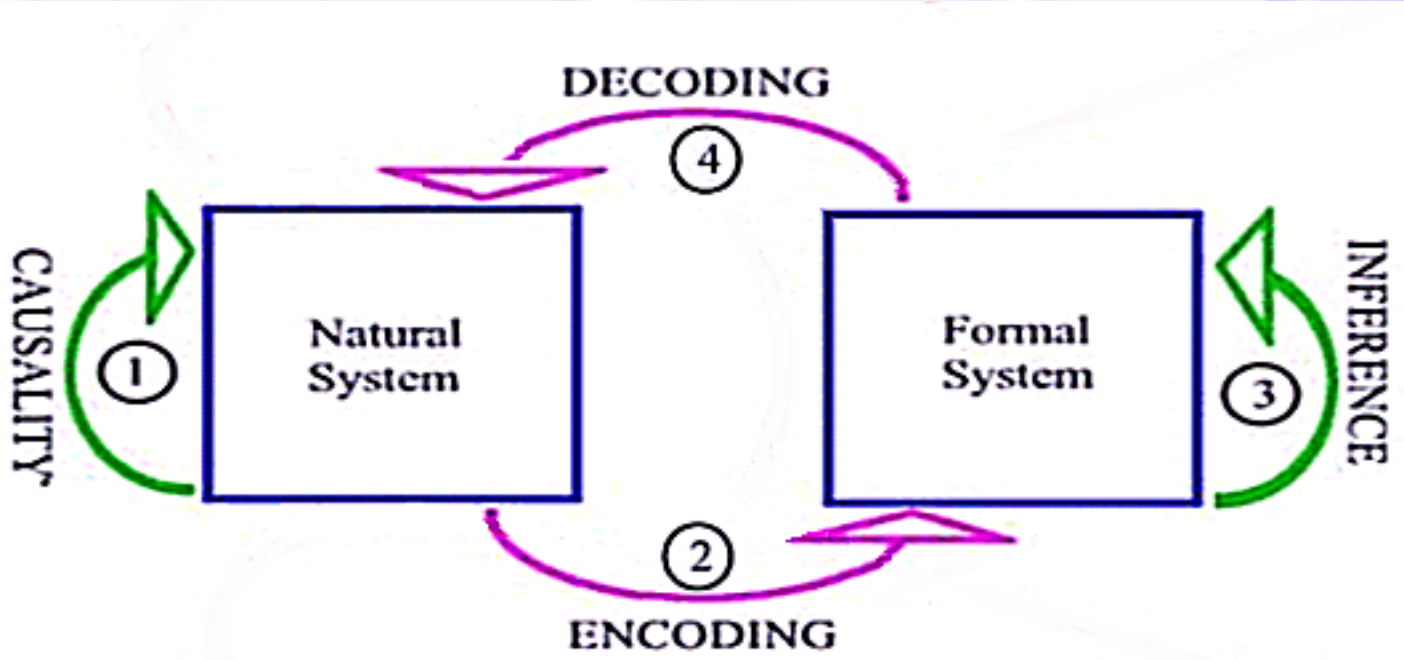
« …any material realization of the (M,R)-system must have non-computable models. »

Robert Rosen (1934 - 1998)



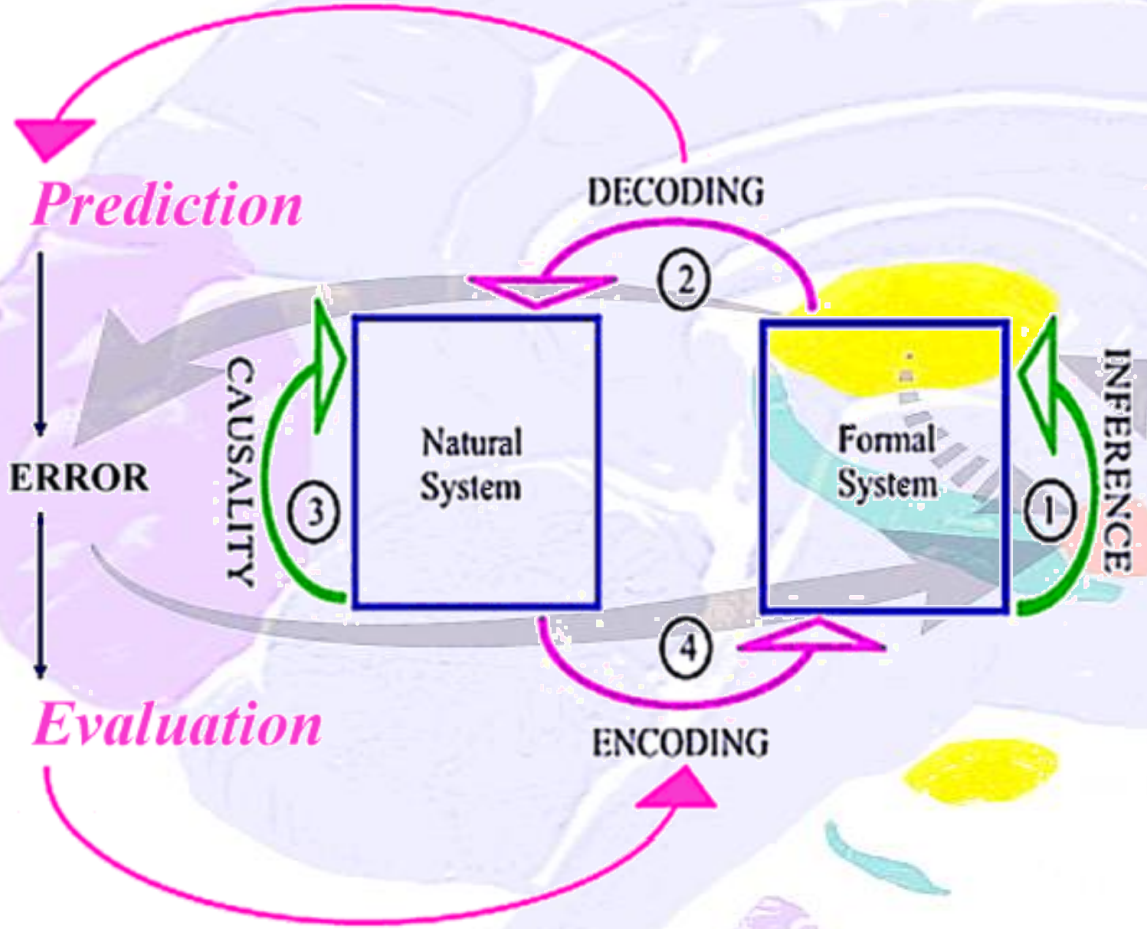
3. Information & Learning (06)

R. Rosen Fundamental Modeling Relation



3. Information & Learning (07)

Systemic Anticipation according to Robert Rosen

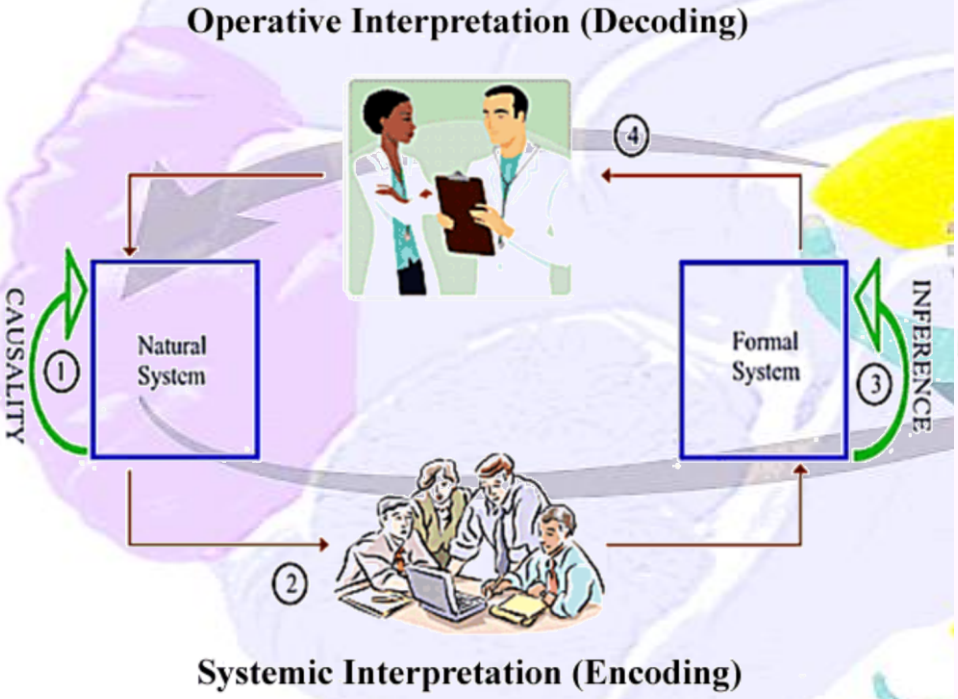


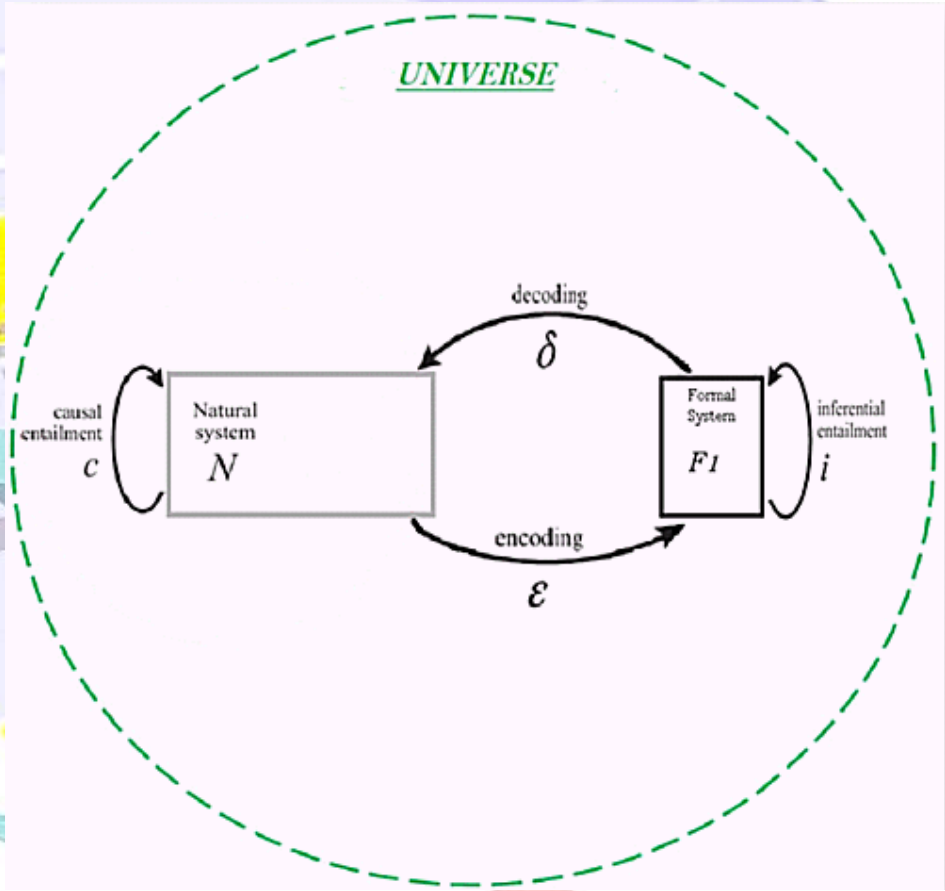
Anticipatory System: « A system containing **a predictive model of itself** and/or its environment, **which allows it to change state at an instant** in accord with the **model's predictions pertaining to a later instant.** »

(Robert Rosen, 1985)

3. Information & Learning (08)

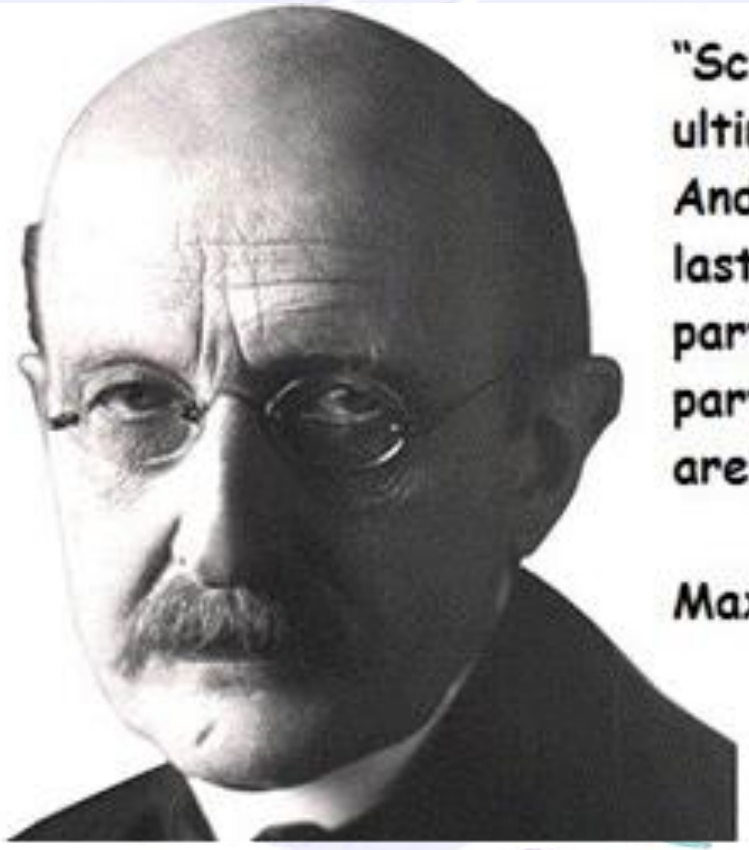
R. Rosen Fundamental Modeling Relation





3. Information & Learning (09)

Remembering The Great Pioneer of Quantum Physics

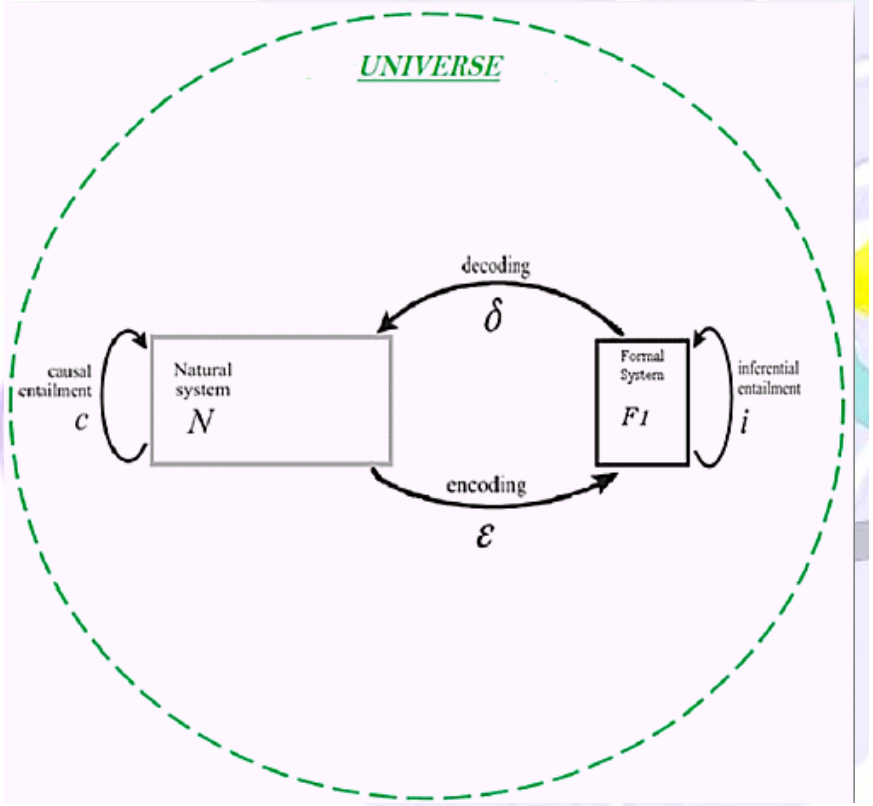


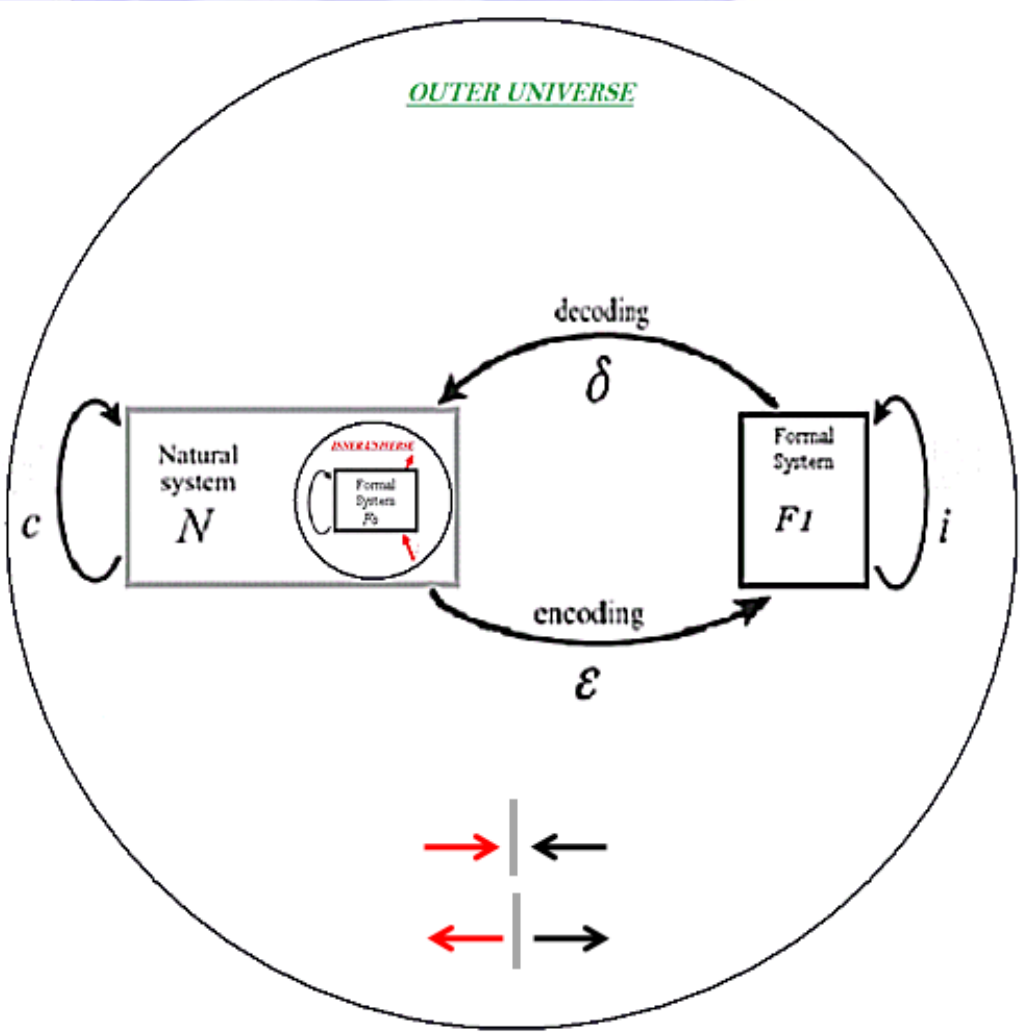
"Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of nature and therefore part of the mystery that we are trying to solve."

Max Planck

3. Information & Learning (10)

R. Rosen Fundamental Modeling Relation (Reflexive/Reflective)





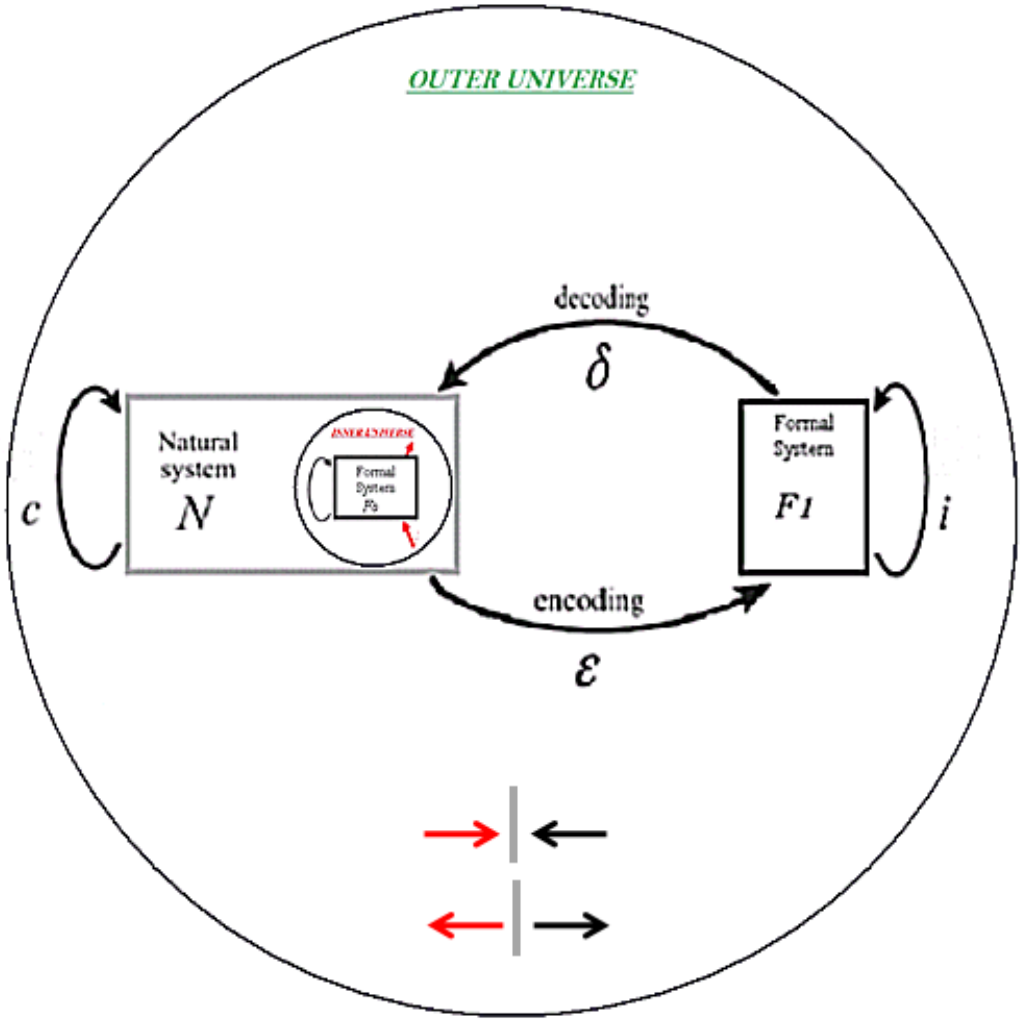
3. Information & Learning (11)

R. Rosen Fundamental Modeling Relation (Reflexive/Reflective)

R. Rosen Fundamental Modeling Relation with **explicit Reflexive and Reflective Representations**.

Immediately, Reflexive and Reflective Representations create **two base system scaling symmetries**: convergent and divergent scaling symmetries.

They allow for the correspondence of a **Inner Universe** representation to an **Outer Universe** representation, both linked by the **Kelvin Transform**.



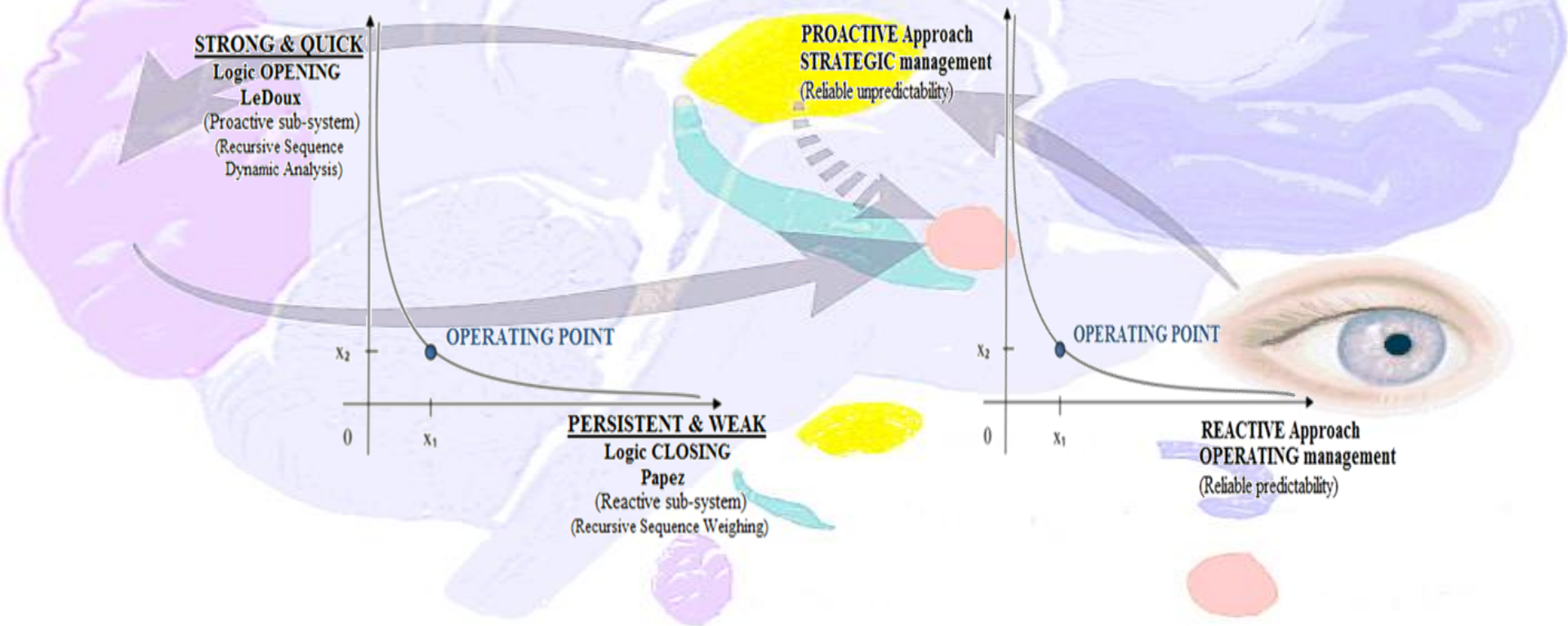
Convergent Scaling: → | ←

Divergent Scaling: ← | →

3. Information & Learning (12)

Two Irreducible Subsystems based on Ideal Asymptotic Dichotomy

Operating Point can emerge as a **new Trans-disciplinary Reality Level**, based on **an irreducible complementary ideal asymptotic dichotomy:** Two Complementary Irreducible Coupled Computational Subsystems.



4. Uncertainty As Resource (00)

4. Uncertainty As Resource (01)

Systems Thinking and Scenario Analysis

Thanks to **Rosen Systemic Anticipation Concept**, traditional understanding, that past events are the primary drivers that influence how we understand the present, is undermined.

By interpreting the present as the time where the forces of the past and future meet, our understanding of the present changes from a "thin" (the present as a boundary without any extension between past and future) to a "thick" present (the present as the collection of reasonable, but even unlikely events).

By giving the future scientific legitimacy, a novel vision of science arises where a fully scientific treatment of "final" causation (= anticipation) is included and not rejected **(Science 2.0)** as is the case in the traditional scientific paradigm **(Science 1.0).**

Systems Thinking and Scenario Analysis

Systems Thinking is the process of understanding how those things which may be regarded as systems influence one another within a complete entity.

Scenario Analysis, is a strategic planning method to make flexible long-term plans. It is in large part a reframing and generalization of classic methods used by military intelligence.

Scenario Planning may involve specifically the recognition that many factors may combine in complex ways to create **sometime surprising futures** (due to **non-linear feedback loops**).

4. Uncertainty As Resource (03)

Four Quadrant Scheme for Application-Domain Dichotomy

APPLICATION / DOMAIN	SIMPLE STRUCTURED TECHNICAL	COMPLEX UNSTRUCTURED NON-TECHNICAL
SIMPLE STRUCTURED TECHNICAL	(known knowns)	(known unknowns)
COMPLEX UNSTRUCTURED NON-TECHNICAL	(unknown knowns)	(unknown unknowns)

(N. Taleb, 2014)

4. Uncertainty As Resource (04)

Value Knowledge Concept

as

Fundamental Constraint

to Reframe

Systemic Convergence

to a Goal.

4. Uncertainty As Resource (05)

From Model Theory

Hartman developed a "formal concept of good"

(Robert S. Hartman, 1967)

4. Uncertainty As Resource (06)

To the Science of Value

"Good is what fulfills its concept"

(Robert S. Hartman, 1967)

Hartman Axiological Value Definition

"The proof of the pudding is in the eating."

(Robert S. Hartman, 1967)

Value Knowledge

Value Knowledge lagged far behind a science such as Physics in precision and technical language.

There are no value experts but only samplers who go out into the woods and gather samples which are then classified, stuck on needles, dried, pickled and preserved in treatise on value.

Robert S. Hartman (1910–1973) did take **value knowledge** seriously, **formulated a basic value-axiom** and deduced therefrom corollaries in a scientific manner.

Hartman Axiological Value Definition

Formal **Axiology** is based on the logic nature of meaning, namely **intension**, and on the **structure of intension as a set of predicates**. It applies set theory to this set of predicates.

Set Theory is a certain kind of mathematics that deals with subsets in general, and of finite and infinite sets in particular.

Since mathematics is a multicultural shareable language and a priori, formal Axiology is a shareable and a priori science; and a test based on it is a shareable test, based on a **multicultural shareable standard**.

4. Uncertainty As Resource (10)

Hartman Axiological Value Definition for a Generic Entity (TD Approach))

1 INTRINSIC VALUE (All the Properties contained in the Meaning of the Name)

2 EXTRINSIC VALUE (Name with a Meaning defined by a Set of Properties)

3 SYSTEMIC VALUE (Certain Name)

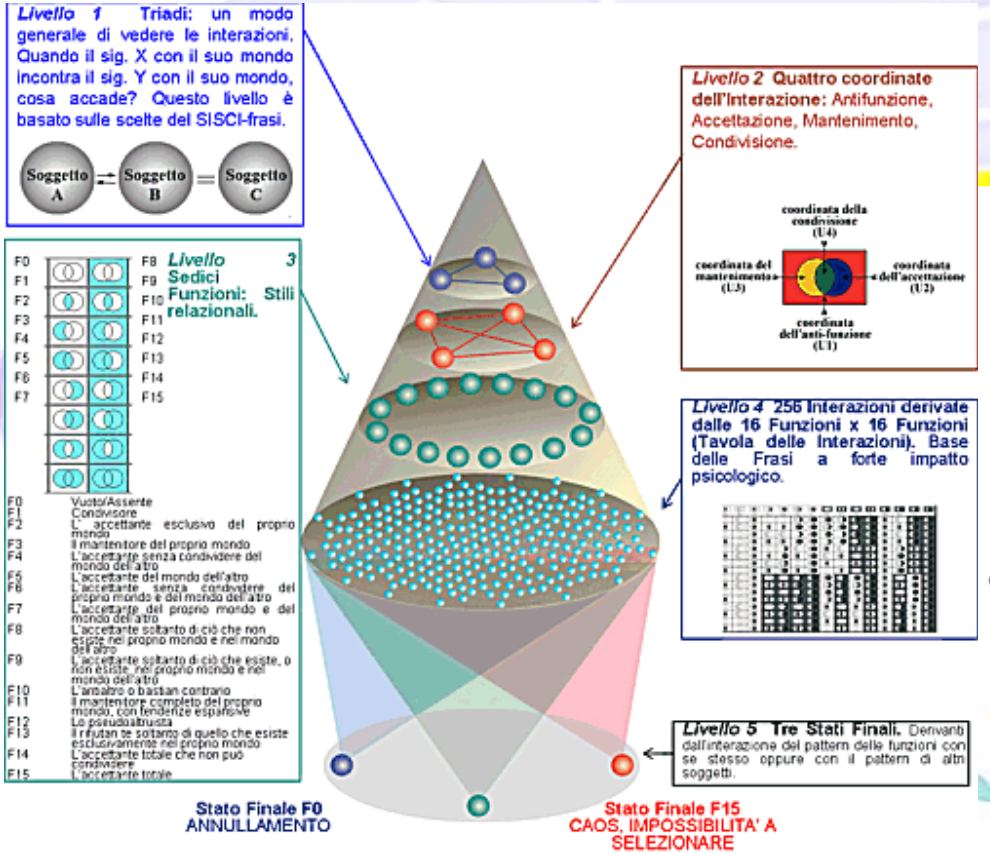
4. Uncertainty As Resource (11)

Hartman Axiological Value Definition

OUTER UNIVERSE	INNER UNIVERSE - SELF
INTRINSIC, “Empathy” Other persons as unique individuals; the spiritual, irreplaceable worth of others; the value of a “thing” as it exists in itself.	INTRINSIC, “Self Esteem” The self as infinitely valuable; the unique individuality of each person; the understanding of “who” one is; actual strengths and limitations.
EXTRINSIC, “Practical Judgment” Material value; things; classes or groups of things; other things as they serve useful roles or have functional value; comparison of things, people or situations; concrete, functional value in general, practical concrete organization.	EXTRINSIC, “Role Awareness” “What” one is; the role function one plays; the sense of using time in a useful, functional way; career thinking; satisfaction or dissatisfaction with what one is doing in the world.
SYSTEMIC, “Systems Judgment” Analytical or structured thinking; structure, order or consistency in thinking; theoretical or conceptual organization and planning; valuing what “ought to be”; the rules.	SYSTEMIC, “Self Direction” “Where” one is going or “ought” to be going; self direction; persistence; drive motivated from commitment to inner principles and goals; self concept; ideal self image.

4. Uncertainty As Resource (12)

Systemic Neuro-Axiological Approach by EPM Logically Articulated Learning Support



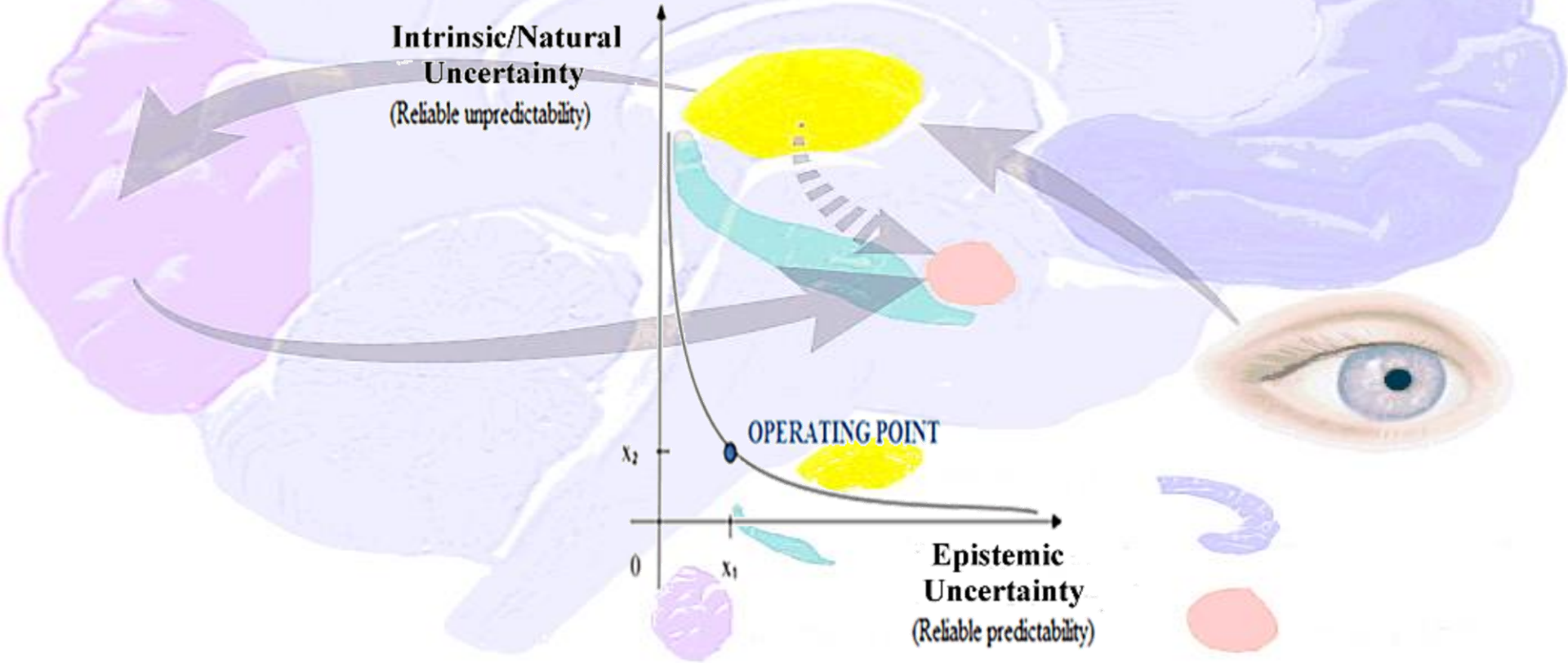
No no no no.....	F_0	F_8	Mi interessa solo cio che non ci riguarda
La nostra relazione è basata su ciò che condividiamo	F_1	F_9	Ciò che abbiamo in comune e ciò che ci è estraneo
Accetto solo ciò che è mio	F_2	F_{10}	Sono un bastian contrario
Mantengo la mia visione del mondo	F_3	F_{11}	Mi interessa tutto meno ciò che è solo tuo
Mi interessa solo ciò che è tuo	F_4	F_{12}	Ciò che mi interessa è il tuo mondo e gli elementi esterni
Entro nel tuo mondo con ciò che abbiamo in comune	F_5	F_{13}	Lasciatemi ciò che è esclusivamente mio
Ogni cosa dei nostri mondi è parte della nostra relazione ma non ciò che condividiamo	F_6	F_{14}	Mi interessa tutto meno ciò che condividiamo
La nostra relazione è basata sull'unione dei nostri mondi	F_7	F_{15}	Si si si si....

(Piero De Giacomo et al., 1982)

4. Uncertainty As Resource (13)

Value Operating Point Systemic Emergence

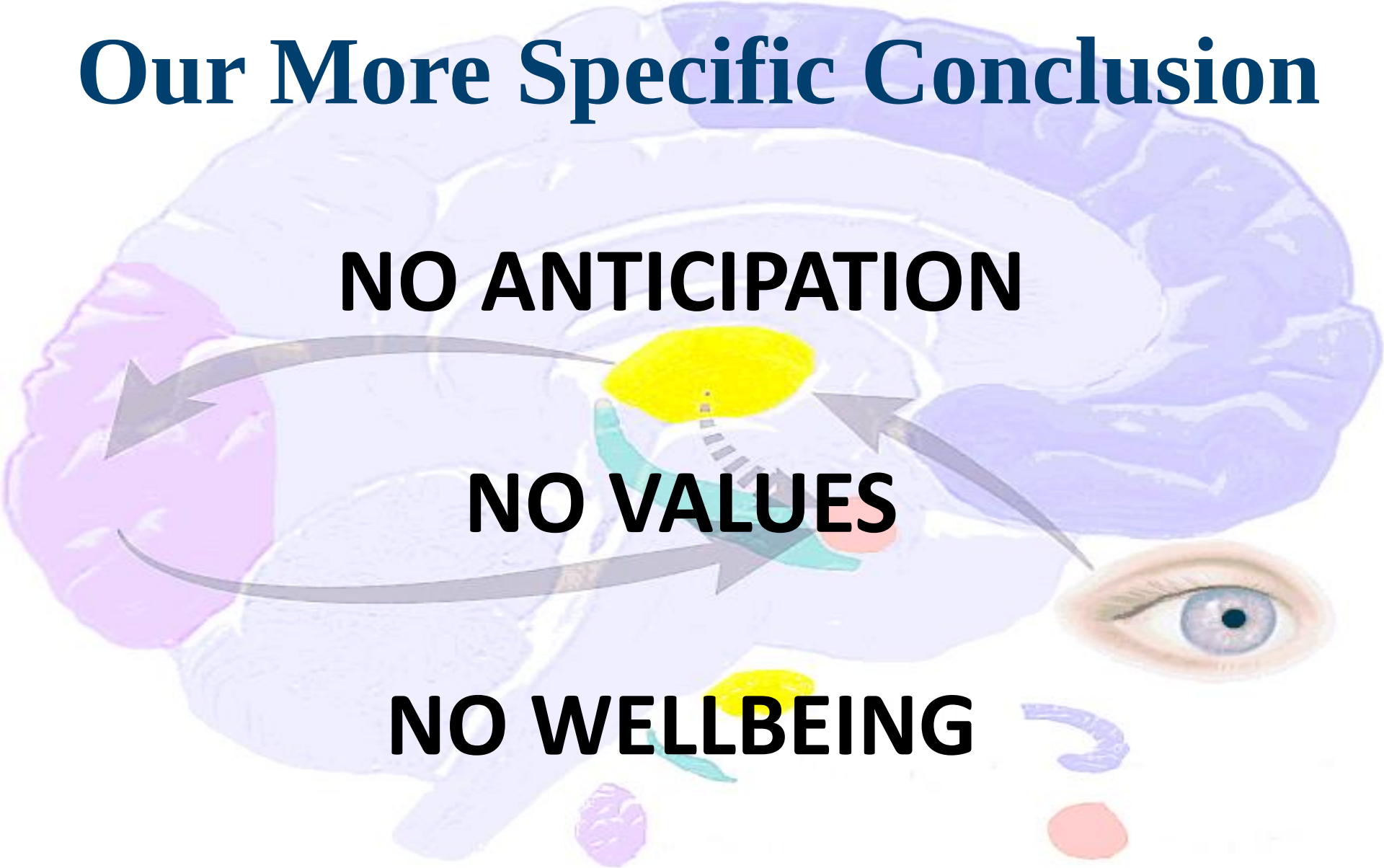
Value Operating Point can emerge as a **new Trans-disciplinary Reality Level**, based on **an irreducible complementary ideal asymptotic dichotomy:** Two Complementary Irreducible Coupled Information Management Subsystems.



5. Conclusions (00)

5. Conclusions (01)

Our More Specific Conclusion

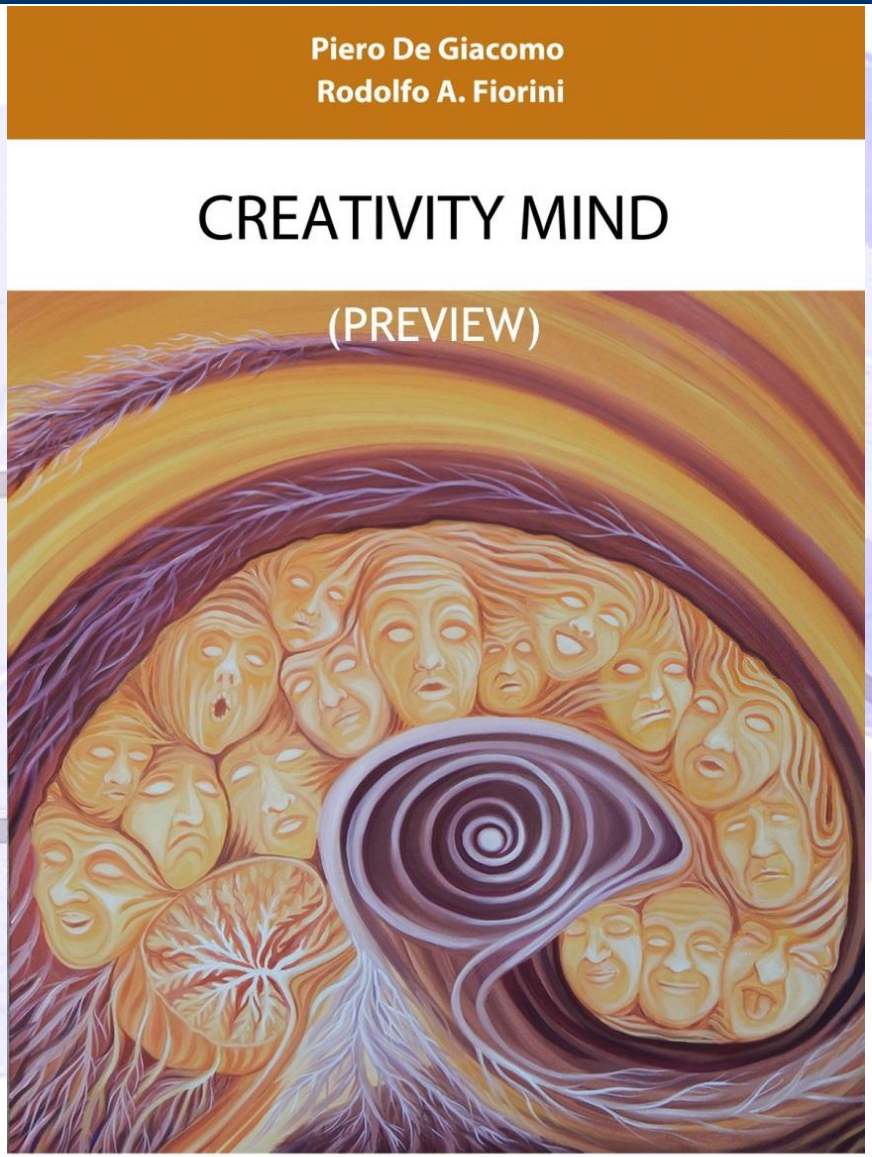


NO ANTICIPATION

NO VALUES

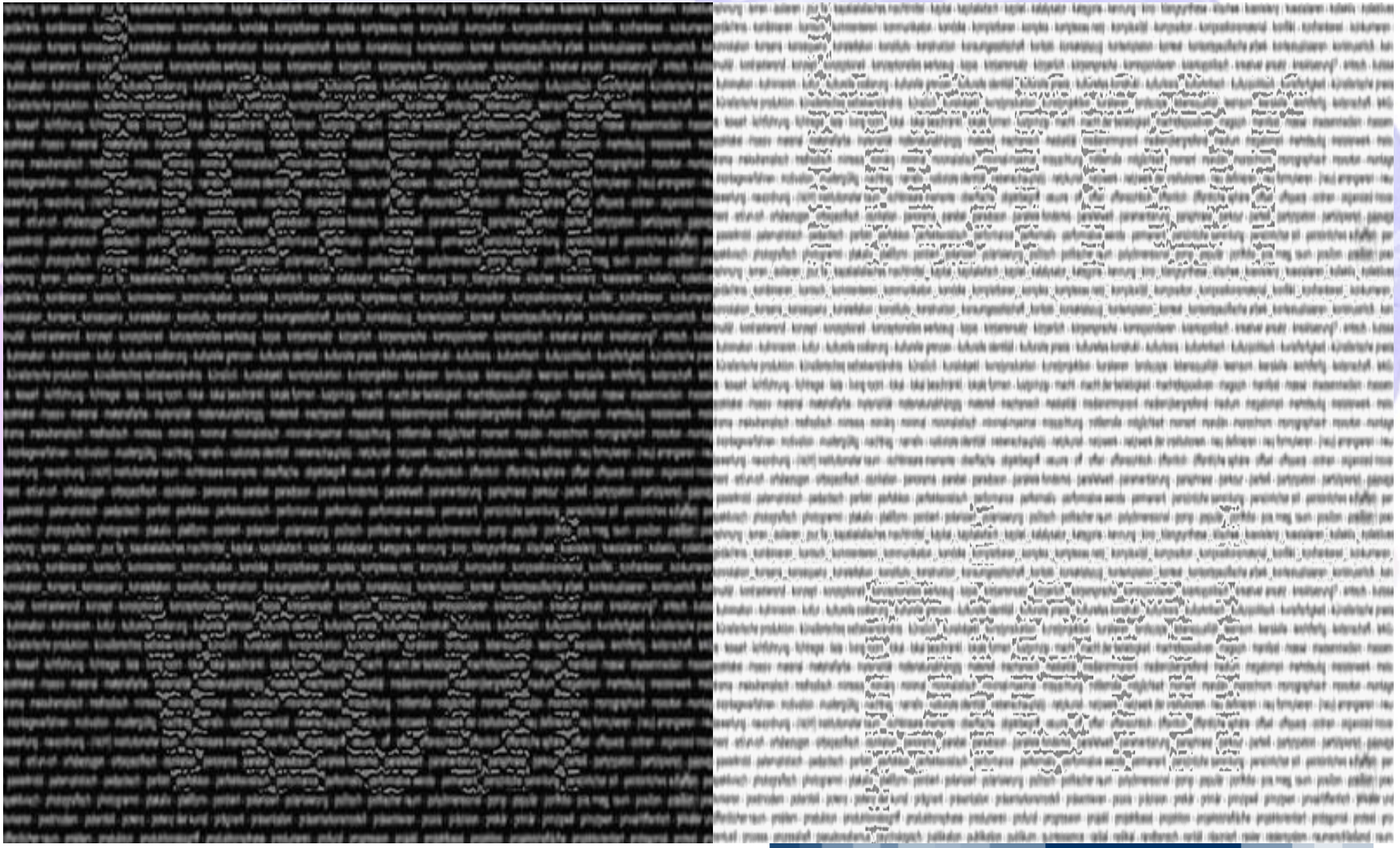
NO WELLBEING

5. Conclusions (02)



5. Conclusions (03)

Work In Progress



5. Conclusions (04)

Neuralizer Work In Progress

No Anticipation, No Wellbeing

POLITECNICO DI MILANO