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## **Addressing the Challenges of Social Determination of Health**

**A View from the South**

**Jaime Breilh**

**2013**

Ponencia presentada en: Teleconference, University of Toronto. Dalla Lana School of Public Health; Universidad Andina Simón Bolívar, Sede Ecuador, Quito, febrero 28 de 2013.

**University of Toronto  
Dalla Lana School of Public Health**

# **Addressing the Challenges of Social Determination of Health: A View from the South**



**Jaime Breilh Md, MSc, PhD**  
**(Dean of Health Sciences Area)**  
**Universidad Andina Simón Bolívar**  
**Sede Ecuador**

**Teleconference, February 28th, 2013**



**Talking from the “South”, not only implies sharing the problems we face, but also sharing the strengths of our theoretical-methodological reasoning (many times made invisible by mainstream public health)**

## **Main objective:**

***Understanding the fundamental character of the “social determination of health” paradigm (critical epidemiology)***

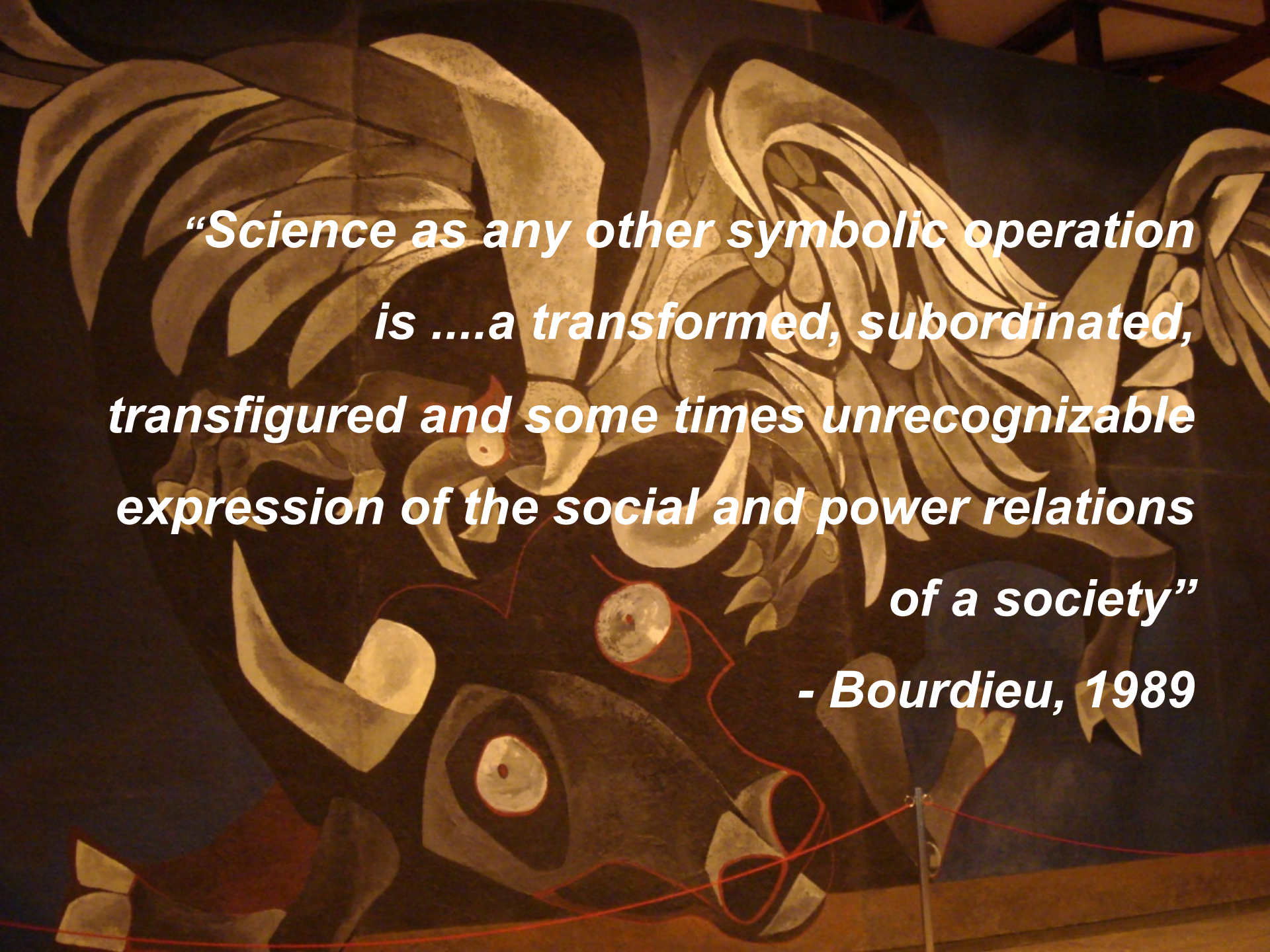
- for the development of public health science, geared towards the building of healthy societies and health rights.***





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# **The Historical paradigm clash in Epidemiology**



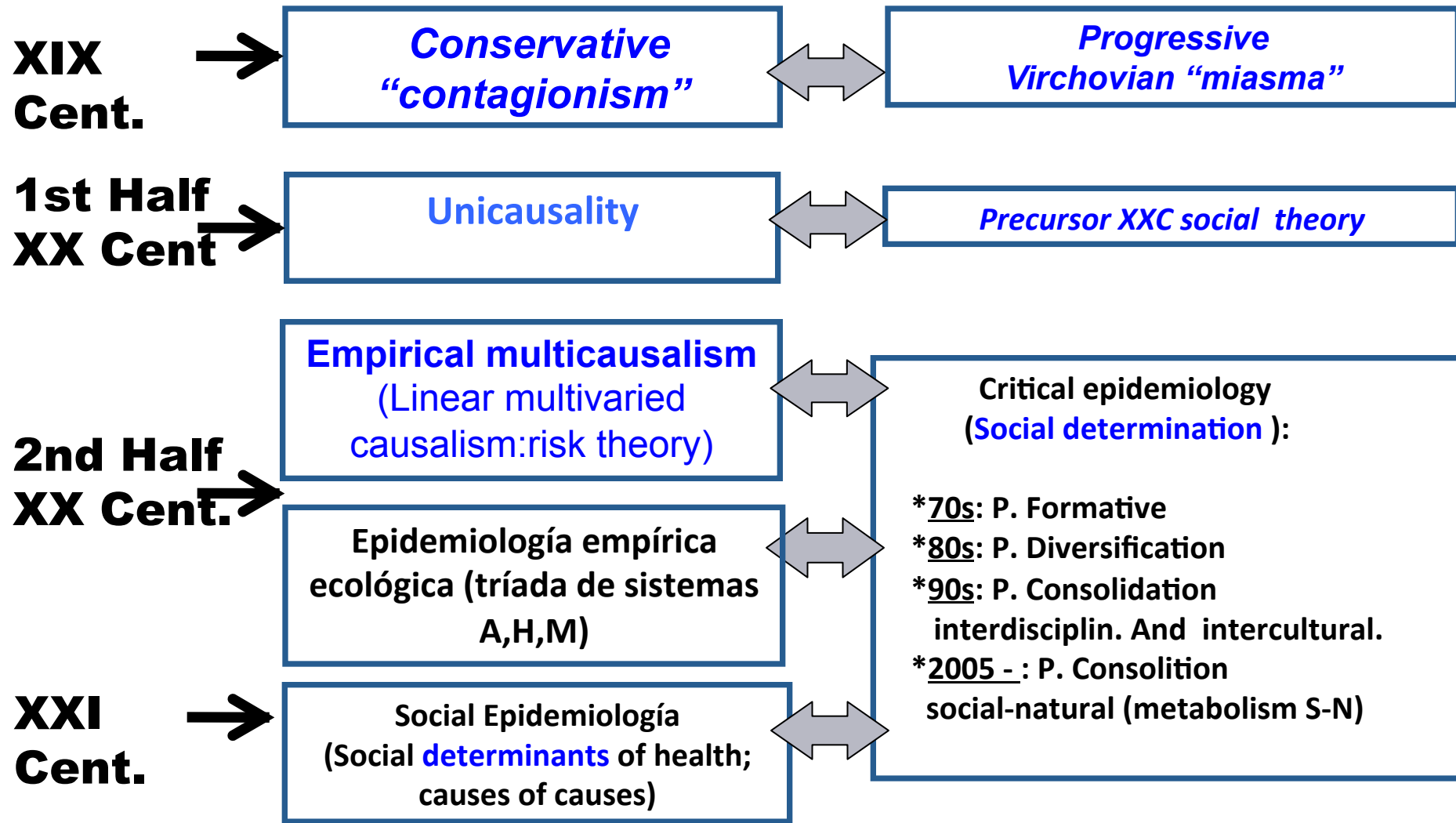
***“Science as any other symbolic operation  
is ....a transformed, subordinated,  
transfigured and some times unrecognizable  
expression of the social and power relations  
of a society”***

***- Bourdieu, 1989***

***Epidemiology, as “diagnostic” instrument of public health, experiences the tensions, impulses and obstacles of all knowledge that contributes to define societal image and the degree of political success.***

**Lineal functional (conservative) conceptions and applications of epidemiology have operated historically as an instrument of hegemony and conservative governance, whereas, the progressive paradigms have become an instrument of emancipatory understanding of science.**

# Figure N°1 Historical dissent in epidemiology





# **A “recent” emblematic case of conflict of interests that affect scientific work: cell phone, RF impacts on health**

*(Based on: D. Davis, Cellphone exposure toxicity and epidemiology: an update. National Institute of Environmental Sciences, April 4<sup>th</sup>, 2012)*

Evidence of cell phone technology impact has been dismissed in mainstream research through misconception of “dose”: low intensity or power of radiation.



# Professor Henry Lai

*(School of Medicine and College of Engineering,  
Washington State University, 1996-98)*

*"Workshop on Possible Biological and Health Effects of RF Electromagnetic Fields",  
Mobile Phone and Health Symposium, Oct 25-28, 1998, University of Vienna,  
Vienna, Austria:*

- *Energy between 10 KHz-300 GHz*
- *Causes a repeated irradiation of a more or less fixed amount of body tissue.*
- *Radio Frequency Radiation (RFR) during the normal use of mobile telephones could lead to hazardous health effects. Research studying RFR of frequencies and waveforms similar to those emitted from cellular telephones and intermittent exposure schedule resembling the normal pattern of phone use is needed.*

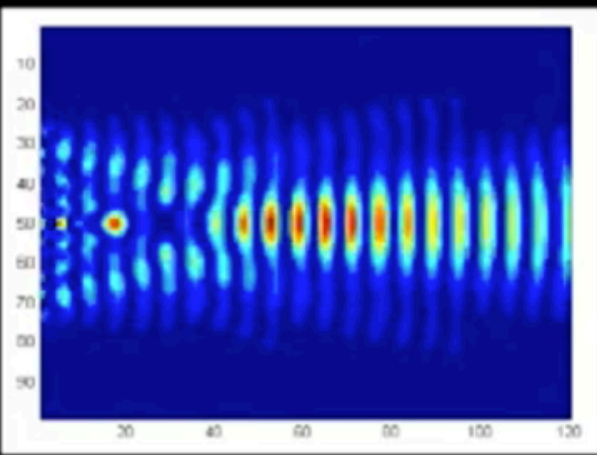


# Cell Phone Dangers | Dr. Devra Davis @ National Institute of Environmental Health Sciences (NIEHS)

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The impact of any form of radiation depends on the nature of the waves

- Frequency (pace)
- Amplitude (power)
- Pulse (beats)
- Intensity (power density)
- Polarity
- Information content



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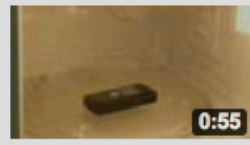
Courtesy of Margaritis et al

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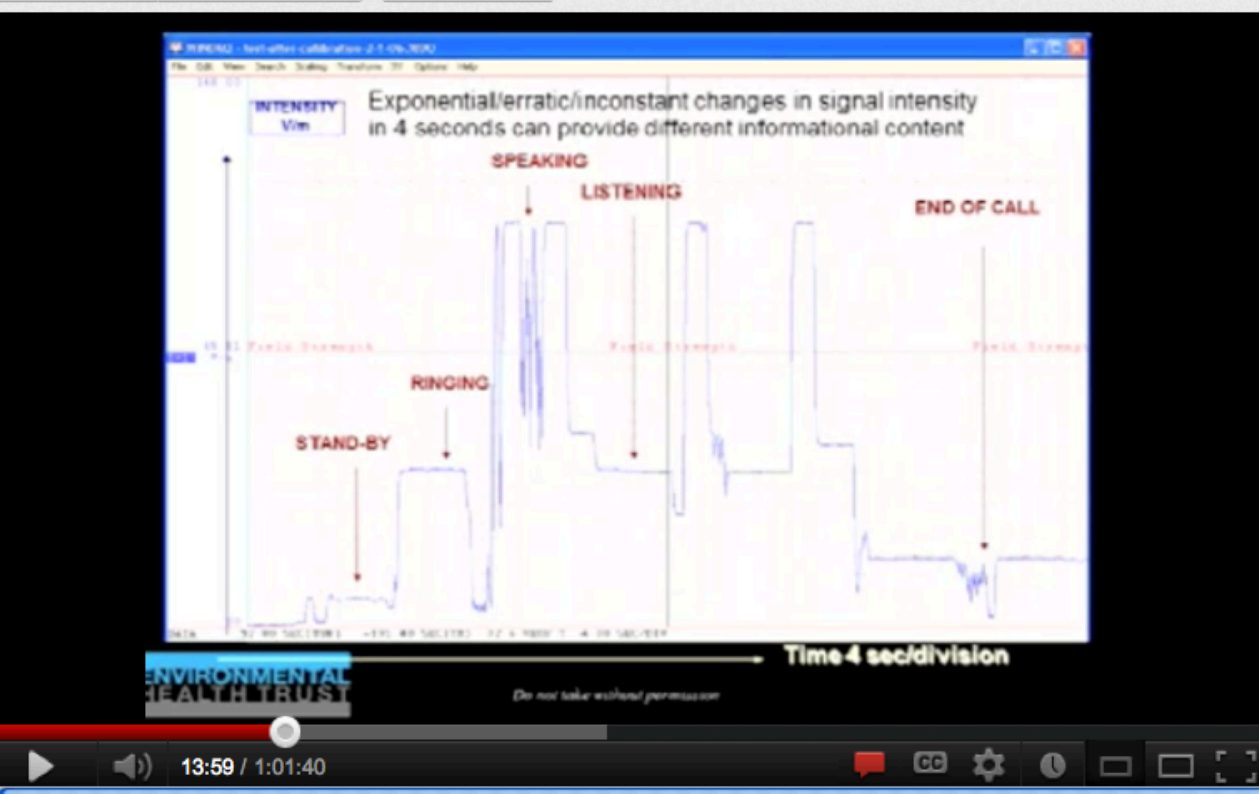
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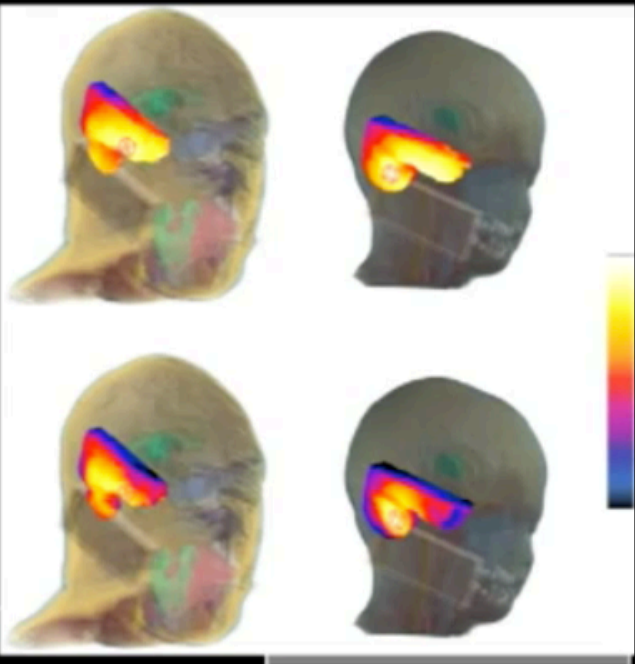
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Cell phone standards are based on a heavy-set 6 foot+ tall man\

900 MHz the SAR maximum occurs in the center of the case  
(w 15 mm spacer for 10 gm)

1800 MHz SAR max occurs at edge of case, Christ et al. 2010

Images courtesy of IT'IS, 2010



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## Microwave/RF Radiation

**Positive Impacts**

- Treats liver cancer
- Stops bleeding
- Enhances uptake of drugs to brain
- Detects cancer

**Negative Impacts**

- Damages DNA
- Disrupts blood brain barrier
- Weakens & damages sperm
- Changes brain metabolism

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## Cell Phone Radiation Penetrating Skull



ADULT Head



CHILD - 10 Years Old



CHILD - 5 Years Old

Study by Gandi et al. University of Utah, 1996.

1. Children **absorb** more **energy** than adults from the same phone.
2. Tumors in **mid brain** are more deadly than those in **temporal lobe**.
3. Children's **cells** are **reproducing** more quickly than adults.
4. Children's **immune system** is not as well developed as adults.
5. Longer potential for **life-time exposure** for children than adults.



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SCIENCE UPDATE: CELL PHONES AND HEALTH  
23 May 2011, İstanbul


## Investigation of EMF effects on the cell number of hippocampus and cerebellum using stereological techniques

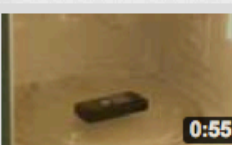
Süleyman KAPLAN  
Department of Histology-Embryology  
Medical School  
Ondokuz Mayıs University  
skaplan@omu.edu.tr


23:04 / 1:01:40

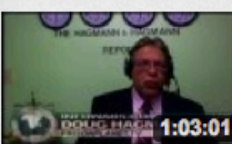
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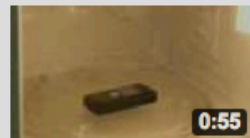
Prenatal 900 MHz RF-MP exposure decreased hippocampal granular cell number in the dentate gyrus of newborn rats

The research question:  
Do electromagnetic fields (EMFs)  
inhibit the formation and  
differentiation of neural stem cells  
during embryonic development in the  
hippocampus

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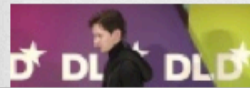
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[www.biyofizik.gazi.edu.tr](http://www.biyofizik.gazi.edu.tr) [www.gnrk.gazi.edu.tr](http://www.gnrk.gazi.edu.tr)

## Experimental Studies of RF/Microwave Radiation from Mobile Phones

Nesrin Seyhan, Ph.D.


GAZI UNIVERSITY  
FACULTY OF MEDICINE  
BIOPHYSICS DEPARTMENT

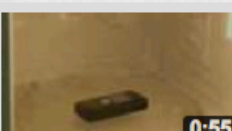
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25:44 / 1:01:40


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- Before After



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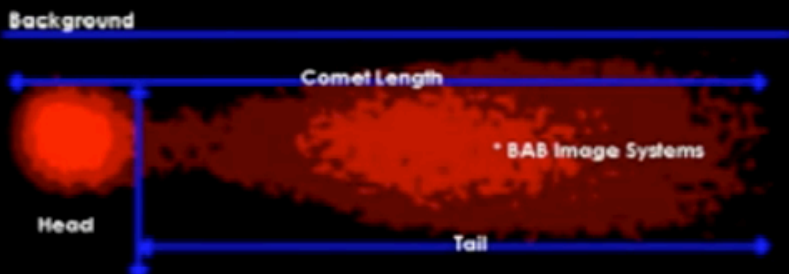
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Background


Comet Length

Head

Tail

\* SAB Image Systems

- DNA is first unwound under alkaline conditions and then subjected to electrophoresis.
- DNA fragments migrate towards the anode, thereby forming a comet-like appearance.
- Amount of DNA damage is quantified by the length and density of the comet tail.



Before After


2:19

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0:55

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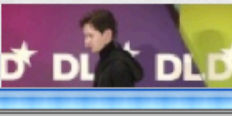


1:03:01

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## RF Effects

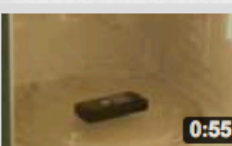
- DNA Strand Breakage
- Chromosomal Abnormalities
- Cell Death
- Cellular Stress
- Neurological Degeneration
- Aging
- Free radical formation

28:25 / 1:01:40


Before After



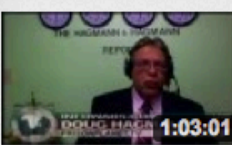
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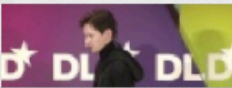
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## Damage to Cell Function or Structure

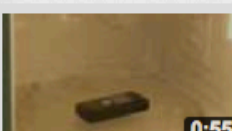
- Cell Function &/or epigenetics
  - Free radical formation
  - Reactive oxygen species (ROS) formation
  - Impeding melatonin metabolism
  - Altering proteomics, GLF
  - Impeding DNA repair may be key
- Cell Structure
  - Disrupting Resonance or Spin
  - Gap junction inhibition
  - Weakening membranes &/or blood-brain barrier

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## Explanations for some negative experimental results

- Apply constant signals not intermittent ones
- Rely on resistant cells rather than susceptibles
  - i.e., adult lymphocytes are resistant, while neural stem cells are susceptible
  - Human mesenchymal stem cells are more sensitive to EMF exposure than adult cells

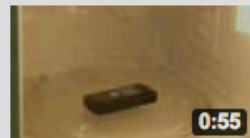


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Huss, et al., Source of funding and results of studies of health effects of mobile phone use: systematic review of experimental studies, Environ. Health Perspect. 115 (2007) 1-4.

Cellphone Biological Studies							
		Effect Found		No Effect Found			
		Studies	% All Studies	Studies	% All Studies	Studies	% All Studies
Industry Funded	No.	27	8.3%	69	21.2%	96	29.4%
	%	28.1%		71.9%			
Independently Funded	No.	154	47.5%	76	23.5%	230	70.6%
	%	67.0%		33.0%			
Totals		181	55.5%	145	44.5%	326	100.0%

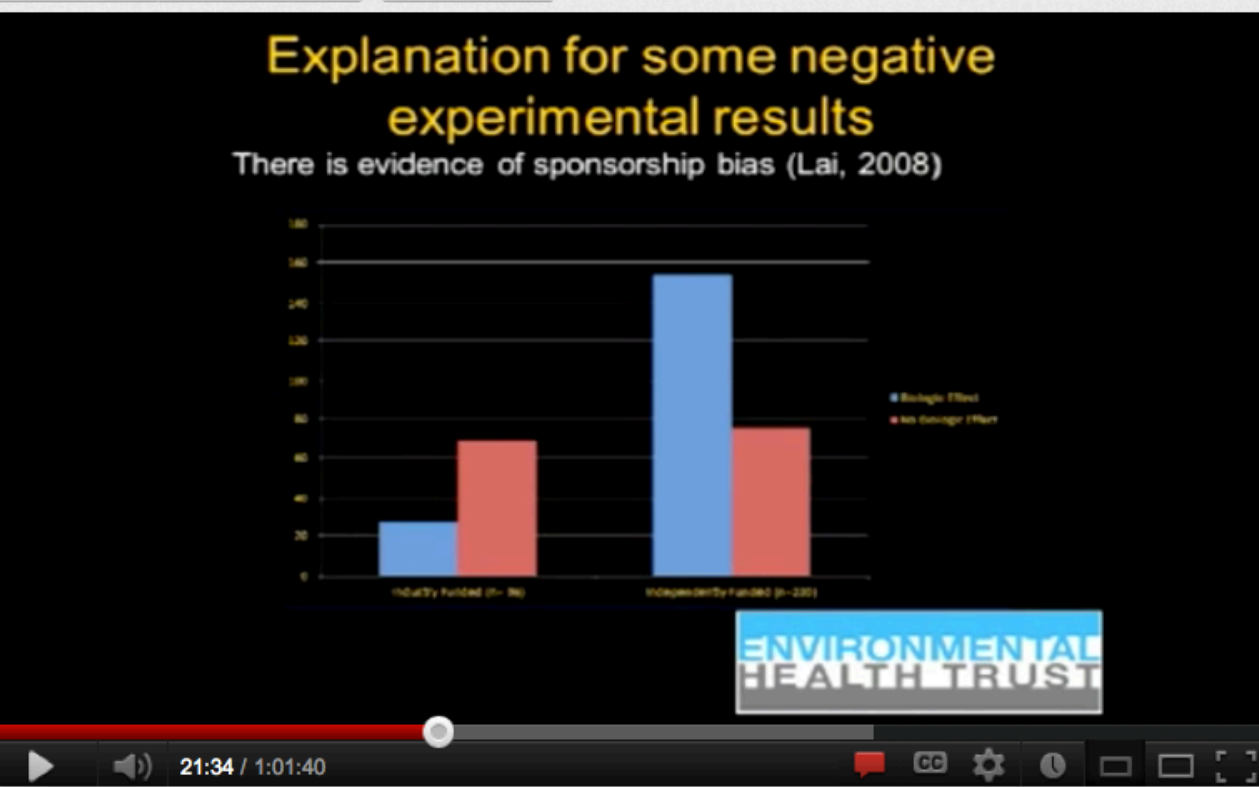
$\chi^2 = 39.8$  ( $p = 2.3 \times 10^{-9}$ )

11 July 2006 [1]

**Table 1:** Industry-Funded and Independently-Funded Cellphone Biological Studies

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"A wake-up call for all those who have accepted the poisons  
of our age of plenty without a blink."—*Discover*

# 21st Century Paradox

The potential of science as an instrument of life is undermined by the "misdirections of science" (and) "the maturing of the science of **doubt promotion** - the concerted and well funded effort to identify, magnify and exaggerate doubts about what we could say that we know as a way of delaying actions to change the way the World operates."

*(Devra Davis, The secret history of the war on Cancer. New York: Basic Books, 2009, p. xxi)*

Author of *When Smoke Ran Like Water*  
FINALIST FOR THE NATIONAL BOOK AWARD



# DOUBT IS THEIR PRODUCT

How Industry's Assault on Science  
Threatens Your Health

David Michaels

**Emblematic tobacco case:  
transnationals invested billions  
of dollars to discredit critical  
research through contracted  
science geared at  
producing doubt**

**"Doubt is our product, the best way to  
compete with the 'body of evidences' that  
exists in the general public.  
It is also the way  
to establish a controversy"**

**[Memo of Brown & Williamson CEO,  
Document n° 680561778-1786, 1969 cited by  
David Michaels "Doubt is their product", 2008]**

**So we must submit to critical scrutiny  
our research paradigms and answer  
some questions which underline the  
critical analysis of graduate research  
and superior education governance.**

**Are public health and  
environmental sciences  
being misdirected by the  
pressure of sponsorship?**

**Is biased and doubt promoting  
science contributing to the  
derailment of public health  
research and teaching?**

**Are apparently sound but essentially  
biased scientific prescriptions  
only an ethical issue?  
(conflict of interests)...**

**....or do they derive from  
a theoretical-methodological flaw?**

***And finally:***

**What are we doing in graduate programs  
to develop our paradigms, methodology  
and means of incidence to correspond to  
the complex challenges of  
unhealthy living modes  
and deteriorating ecosystems?**

A black and white portrait of Albert Einstein, showing him from the chest up. He has his characteristic wild, curly hair and a mustache. He is wearing a suit jacket, a white shirt, and a striped tie. The background is slightly out of focus, showing vertical lines that could be curtains or a wall.

**“The only thing that interferes with  
my learning is my education.”**

***A. Einstein***

**The need to debate conceptual  
and logic foundations  
of Public Health sciences  
such as epidemiology**



# **DEFINING A SCIENTIFIC MODEL**

# KNOWLEDGE ↔ ACTION

1

**OBJECT**

**STUDY OBJECT**

What we include, what we leave out;  
weights;

(Critical processes)

2

**CONCEPTS**

**MODELS**

Questions. Conceptual  
representations; observation  
methodology; proof criteria

3

**FIELD**

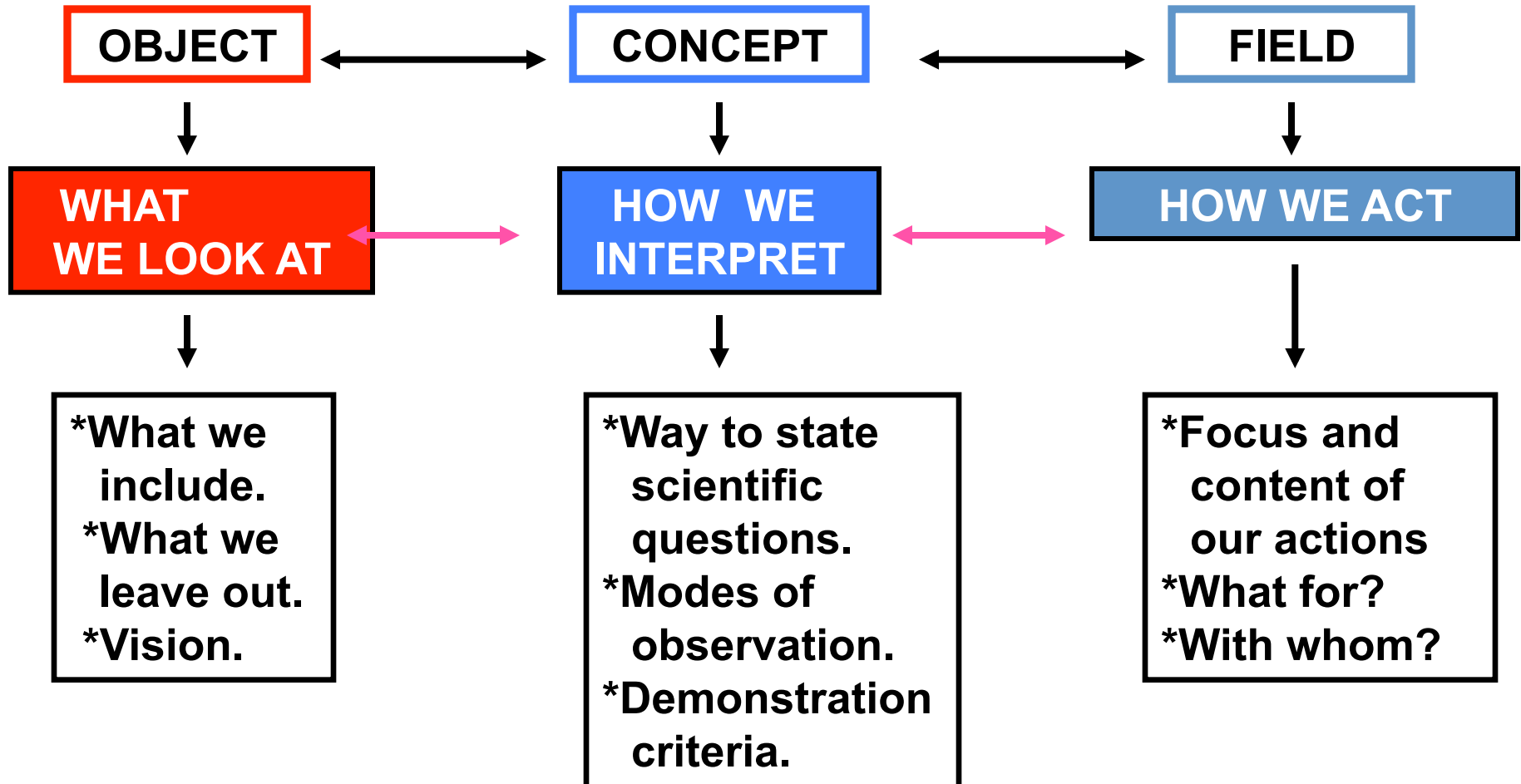
**ACTION LINES**

Content and subjects  
of our actions;  
our relationships;  
strategic links.

Figure N°4 Comparative analysis of health determination paradigms (models)

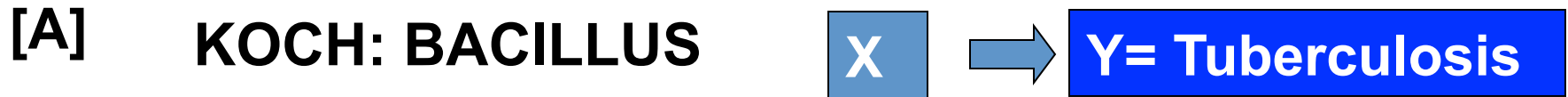
DIMENSION FOR DESCRIPTION	ELEMENTS FOR DESCRIPTION OF DETERMINATION	EPIDEMIOLOGIC PARADIGMS	TYPE	CAUSAL LINEAL	EMPIRICAL ECOLOGY	CRITICAL (TRANSITION)		CRITICAL
			NAME	Lineal Epidemiology (Uni y Multi causal)	Empirical - ecological system epidemiology	Social Epidemiology (Social Health Determinants- DsSS)	Eco-social epidemiology	Critical Epidemiology
		AUTHOR(s): REPRESENTATIVE, THAT WORKED ON THE CATEGORICAL OF DETERMINATION		MacMahon 1960, 1975 Rothman 1998, 2008	Leavell Clark 1965	Marmot 2006 Solar 2007	Krieger 1994, 2001, 2011	Breilh 1976/77, 1979, 2003, 2011
<b>OBJECT</b> (Objective Dimension)	ORDER							
	CHARACTERIZATION OF MOVEMENT							
	TEMPORAL ANALYSIS							
	SPATIAL ELEMENTS							
<b>SUBJECT</b> (Subjective Dimension)	IDENTITY							
	CONCEPTION OF NATURE							
	SCOPE OF STUDY OBJECT							
	ACTIVE ELEMENT OF KNOWLEDGE							
	CRITERIA FOR SCIENTIFIC TRUTH							
	ETHICAL POSITION							
	GENERAL PARADIGM							
<b>ACTION FIELD</b> (Practical Dimension)	TRANSFORMATION OBJECT							
	SOCIAL RELATIONS OF RESEARCH WORK							
	APPROACH ON PARTICIPATION							
	INTERCULTURALITY							
	HISTORICAL LINKS OF ACTION							

# The Unity of Logic and Action



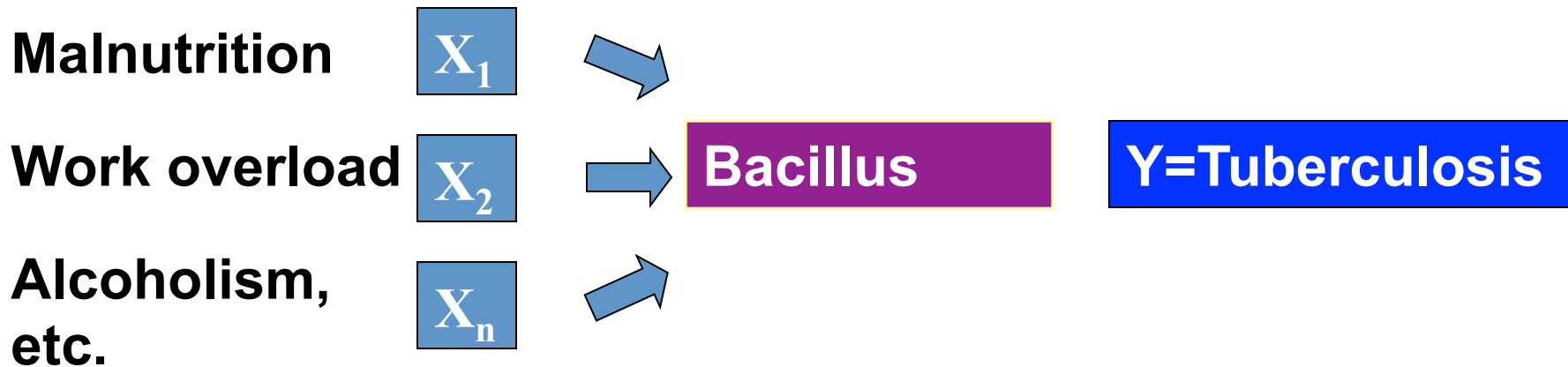
**THE NEED TO OVERCOME THE  
REDUCTIONIST APPLICATION OF  
*CAUSATION***

# TUBERCULOSIS: POSITIVIST MODELS



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[B] MULTICAUSALITY:

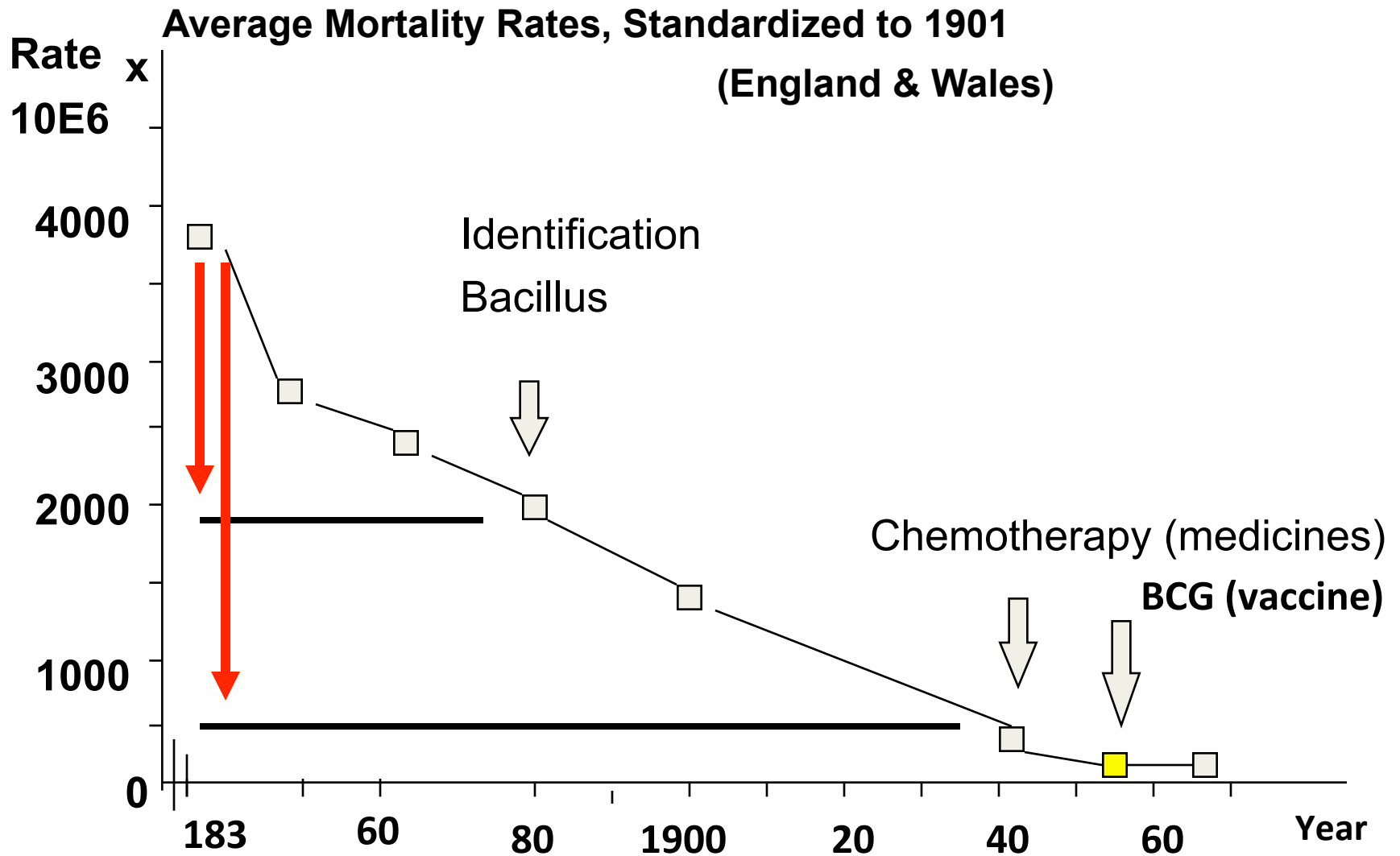


\* FORMAL ASSOCIATIVE REASONING

\* FUNCTIONALIST, COSMETIC

INTERVENTION

# HISTORICAL EVOLUTION OF TUBERCULOSIS



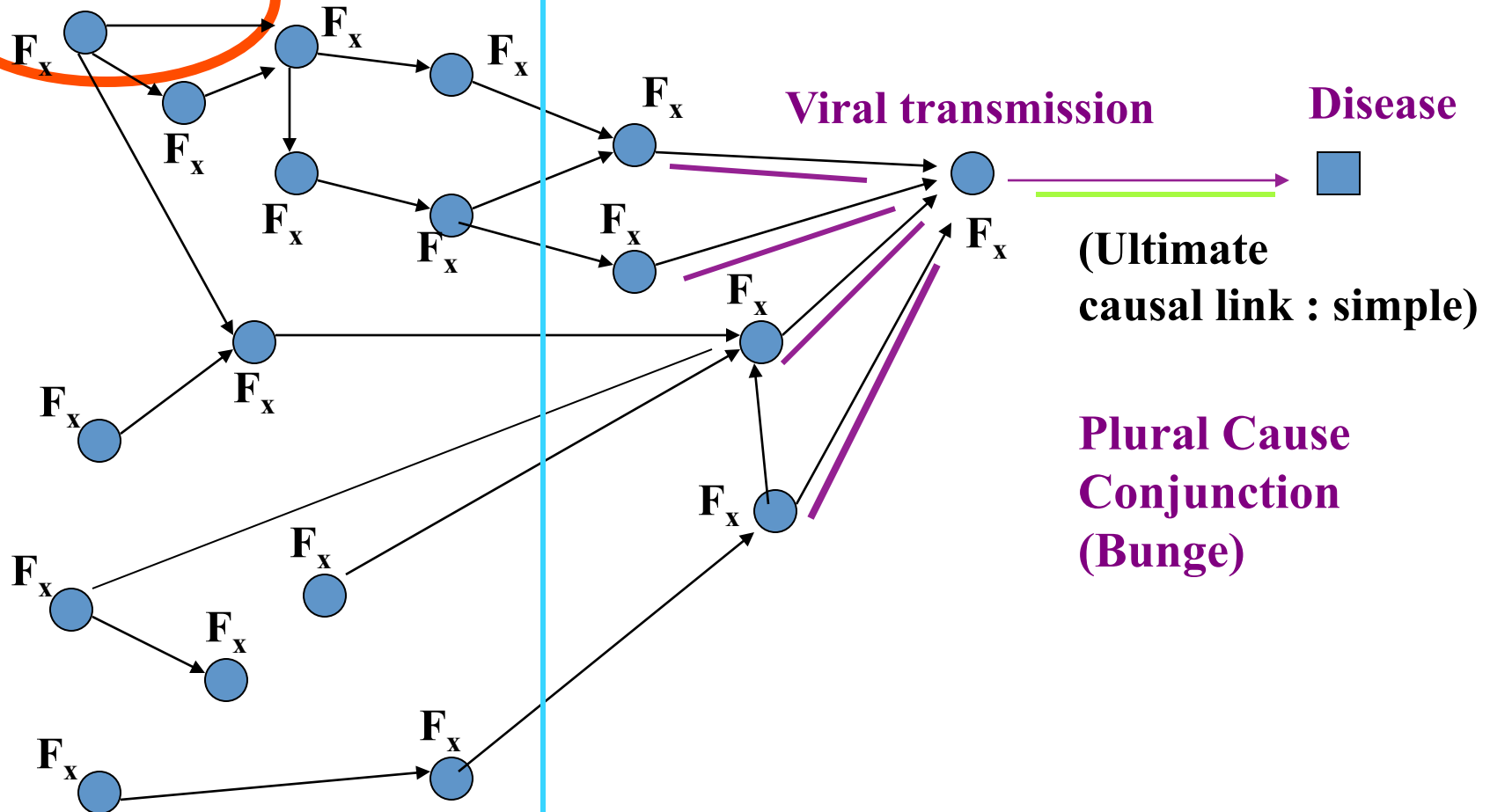
Source: Mckeown-The Role of Medicine

# Critique of MacMahon's Causal Web

("Epi.:E,M yP." Breilh, 1979)

Indirectly Associated Factors

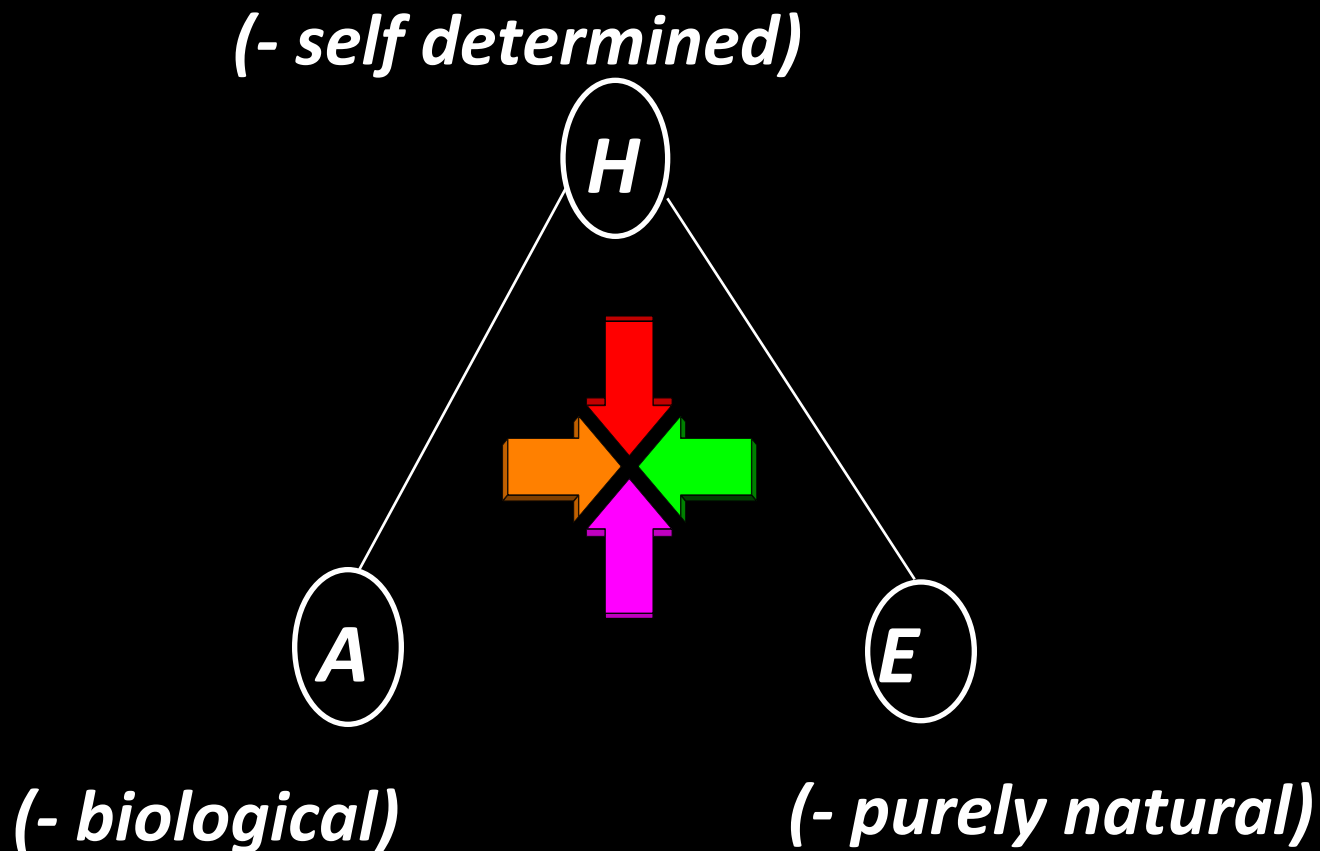
Social Class



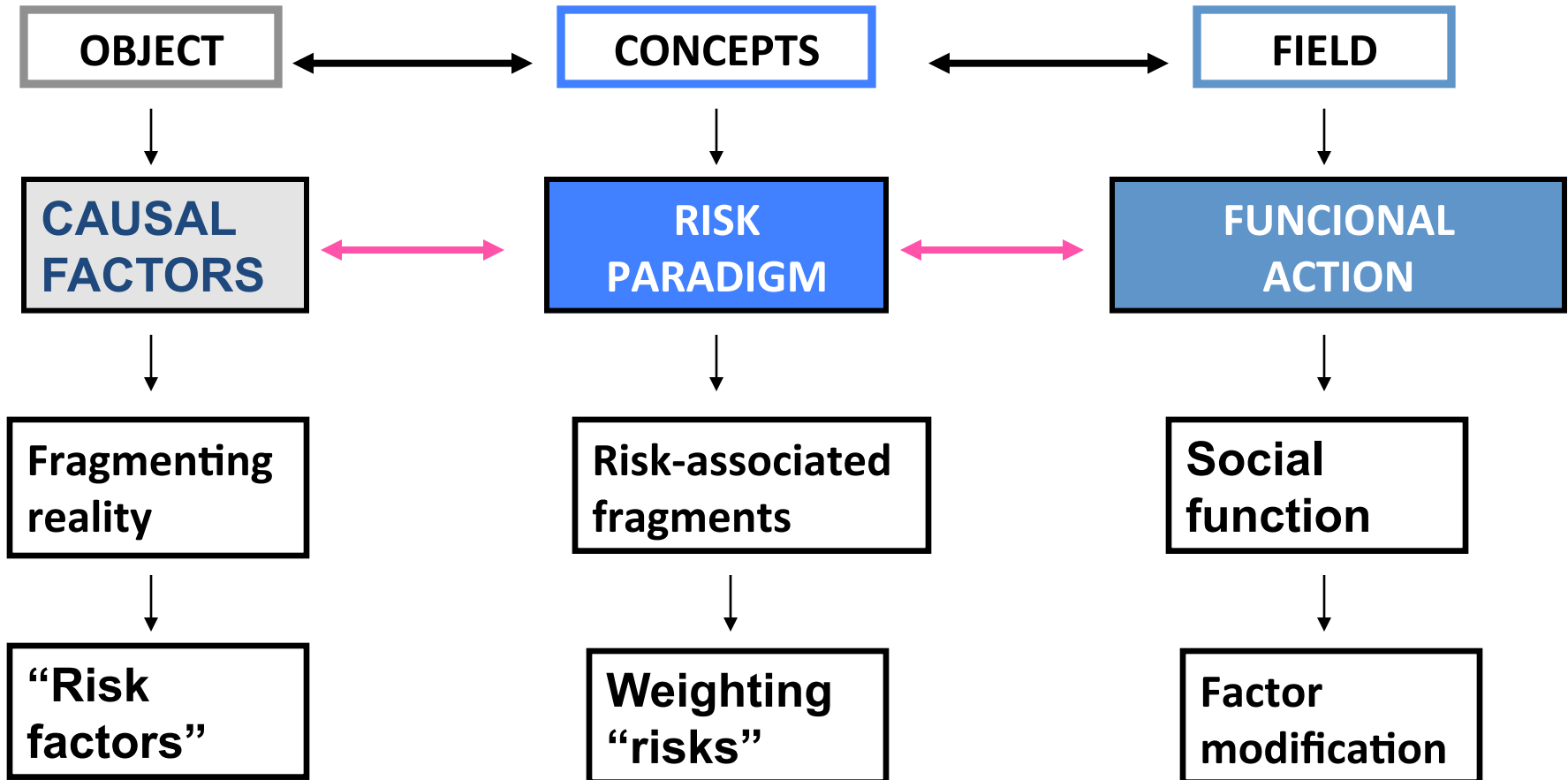


# EMPIRICAL ECOLOGY MODEL

## *Natural history of disease*



# CAUSAL LOGIC (Fragmenting)





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***SDH and the Historical  
paradigm clash  
in Epidemiology***



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***Shortcomings of conventional  
social and environmental  
epidemiology***

# Shortcomings of conventional social and environmental epidemiology

- Ontological: reductionism, both social and ecological; neglects political economy of determination.
- Epistemological: interpretative monism; unculturality.
- Practical: governance - not critique of the economic concentration/exclusion system; of the “civilization model” and the corresponding relations with nature.

# Premise: the “kuhnian divide”

- Normal scientific theories: problems must be focused from conventional knowledge; accepted canons; known laws.
- “Post normal” theories: projected outside present hegemonic scientific and philosophical boundaries.



# **Scientific critique of positivist science (Emphasis of the 70s)**

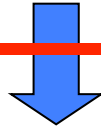
- **“Health sciences are divorced from real life and societal needs.”**
- **“Non critical application of dominant paradigm (models)”**
- **“Dependent on central hegemonic scientific groups.”**

# Divorce: society (humans) and nature

Anthropocentric philosophy:

HUMAN BEING

Centre

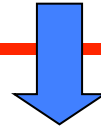


Resources

NATURE

Classical economy:

Landlord



Commodities

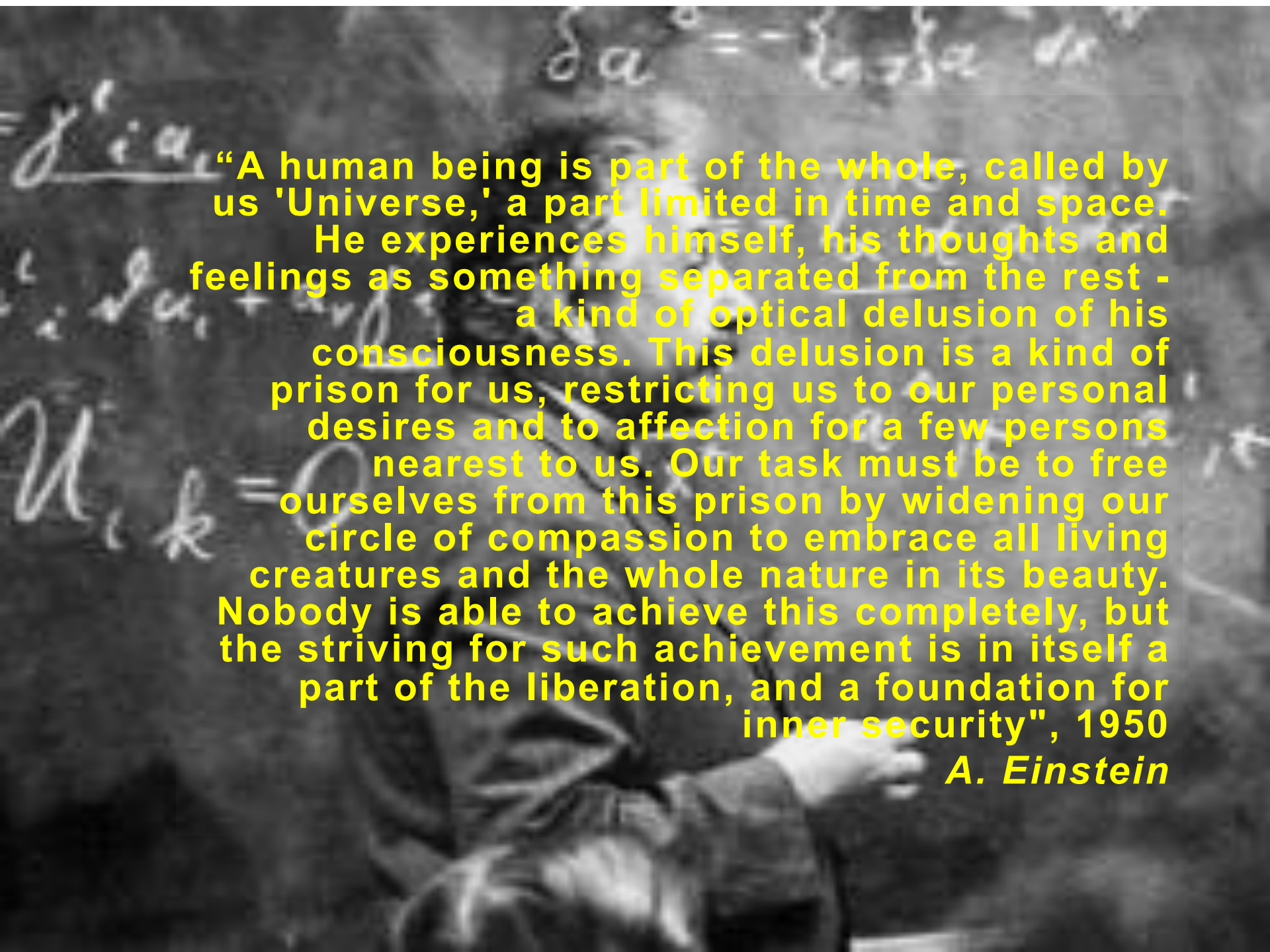
Critical economy (political economy):

NATURE



HUMAN  
BEING

Metabolism (material interchange and  
Regulatory action –conditions imposed  
By nature and the human capacity –  
productive forces of society.)

A black and white photograph of a chalkboard filled with mathematical equations. In the foreground, a person's hand is visible, pointing towards the board. The equations on the board include  $\delta a^0 = -\{a^0, a^i\} \delta x^i$  at the top,  $\delta a^i = \{a^i, a^j\} \delta x^j$  on the left,  $\delta a^i = \{a^i, a^j\} \delta x^j$  in the middle, and  $U_{ik} = 0$  at the bottom left. The text of the quote is overlaid on the right side of the image.

**“A human being is part of the whole, called by us 'Universe,' a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest - a kind of optical delusion of his consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole nature in its beauty. Nobody is able to achieve this completely, but the striving for such achievement is in itself a part of the liberation, and a foundation for inner security”, 1950**

***A. Einstein***

# Functional epidemiology (hegemony)

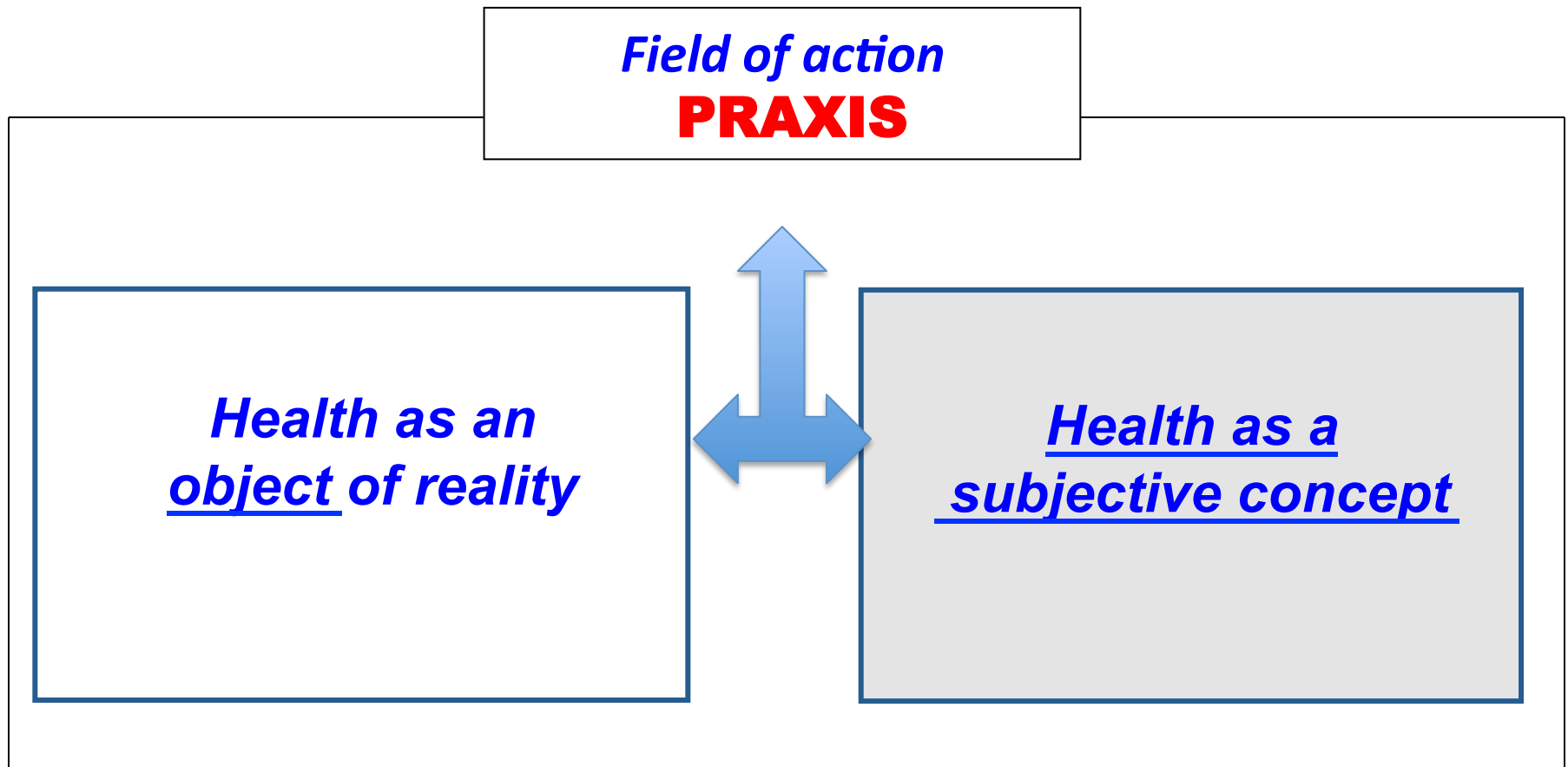
- **Denounces without revealing.**
- **Informs without providing pathways for profound action and mobilization.**
- **Works on isolated factors, but without explaining structural and socio-ecological processes which generate them.**



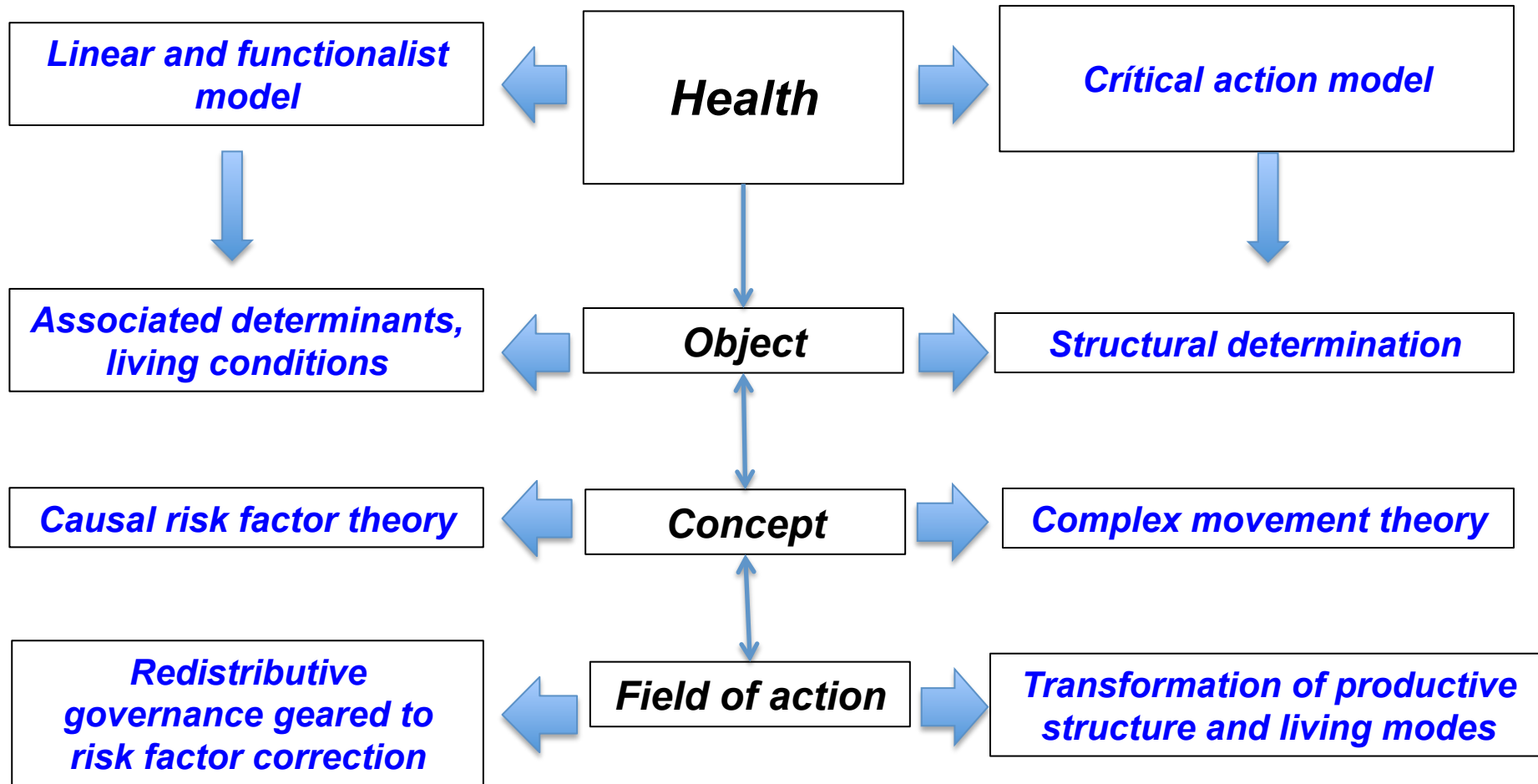
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**Recuperating complexity:**  
**redefining “health” and**  
**understanding “determination”**

# ***Health is a polysemic and complex notion***



# ***Need to overcome the linear reductionist perspective about health determination***





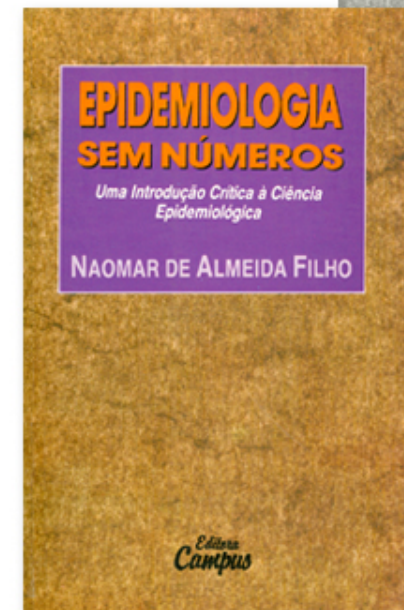
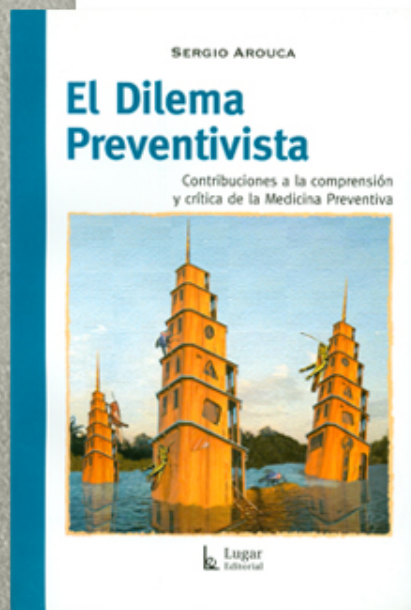
# ***Critical epidemiology in Latin America***



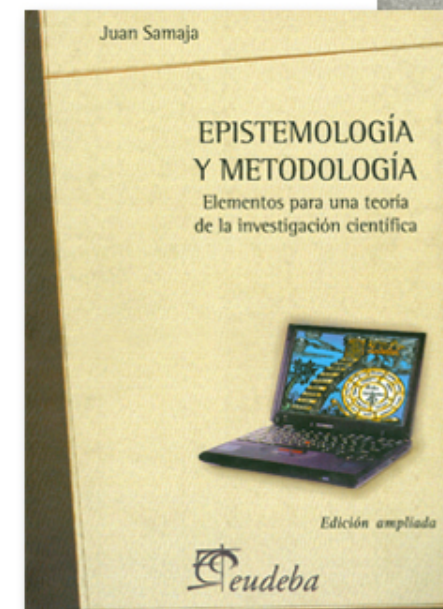
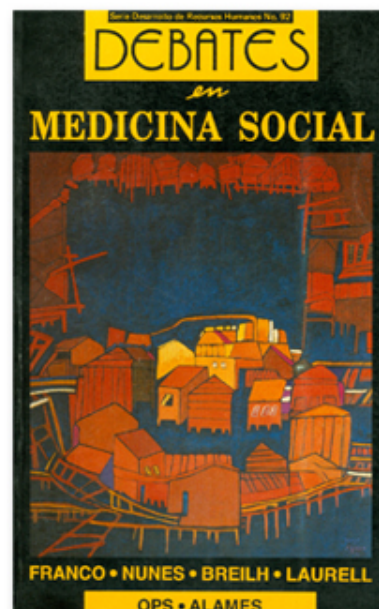
***Latin American books on social  
determination of health and  
many peer review articles***

**1976-2011**

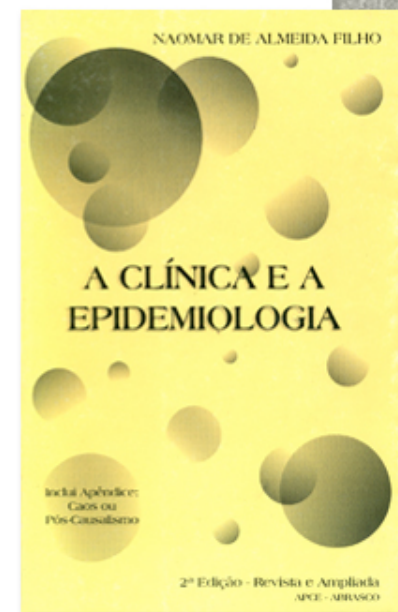
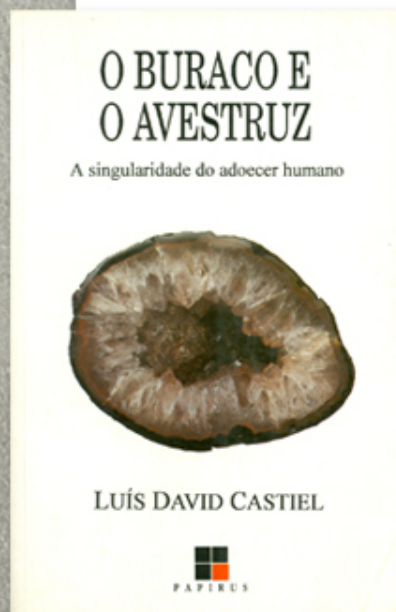
***made invisible by mainstream  
science and WHO***



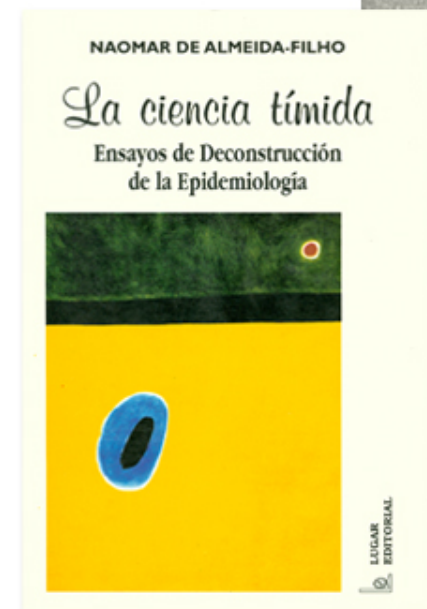
## Aportes de Epidemiología Crítica Latinoamericana (I)







## Aportes de Epidemiología Crítica Latinoamericana (II)





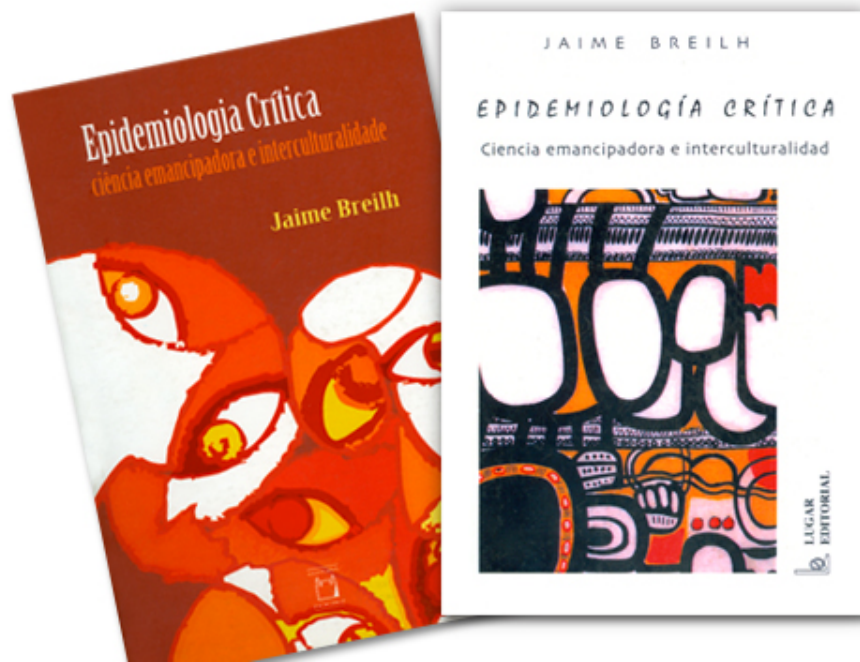
## Aportes de Epidemiología Crítica Latinoamericana (III)





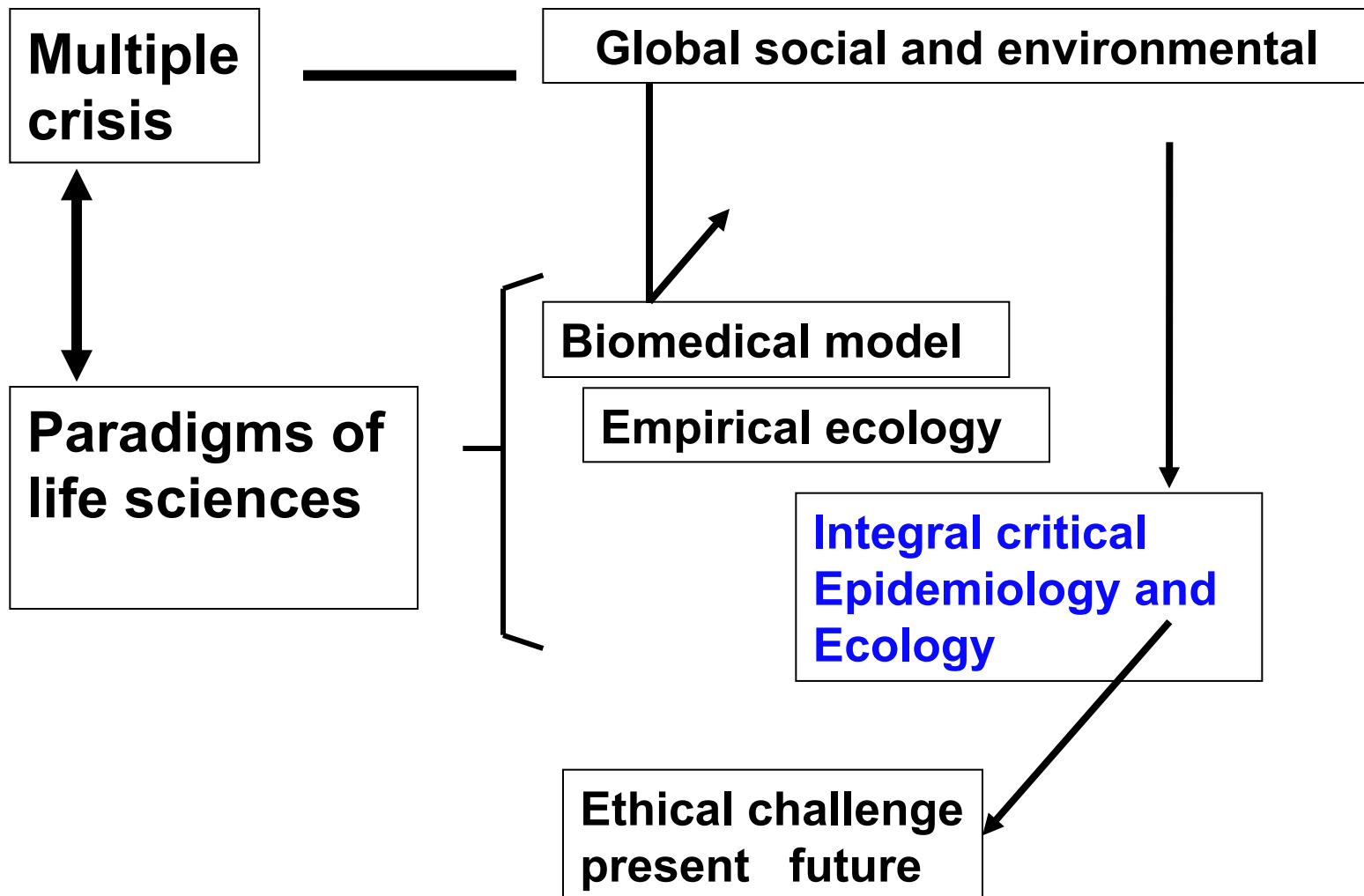


## Aportes de Epidemiología Crítica Latinoamericana (IV)



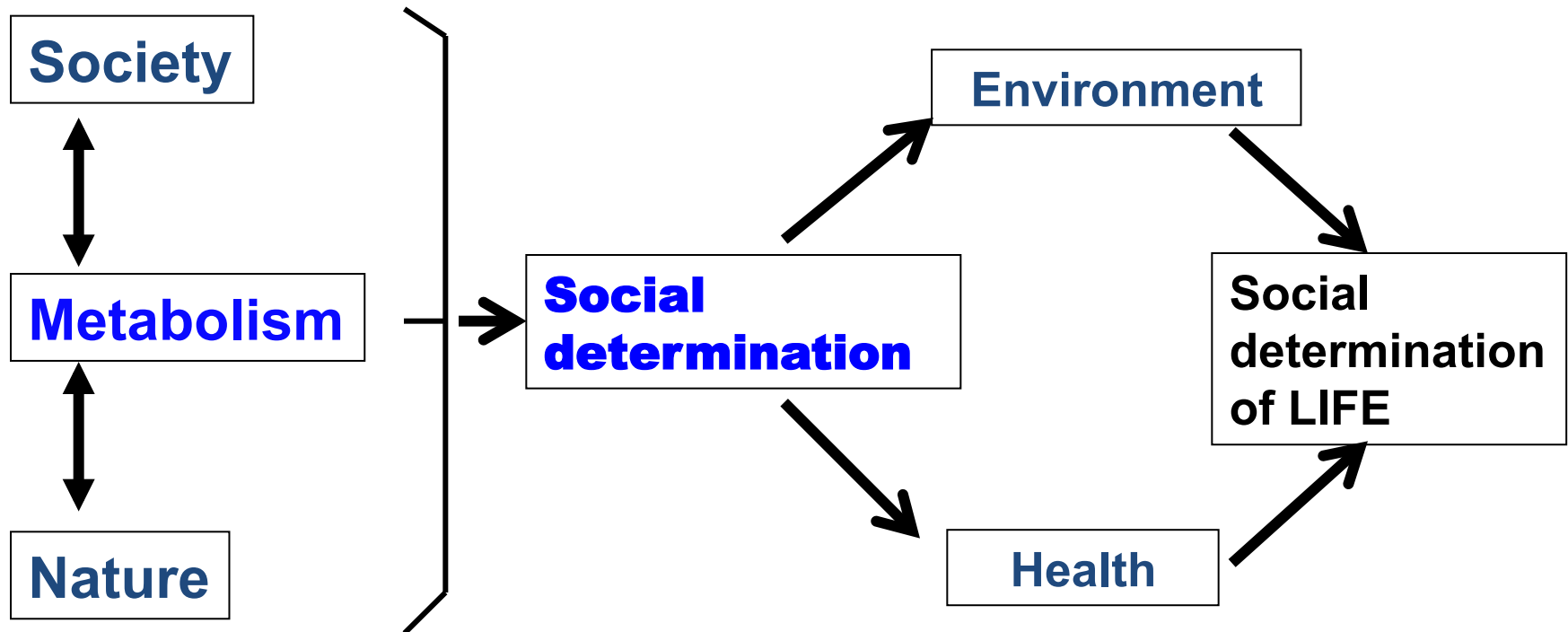
programa  
PALTEX

# Challenge 1: Understanding the obstacles of the bio-medical pharmo-business model and empirical ecological models





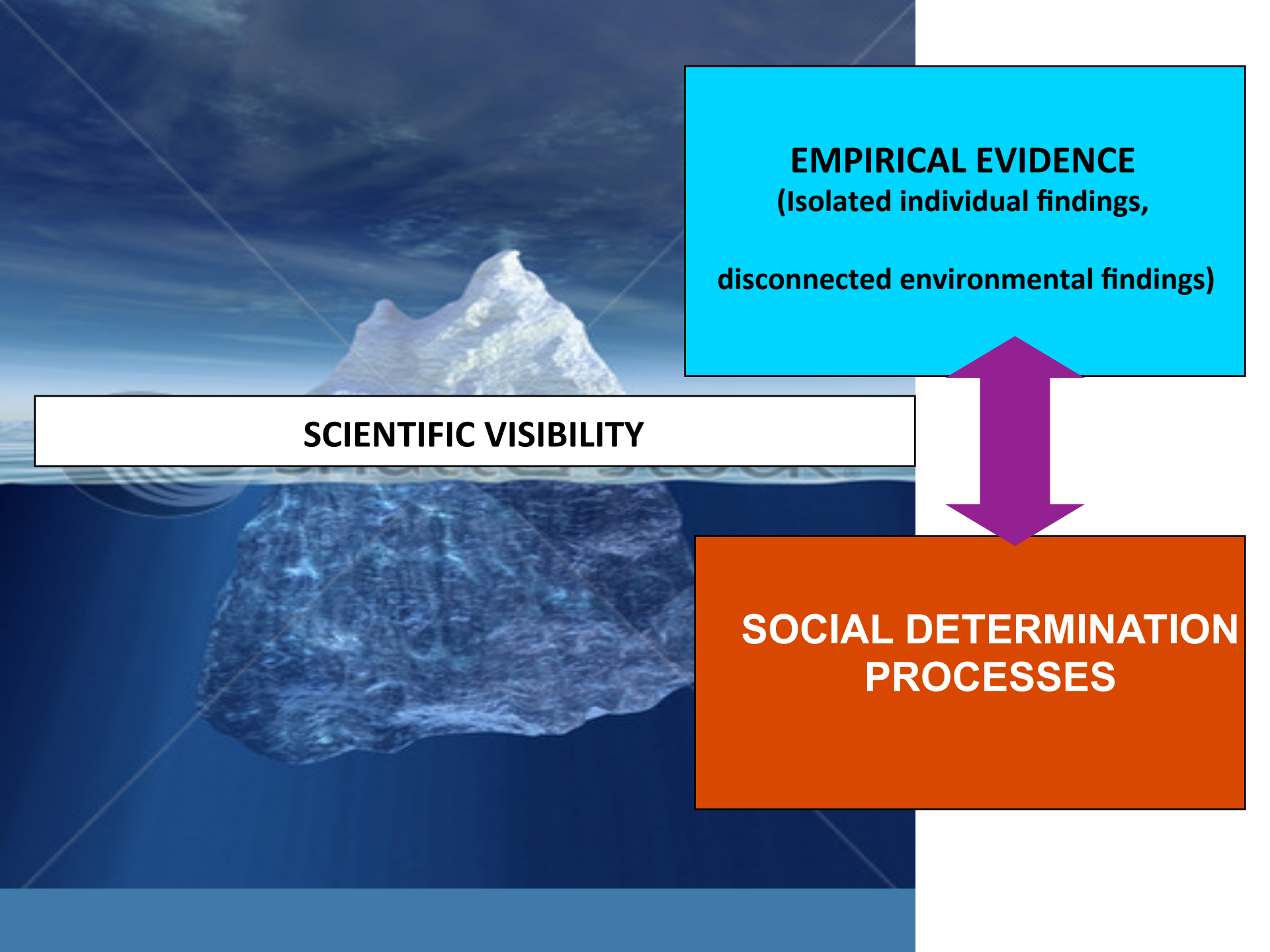
## Challenge 2: Understanding the **SOCIAL DETERMINATION** (not “determinants”)



***Biomedical model is based on the  
positivist paradigm***

**Works for health operating on  
isolated phenomena of the  
empirical plane.**

**Converts or reifies processes in  
“risks” (factors)**

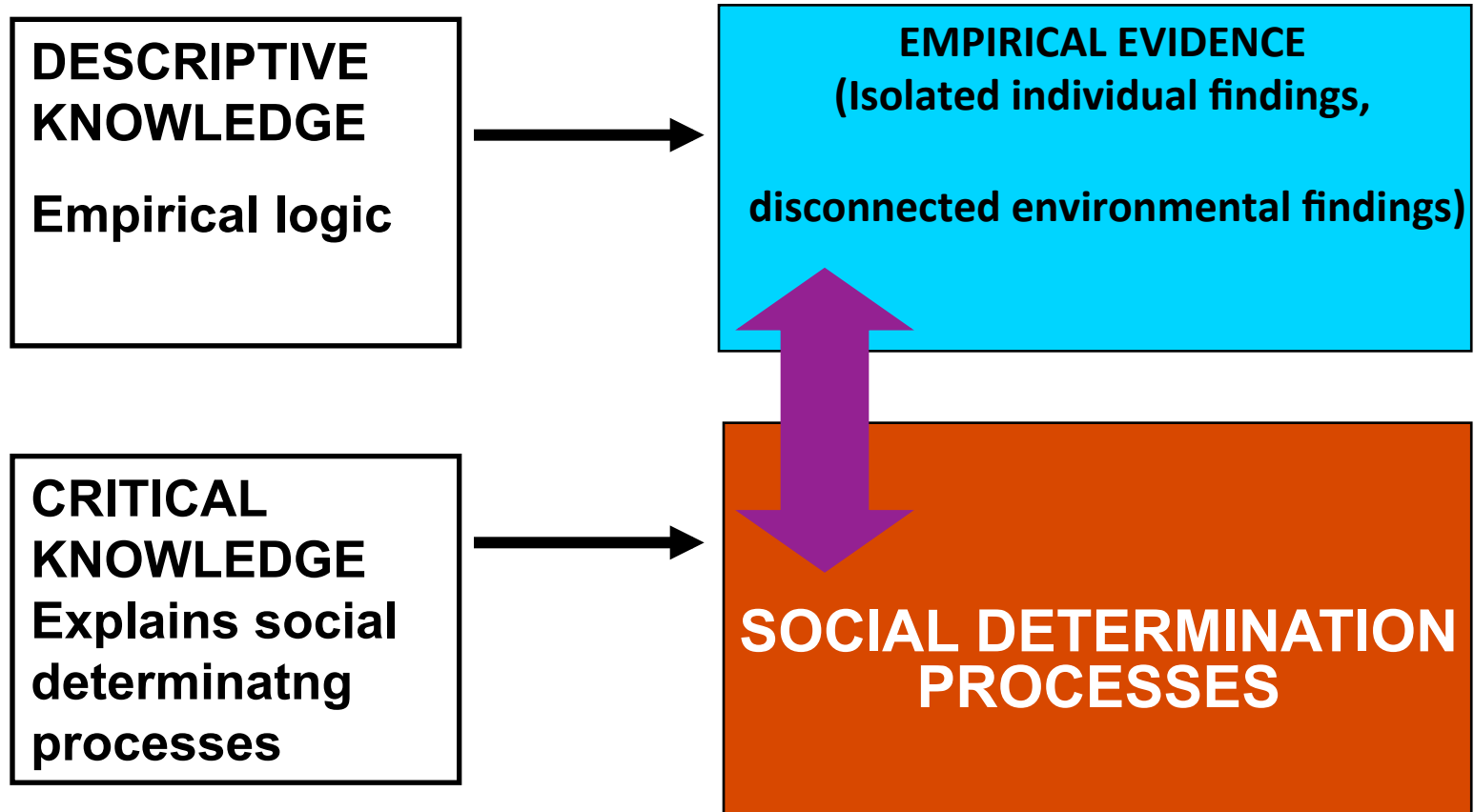
The background of the slide features a large iceberg floating in a dark blue ocean under a cloudy sky. The iceberg's tip is visible above the water line, while its much larger, jagged base is submerged. A horizontal white line represents the water surface. A white rectangular box labeled 'SCIENTIFIC VISIBILITY' is positioned on this line. To the right, a light blue box labeled 'EMPIRICAL EVIDENCE' is above the water, and an orange box labeled 'SOCIAL DETERMINATION PROCESSES' is below it. A large purple double-headed arrow connects the two boxes on the right side.

**EMPIRICAL EVIDENCE**  
(Isolated individual findings,  
disconnected environmental findings)

**SCIENTIFIC VISIBILITY**

**SOCIAL DETERMINATION  
PROCESSES**

**CRITICAL SCIENCE: NOT ONLY DESCRIBING  
CAUSE-EFFECT EMPIRICAL ASSOCIATIONS  
BETWEEN ISOLATED “FACTORS” AND  
PROBLEMS, BUT EXPLAINING  
DETERMINATING PROCESSES**



# **An emancipating approach to interculturality**



# COMPLEMENTARY PERSPECTIVES

```
graph TD; A[IMPORTANT & INNOVATIVE VISIONS] --- B[Critical epidemiology]; A --- C[Indigenous holism]
```

**IMPORTANT &  
INNOVATIVE VISIONS**

**Critical  
epidemiology**

**Indigenous holism**

# **INTERSUBJECTIVITY**

## **(Historical Subjects)**



### **INTERCULTURALITY**

**Relation among types of knowledge which correspond to specific groups, that co-participate in a historical setting where meanings, identities, representations, subjectivity, symbolic power (culture and significance) are produced and reproduced.**



### **INTERDISCIPLINARITY**

**Relationship between types of academic knowledge that share a common learning/teaching and research setting, participating in the direct production and reproduction of knowledge and the indirect production/reproduction of culture.**



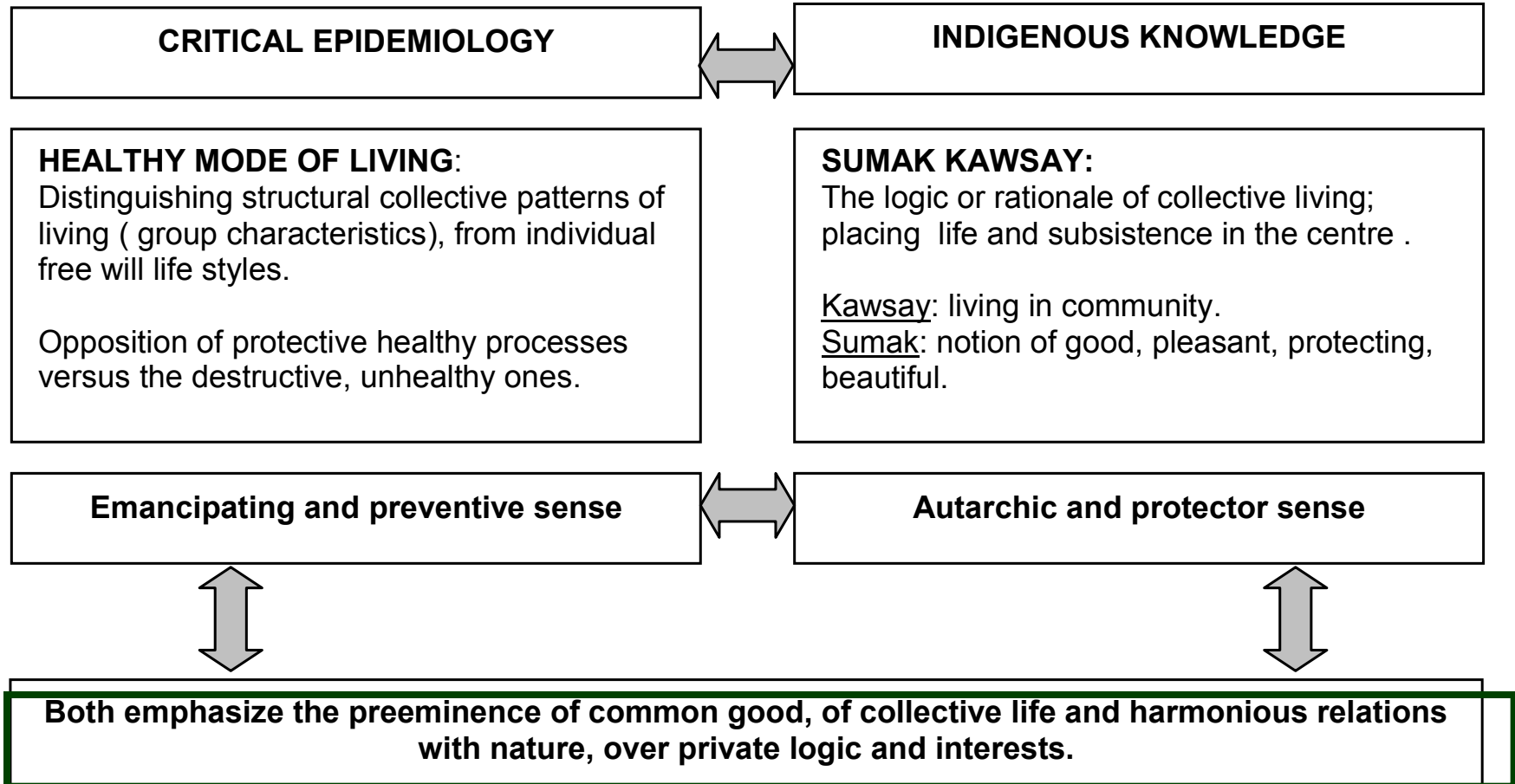
# ***Interculturality***

## **(Critical interculturality)**

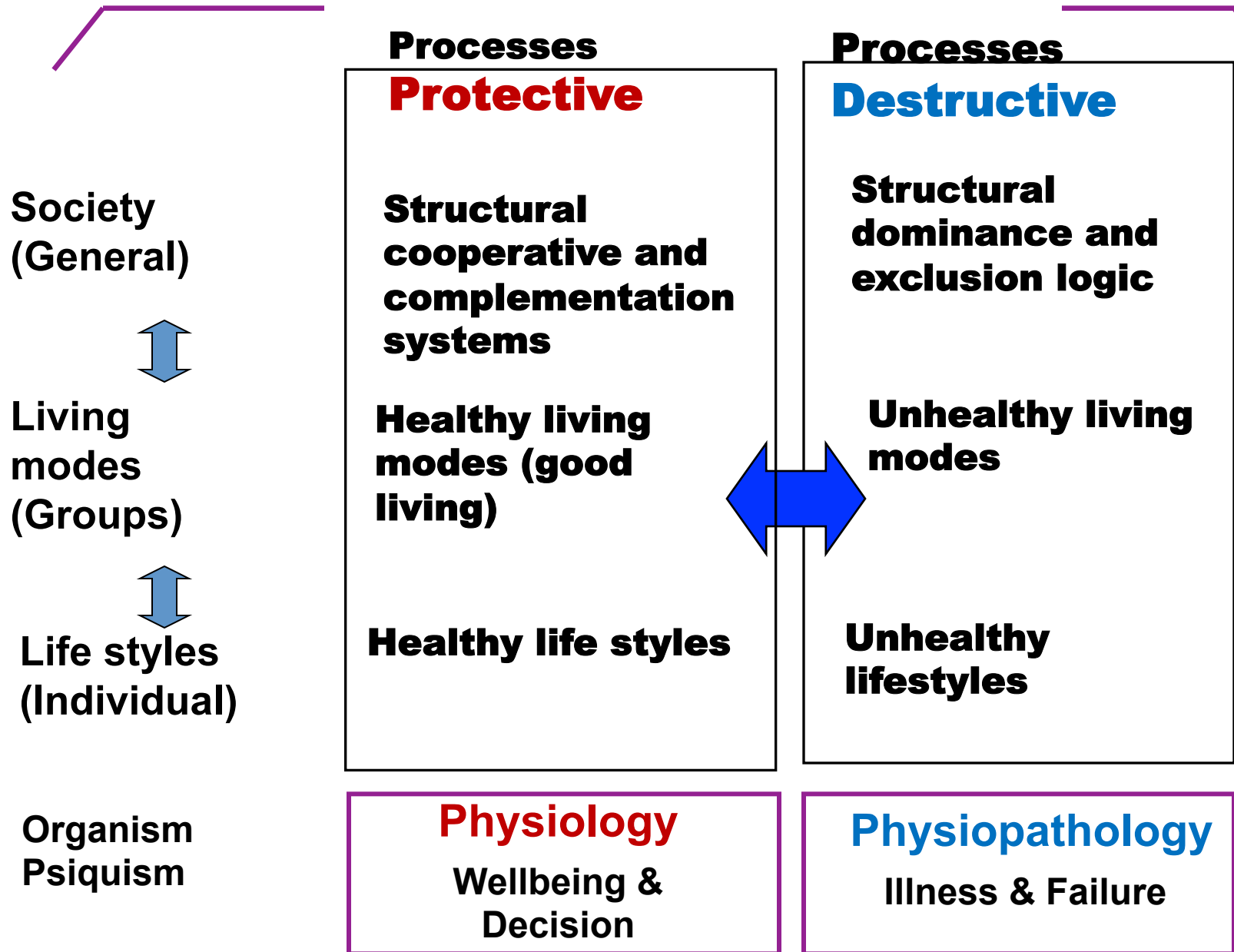
**An strategic / dialogic relation between culturally differentiated subjects, to build, counter build, and deconstruct an emancipating social project.**

# INTERCULTURAL HEALTH DETERMINATION

## “HEALTHY HUMANLY LIVING” / “SUMAK KAWSAY”

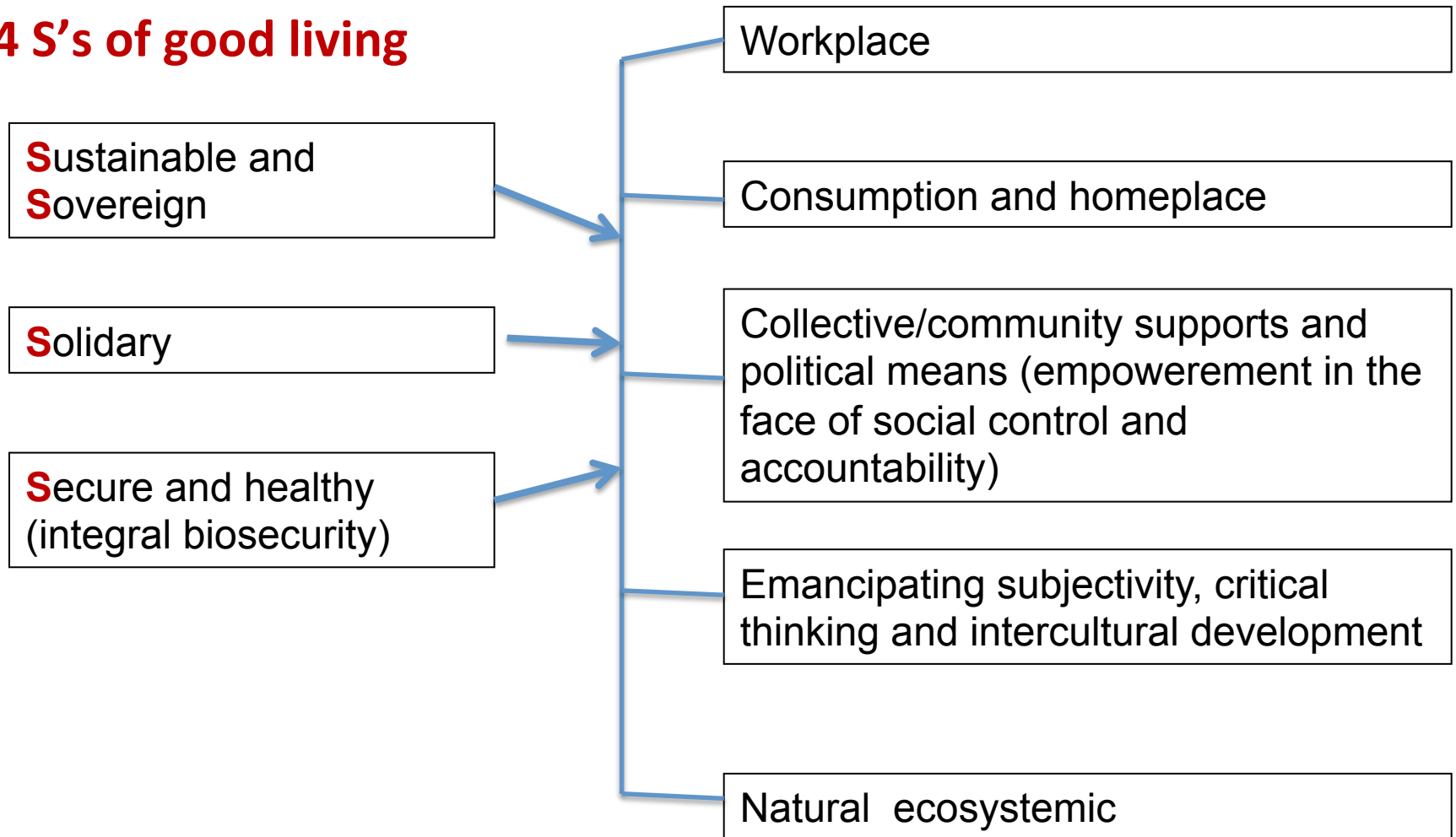


# Epidemiological profile (multidimensional)



# Critical processes of good living ("buen vivir")

## 4 S's of good living



**“The world is not dangerous  
because of those who do harm  
but because of those who look at  
it without doing anything”  
*A. Einstein***

**Our ethical approach in scientific work:  
Our indigenous grandparents taught  
that wisdom implies not only "ñucto"  
logical reasoning (left brain) but also  
"shungo" or compassion (right brain).**



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Ecuador

**Thank you**

**Jaime Breilh, Md. MSc. Ph.D  
Health Sciences Area**

**Universidad Andina “Simón Bolívar”**

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