Multidimensional interdisciplinarity and coherence in cognitive neuroscience: challenges for philosophy

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Interdisciplinary Cognitive (Neuro-)Sciences:

11/9/1956, MIT: Cognitive Sciences
~ 1975, NYC; Cognitive neuroscience

(fig.: Miller, 2003, TiCS)
Mechanistic explanation & vertical (inter-level) interdisciplinarity

- “[A] mechanism is an organized system of component parts and component operations. The mechanism’s components and their organization produce its behavior, thereby instantiating a phenomenon” (Bechtel, 2005).

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Mechanistic explanation: 2 dimensions of interdisciplinarity

- Horizontal ID through decomposition of the phenomenon
- Vertical ID through localization of the phenomenon

Figure 1. General scheme of multilevel framework of biological explanation.
* Decomposition and horizontal dimension of ID;
* Localization and vertical dimension of ID.

![Diagram of memory system]

Figure 5.3 The initial stages of a functional decomposition of memory.
Consciousness studies:
2 distinct types of decomposition
a) States of consciousness
Consciousness:
2 distinct types of decomposition

a) states of consciousness
b) contents-of-consciousness

Look at the green dot. Is it located in the lower left rear or in the lower left front?
A multiply decomposed domain, yet occupied by coherent wholes?

- pluralism of concepts, theories, methodologies
- no foundationalist – branching – structure, therefore:
  - no regress problem
  - no input problem
  - strength depends not on weakest link
Coherence – network – conception of knowledge & truth

- different kinds of propositional content
- each kind of proposition has its own ‘plausibility criterion’
- no distinction in fundamentality of propositions
- mutual support of different kinds of propositions
- heterogeneity of support makes for more robustness

“This approach is fundamentally holistic, judging the acceptability of every purported item of information by its capacity to contribute towards a well-ordered whole” {Rescher, Coherence theory of truth, 1973,317}. 
How to avoid coherent yet isolated wholes

Arbitration between competitors via:

- degree of coherence
  - internal coherence, within the (sub)domain
  - external coherence, with other (sub)domains

- practical successes
  - prediction and control
  - application
Roles of philosophy in interdisciplinarity

- Coping with vertical interdisciplinarity
  - conceptual clarification
  - interlevel (methodological) alignment
  - data interpretation (re definition & decomposition)

- Coping with horizontal interdisciplinarity
  - reconstitution of the definition & decomposition
  - scrutinizing for methodological interactions across ‘wholes’
  - proactively looking for interdependencies
Philosophy of/as Interdisciplinarity?
- Systematic philosophy!

‘Das Wahre ist das Ganze’

Hegel, Phaenomenologie des Geistes, 1807.

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