

# The failure of evolutionary epistemology

## — a lesson to biosemiotics?

Tommi Vehkavaara  
Department of History and Philosophy  
University of Tampere  
Finland  
e-mail: tommi.vehkavaara[at]uta.fi  
Homepage: <http://www.uta.fi/~attove>

## 1. What is evolutionary epistemology (EE)?

- 'Minimum characterization' of EE by Donald T. Campbell:

"An evolutionary epistemology would be at minimum an epistemology taking cognizance of and compatible with man's status as a product of biological and social evolution." (Campbell 1974: 393.)

- Too generous or vague in order to be proper definition for a **theory** – just historically oriented naturalistic epistemology

## What is EE?

- Additional specifications to the 'minimum definition':

"[...] it is also argued that evolution – even in its biological aspects – is a knowledge process, and that the natural-selection paradigm for such knowledge increments can be generalized to other epistemic activities, such as learning, thought, and science." (Campbell 1974: 393.)

- This **seems** to contain stronger and more distinctive hypotheses

## 2. What for are the hypotheses of EE?

- A phenomenon that begs an explanation:
  - Amazing apparent fit between many organic forms or behavioral patterns and their environments
  - This 'fit' is a **functional** fit - understood in **self-normative** sense
  - Properties of an organism are '**meaningful**' to it
  - Common insight for both EE and biosemioticsHow such 'fits' could be explained?

## Explanation of 'fit' and an analogy

	Forms of life	Human cognition/mind
<b>Amaze/observation</b>	(increased) fit between organic forms/behavior and environment	increased control over the world
<b>Explanation</b>	adaptation ←	knowledge (about the world)
<b>Process/production</b>	adaptation through natural selection	learning (e.g. trial and error) →

- 'Internal meaningfulness' of 'fit' is explained by appropriate production history
- Analogy between evolutionary adaptation and (trial and error) learning

## Two basic hypotheses of EE

1. **Extended epistemology:** Concept of knowledge abstracted and extended to cover all adaptive processes.
2. **General Selection Theory (GST):** Principle of natural selection extended – in abstracted form – to cover all increased 'fit' between two things:

"blind variation and selective retention" (BVSr, 1960) or "variation-selective-retention-and-reproduction" (VSRR, 1987) algorithm.

Notice: GST is independent on the project of extending epistemology but not *vice versa*.

## 3. GST as a multi-level theory

- BVSr or VSRR algorithm produces a multi-level approach to selection processes:
  1. *non-mnemonic problem solving* (e.g. locomotor activity of *paramecium*, Jennings 1906)
  2. *vicarious locomotor devices* (sonar, vision, etc.)
  3. *habits and instincts*
  - :
  4. *mnemonically supported thought or creative thought*
  5. *Science*

## GST and nested hierarchy

- Selection levels form a *nested hierarchy* of **vicarious selectors** that
  1. operate in themselves according to the BVSr or VSRR algorithm,
  2. can exploit other level VSRR processes as their subprocesses,
  3. are produced by earlier lower level VSRR processes, and
  4. substitute and shortcut more primary level selections of 'life and death winnowing'

Example: vision in spatial exploration — 'looking is vicarious moving'

## Campbell's '1960 dogma' of EE

1. "A blind-variation-and-selective-retention process is fundamental to all inductive achievements, to all increases in knowledge, to all increases in fit of system to environment.
2. The many processes which shortcut a more full blind-variation-and-selective-retention process are in themselves inductive achievements, containing wisdom about the environment achieved originally by blind variation and selective retention.
3. In addition, such shortcut processes contain in their own operation a blind-variation-and-selective-retention process at some level, substituting for overt locomotor exploration or the life-and-death winnowing of organic evolution." (Campbell 1960: 91-92)

## Three hierarchies of selection

1. **Production hierarchy:**
    - vicarious selectors are *historical products* of lower level selection processes
  2. **Embeddedness or entailment hierarchy:**
    - Vicarious selection processes uses other level selection processes as their subprocesses
  3. **Control hierarchy:**
    - In each organism or biosystem, there is continuous interplay between different levels of selection in both upward and downward
- the system of levels in each organism (or other biosystem) forms a holistic totality

## 4. What is wrong in EE?

- Obvious doubt – is it adaptationist?
- Critique of two kinds of adaptationism (Gould & Lewontin 1979):
  1. **Fallacy of optimality adaptationism:**

Natural selection is assumed to forge *optimal* —not just *sufficient*— adaptations.

    - Easy to avoid in EE – knowledge is never perfect or almighty and the environment is not the sole selector
  2. **Fallacy of 'just so' –story adaptationism:**

Every identifiable common trait is implicitly assumed to be a real adaptation, i.e. that nature has really selected it *because* of its advantageousness.

    - Only adaptive historical explanations are drawn - no evidence is demanded because no alternative explanatory principles are seen.
    - This is a problem for EE

## Example: human creative thought

Creative thought (planning, problem solving, etc.)

- At the level of creative thought, the environment is explored vicariously (in thought experiments) according to
  1. vicarious *criteria of selection* (mental representation substituting external states of affairs)
  2. in vicarious *selection* (i.e. in mind substituting 'direct' selection)
  3. of vicarious *variation* (thought trials substituting executed actions) (Campbell 1960: 96)
- Problem: Seemingly clairvoyant variation – lack of really stupid trials

# Creative thought explained?

- Campbell postulated that thought trials in creative thought are
  1. constrained by pre-selected aesthetic, logical, etc. mental structures, and that additionally
  2. there *must* be wide variety of unconscious thought trials that are so rapidly selected away as senseless, inappropriate, inconsistent, etc. that they do not leave any mnemonic trails
- But what could falsify such an explanation?

NOTHING
- It is mere 'Just so' story – no alternatives to GST is not seen

# Alternatives to adaptive stories:

Increased 'fit' between two things – i.e. self-functional traits

1. may have been originally adapted for some other function (which may not be functional anymore) and later *exapted* for new use (accidentally) (Gould & Vrba 1982),
  2. may not be adapted at all but being consequences of
    - A. some developmental or material *constraints*,
    - B. *genetic drift*
    - C. 'hitchhiking' genes
    - D. self-organization (Kauffman) } selection without adaptation
- In A and D there is not necessarily any selection or variation at all
    - General Selection Theory fails
  - All of these alternatives are lethal to the project of extending the concept of knowledge

# What went wrong 1

- GST: variation is always to some extent due to chance:

"If one is going beyond already achieved "knowledge," one has no choice but to explore blindly." (Campbell 1987: 147)

- When turned other way round it will be transformed to almost analytic principle:

if some cognitive process does not seem to make initial explorations blindly, some already achieved knowledge **must** be involved (that directs the variation)

- It is hierarchy theory that makes GST plausible but at the same time empties its content

# What went wrong 2

- Why alternatives to adaptive stories ruin the extension of epistemology?
- Self-normative functionality of 'fit' is explained by previous adaptive process where the thing coming to be 'known' has been interacted with the adapting system
- But without adaptive process there is no knowledge process either.
- In many cases, the lack of historical evidence leaves us permanently in the dark about whether some apparent 'fit' or useful trait is a product of adaptive process or not.

Historical origins do not always explain —or have anything to do with— the usefulness of traits.
- Extended knowledge characterized in terms of its production history but left ultimately undefined is meaningless for its host – all that matters is **future** functionality

# Lessons to biosemiotics?

## Same problems threaten biosemiotics too

1. IF biosemiotics is defined too liberally – no uniting theory or even point of view, merely joint metaphors and jargon
2. IF biosemiotics coins the similarly empty ‘just so’ –stories, assuming that all the wonders of living nature are due to past semiosis
  - the clear distinction between semiotic and non-semiotic influence *within* living systems is needed
  - Distinctive and *not too general* definitions of the used concept of sign and semiosis are needed
  - Beware of hierarchies of levels (though they are necessary)
3. IF biosemiotics falls on ‘overformalization’ – diluting synthetic or normative conceptions of Peirce (and Bateson, Uexküll, etc.) by transforming them into purely formal conceptions