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Can We Be Epigenetically Proactive?

Human Brain Project

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The autonomous brain

Contemporary neuroscience views of the brain:

- ✧ an **autonomously** active, self-referential, and selectional system
- ✧ in which **values** are incorporated as necessary constraints
- ✧ operating in a **projective style**
- ✧ in constant **social interaction**

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Knowledge acquisition

Models of the world are stabilised through ”Cognitive Games”:

Pre-representations are selected as permanent features, representations, of the developing cognitive apparatus by **reward signals**, in a process referred to as **mental Darwinism.**

J.-P. Changeux: The Physiology of Truth, 2004, Harvard University Press

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Born evaluators

We are neurobiologically predisposed to develop **systems of values** that enable us to function in our physical, social and cultural environments.

Are there ***specific*** innate values?

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Innate evaluative tendencies

- ✧ **Self-interest**
- ✧ **Control-orientation**
- ✧ **Dissociation**

These cerebral features characterize the individual, but they are also reflected in the **social relationships** proper to the human species.

Evers, K. *Neuroéthique. Quand la matière s'éveille*, 2009. Éditions Odile Jacob, *Paris.* Transl:

Neuroética. Cuando la materia se despierta, Katz Editores, Madrid / Buenos Aires.

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The self and others: biological (in)abilities

- **“us” versus “them”**: Ethics arises in the creation of social hierarchies & distribution of privileges
- **Empathy**: Apprehension of other minds
- **Sympathy**: Emotional engagement with others
- **Dissociation**: Emotional disengagement from “the other”

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The empathetic xenophobe

- Empathetic by virtue of intelligence
- Selectively sympathetic to the group into which we are born, create or choose to join
- Indifferent or hostile to the alien

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A neurobiological predicament?

The question can be raised: are we are **neurobiologically conditioned to remain** morally selective and xenophobic?

Can sympathy **biologically** be extended?

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Cultural imprints

The neuronal organisation of our adult brain develops in the course of a 15 years long period following birth during which, and, to a lesser extent, after which it is subject to **cultural influence**, both on the individual level and, at the social group level, across generations.

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Epigenetic evolutionary processes

The genetic control over the brain's development is not absolute but subject to **epigenetic evolutionary processes**:

A coordinated and organised neuronal development that is the result of learning and experience and that intermixed with the action of genes

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Evolution of the relationship genome – brain

Non-linear evolution of brain vs genome complexity

	GENOME SIZE	NUMBER OF GENES	NUMBER OF NEURONES
YEASTS	13.5 Mb	6.144	-
WORMS	97 Mb	18.266	302
FLY	165 Mb	13.338	250×10^3
MOUSE	2.5 Gb	**20-25.000**	40×10^6
HUMANS	2.9 Gb	**20-25.000**	$50\text{-}100 \times 10^9$

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Selective stabilisation of synapses

The 10^{15} synapses that form the human brain network **assemble through trial-and-error mechanisms** that formally resemble an evolutionary process by variation selection:

- ✧ Helps explain the non-linearity?
- ✧ Theorem of variability
- ✧ May play a critical role in social and cultural evolution

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Epigenetic transmission of cultural imprints

Cultural imprinting passed on through Darwinian evolution (e.g. reading & writing) plays a critical role in shaping the brain phenotype in relation with the social group through oral and written language but also though the diverse culture-specific habits, traditions, symbolic systems, including the ethical and social norms embodied in the adult brain.

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1948 Universal Declaration of Human Rights

All human beings are born free and equal in dignity and rights

Read as a **description** of the actual situation of human beings, this is tragically false. Read as a **normative** ideal that we should strive for, it is noble but tragically unrealistic.

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Proactive epigenetics

Certain areas of research are especially important to pursue with the "epigenetic proaction goal" in mind, integrating recent advances in neuroscientific research into normative debates at the level of society:

- ✧ Problems of adolescence
- ✧ Violent interconfessional conflicts

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The naturalistic responsibility

- To **decipher the network of causal connections** between the neurobiological, socio-cultural and contingent historical perspectives
- To evaluate their “universal” character as **pre-specified in our genome** in distinction from those **relative to a given culture** or symbolic system

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Steering evolution

- The naturalistic approach entails the **responsibility of connecting biology and socio-cultural structures**, and using that enriched understanding for the benefit of ourselves and our societies.
- In line with Darwin, **we can be active constructors of our own brains** with the use our environment and culture, a relationship that is reciprocal.

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Epigenetic proaction & precaution!

- Epigenetic proaction can be a powerful and long-term way of influencing human nature and of improving our societies. However, **precaution** is needed.
- Science can be, and has throughout history repeatedly been, **ideologically hijacked**.
- What traits we choose to favour epigenetically, depends on **who "we" are**, and in what society we wish to live.

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Evers, K. 2015. ***Can we be epigenetically proactive?***

T. Metzinger & J. M. Windt (Eds). Open MIND: Frankfurt am Main: MIND Group.

www.open-mind.net

In press, MIT Press, 2016.