

Mind: Architectures, Models, Formalisms

1. The traditional model of cognition (is wrong)

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Table 1 Traditional model of human cognition: correlation between types of mental representation, type/level of information processing, and (un)consciousness

Type of mental representation	Sub-symbolic, non-conceptual		Symbolic, conceptual
	Signals	Signs	Symbols, concepts
Type of information processing (IP)	Sensorimotor	Know-how	Abstract reasoning
Objective of IP	Activation of automated sensorimotor patterns	Feature recognition with a view to the activation of stored rules	Feature identification with a view to planning and predicting
Level of IP	Low (automation)	Intermediate (automation, but may require adaptations)	High (reasoning in face of novelty: decisions may be required)
Type of Performance	Skill-based	Rule-based	Knowledge-based
Consciousness?	No!	No (yes, sometimes)*	Yes!

Based on Rasmussen 1983

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Processing or representation?

Process theories assume that consciousness depends on certain functional or relational properties of representational vehicles, namely, the computations in which those vehicles engage. On this view, representational contents are conscious when their vehicles have some privileged computational status, independently of any particular intrinsic property of those vehicles. What counts is 'what representational vehicles do, rather than what they are' (Ref. 13, p. 128).

Atkinson et al., 2000

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For **vehicle theories**, on the other hand, consciousness is determined by intrinsic properties of representational vehicles, independently of any computations in which those vehicles engage. On this view, consciousness, and particularly P-consciousness, should be explained in terms of the way information is represented¹³. Thus, when you observe the scene outside your window, what it is like for you to have that visual experience is to be explained in terms of the way in which the objects in your visual field – their shape, color, relative size and location – are represented in your brain. In other words, consciousness depends on some aspect of the physical medium of representation¹⁴. For in-

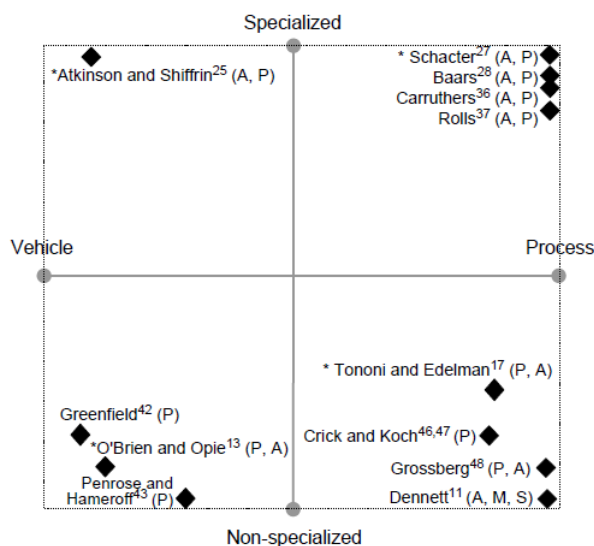
*trends in Cognitive Sciences*

Fig. 1. A 2-D map of computational theories of consciousness. This represents our

Atkinson et al., 2000

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The following cases make the TMHC—and therefore process, as well as vehicle, theories—appear simply misguided:

- I. Infants as young as 3 months old can learn to control contingent events (e.g., by repeating certain actions) and to make predictions, as suggested by their emotional reactions to the success or failure of the supposed predictions (see, e.g., Papoušek 1967).
- II. Experimentally conditioned subjects can accurately predict a specific stimulus without being aware of that or even against their conscious expectations (e.g., Perruchet 1985).
- III. People with cortical blindness over their entire visual fields can navigate physical obstacles in a wholly new environment, an action that requires good planning and predicting, unaided (e.g., de Gelder et al. 2008).
- IV. We more often than not make judgments about people, i.e., we make decisions regarding them, based on stereotypes and attitudes of which we are wholly unaware (see, e.g., Dion et al. 1972).

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Table 2 Proving wrong the traditional model of human cognition

	Cases			
	I	II	III	IV
Higher-level cognition?	Yes	Yes	Yes	Yes
Conceptual manipulation?	No (?)	Yes (?)	No (?)	Yes (?)
Conscious manipulation?	No	No	No	No
Amenable to consciousness?	No	Yes	No (?)	Yes (?)

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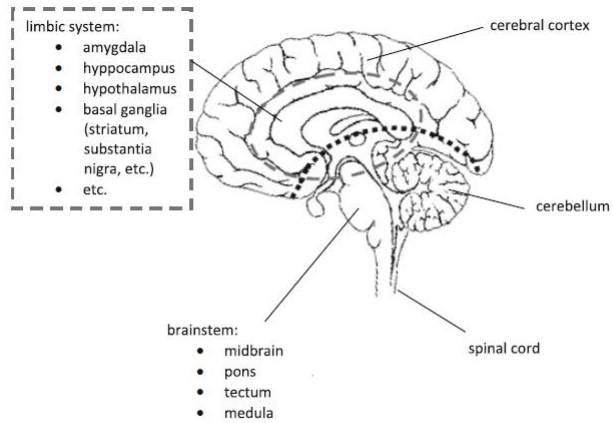


Fig. 1 The 'minimal viable brain' spared in hydranencephaly in surviving patients (shown below *black dotted curved line*)

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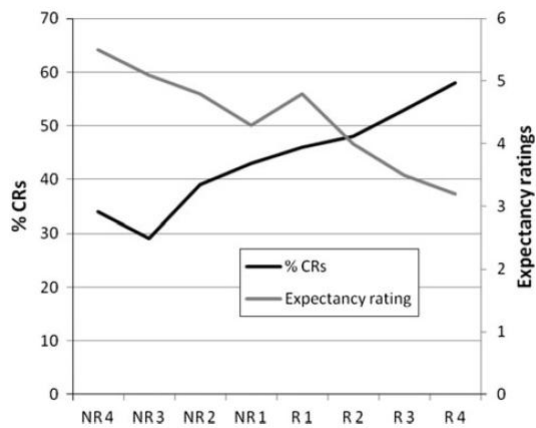
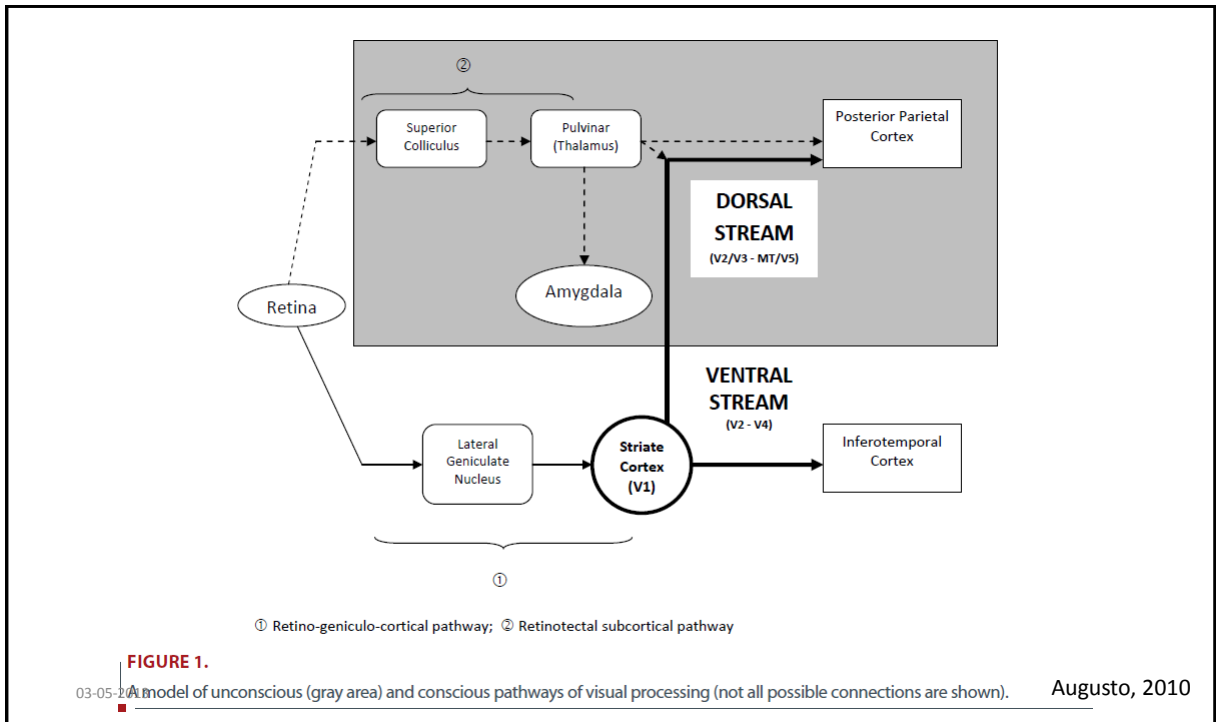


Fig. 2 Mean percentage of CRs and mean subjective expectancy (full scale: 0–7) for the US as a function of the length (1–4 trials) and nature (non-reinforcement [NR] vs. reinforcement [R]) of the preceding run. [Approximate values; *source* Perruchet (1985)]

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Main references

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