

Challenges presented by the semiotic revolution

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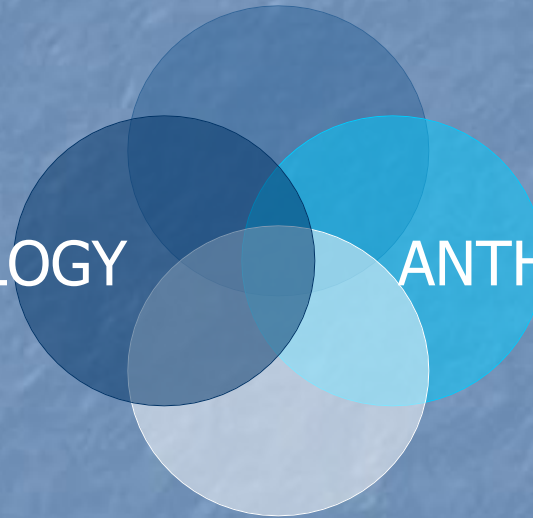
Cognitive evolution

PALEONTOLOGY/ARCHAEOLOGY

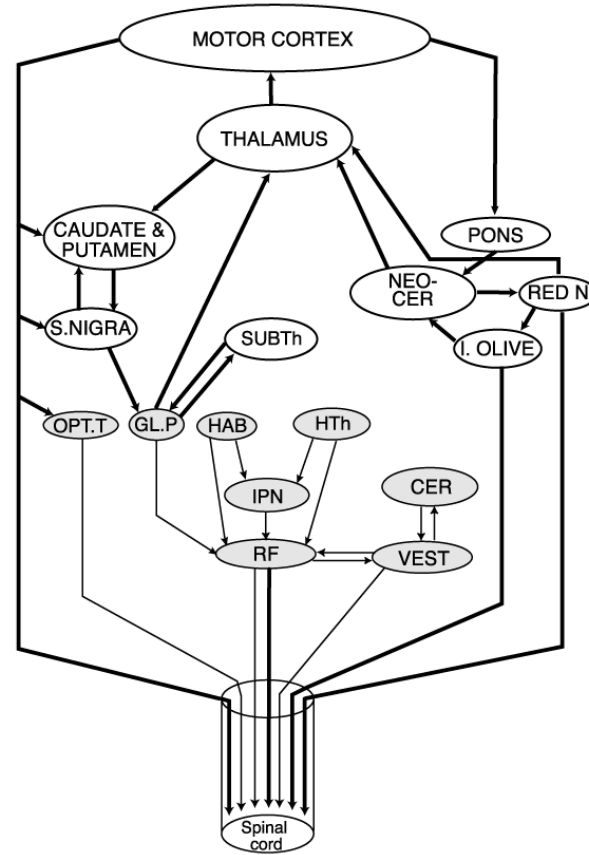
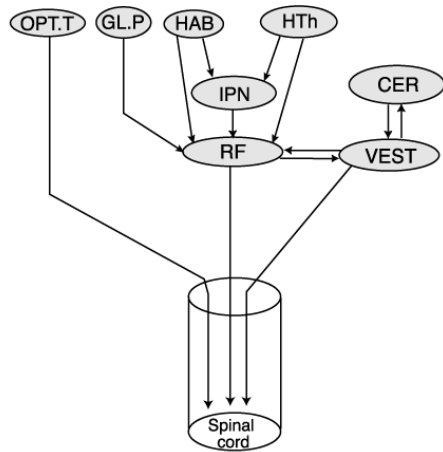
PSYCHOLOGY

ANTHROP/LING

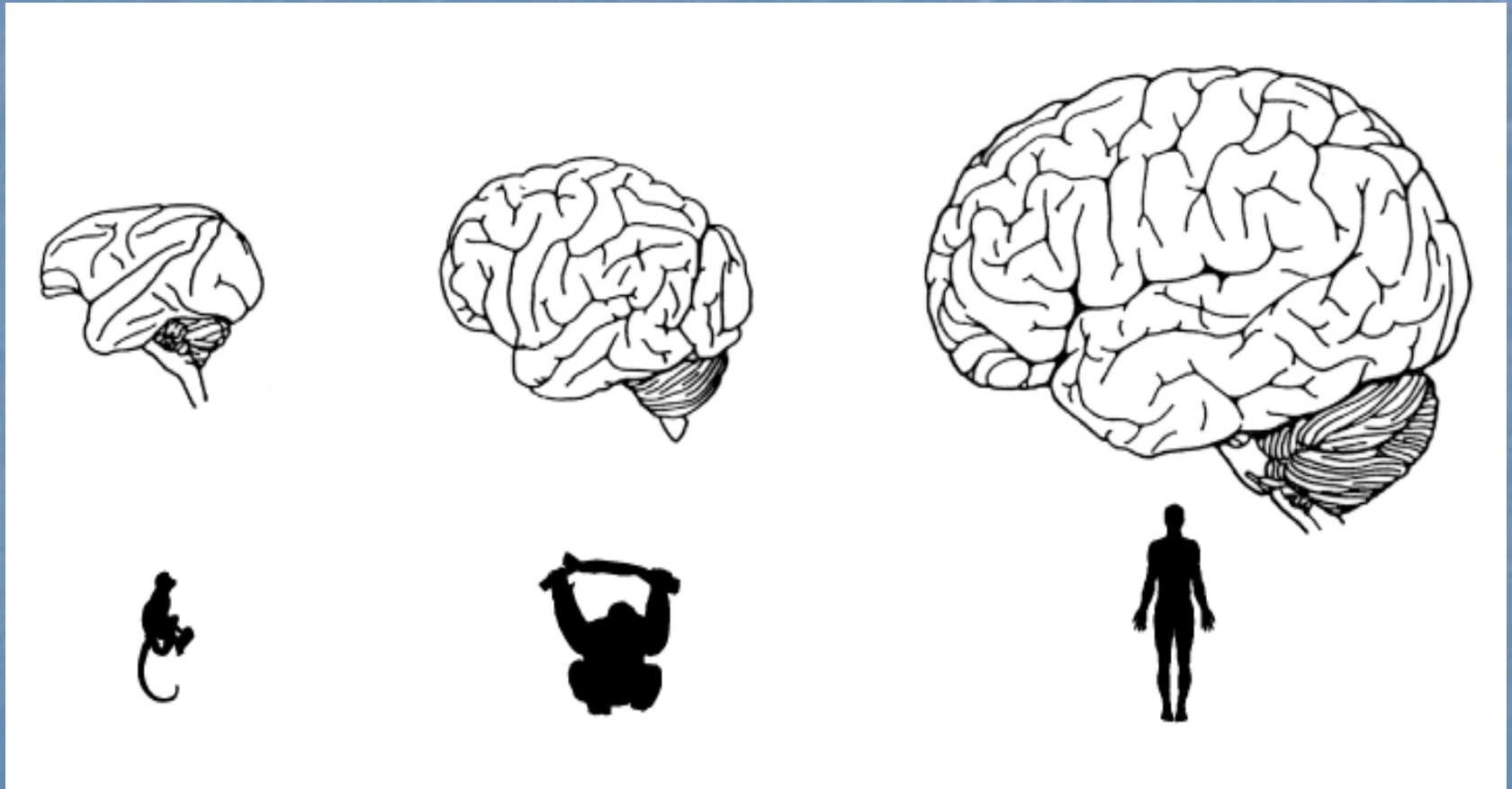
COMPARATIVE NEUROBIOLOGY



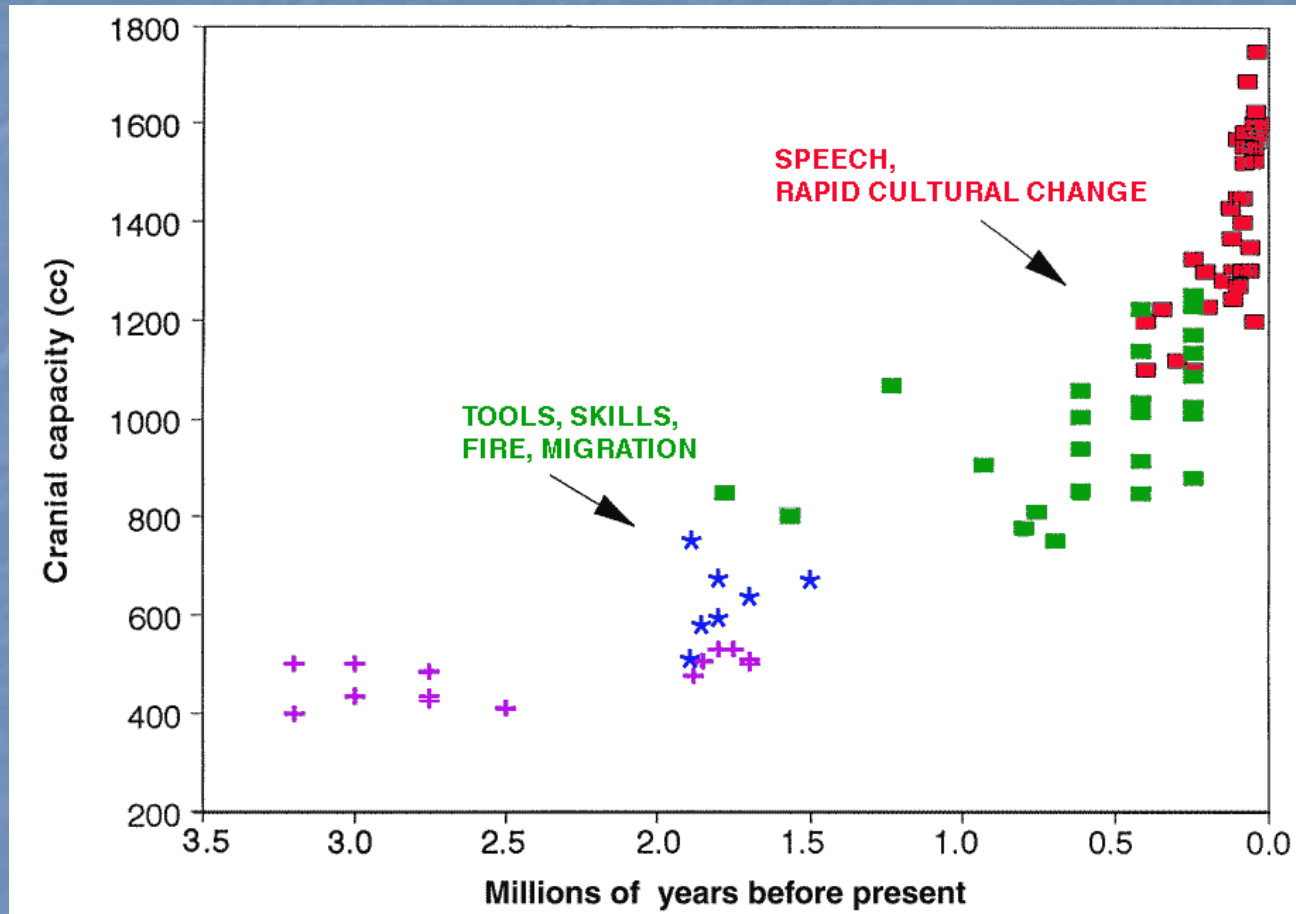
Conservation of gains: vertebrate brain



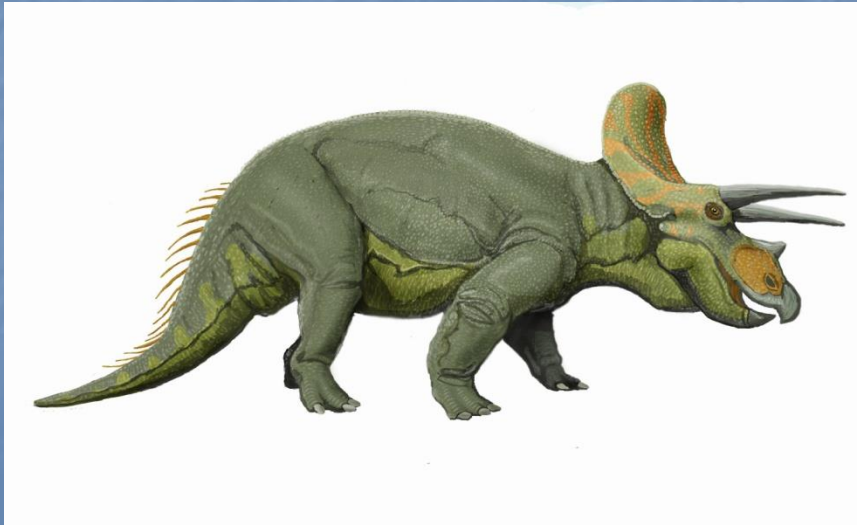
Conservative template: The primate brain



Bridging hominid species emerged at 2 points



Cultural change coincides very roughly with encephalization





Major facts about human cognition

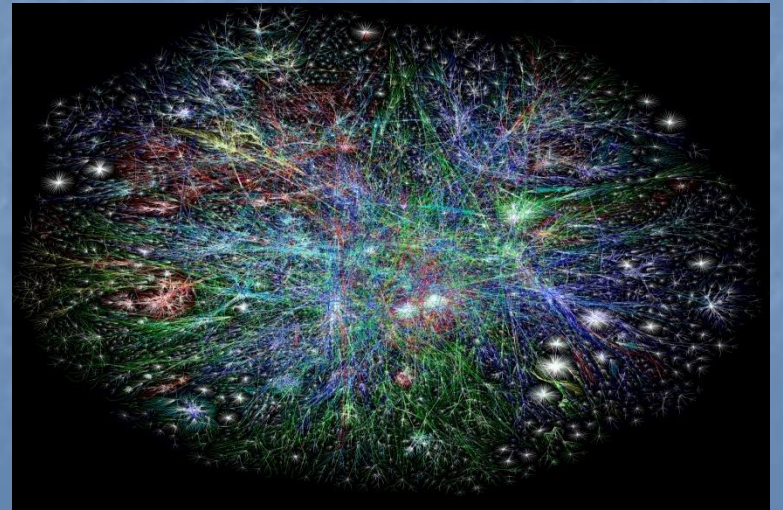
- 1. Humans live in COGNITIVE COMMUNITIES
- 2. that construct MINDSHARING cultures
- 3. that govern empathic, emotional, and cognitive attunement among their members
- Signature human trait: distributed cognition

Cognitive ecosystems

- Comprised of both organic and inorganic components (culture & technology)
- That work on the brain from the outside in
- Restructuring the cognitive field in ontogenesis



Hybrid cognitive ecosystems



Cultural takeover of the hominid brain

- The human brain is unusually plastic, into old age.
- Much of what we call “higher cognition,” including language, originates in cultural reprogramming.
- This creates unique cognitive architectures in the brain
- It can also create new domains of representation

Governing representational systems in communities of mind, in order of emergence

Stage	Species/period	Novel forms of representation	Manifest change	Cognitive governance
EPISODIC	primate	complex episodic event-perceptions	improved self-awareness and event-sensitivity	episodic and reactive; limited voluntary expressive morphology
MIMETIC (1st transition)	early hominids, peaking in <i>H. erectus</i> ; 4M-0.4 Mya	nonverbal action-modelling	revolution in skill, gesture (including vocal), nonverbal communication, shared attention	mimetic; increased variability of custom, cultural "archetypes"
MYTHIC (2nd transition)	sapient humans, peaking in <i>H. sapiens sapiens</i> ; 0.5 Mya - present	linguistic modelling	high-speed phonology, oral language, oral social record	lexical invention, narrative thought, mythic framework of governance
THEORETIC (3rd transition)	recent sapient cultures	extensive external symbolization, both verbal and nonverbal	formalisms, large scale theoretic artifacts and massive external memory storage	institutionalized paradigmatic thought and invention

Hypothesis

- Human beings did not evolve new innate LTM “systems” for storing cultural representations
- Rather, humans evolved a novel capacity for recall
 - **The unique nature of human memory may be explained largely in terms of voluntary access, ie retrieval**

Voluntary recall: autocuing

- Animal retrieval is mediated by passive, usually externally cued associative triggers
- However, human recall can be deliberately self-triggered: this is defined as “**autocuing**”
- Autocuing evolved independently of storage and encoding mechanisms

Evolutionary origins of autocuing

- Common assumption:
 - autocuing must have evolved as an aspect of language
- Problem: *autocuing could not have originated in language*
 - *No morpho-phonological invention can occur without it*
 - *Without this, no lexical invention could have occurred*
 - *Without the latter, not even protolanguages could evolve*
- The cognitive fundamentals of retrieval had to evolve before language
 - *Language evolution was scaffolded on the earlier evolution of autocuing*

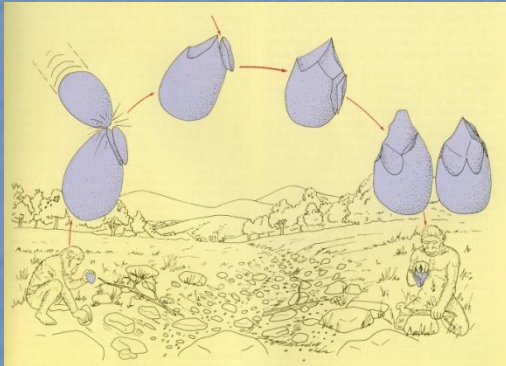
Evolutionary origins of autocuing

- No evidence of voluntary autocuing in wild primates
- Human children are excellent at autocuing at an early age – as seen in event-reenactment
 - eg Fantasy play, self-reminding, rehearsal of action
 - eg: Practice and rehearsal of skills

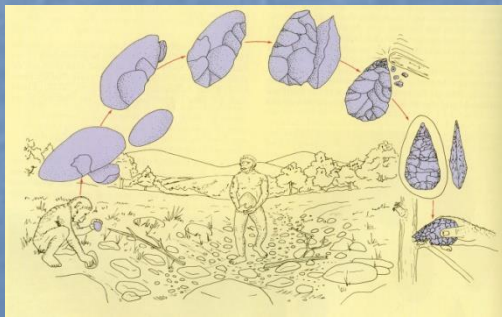
Origins of autocuing in skill

Hypothesis: an early evolutionary change in the hominid brain enabled voluntary recall of exact memories for action = rehearsing refined skills

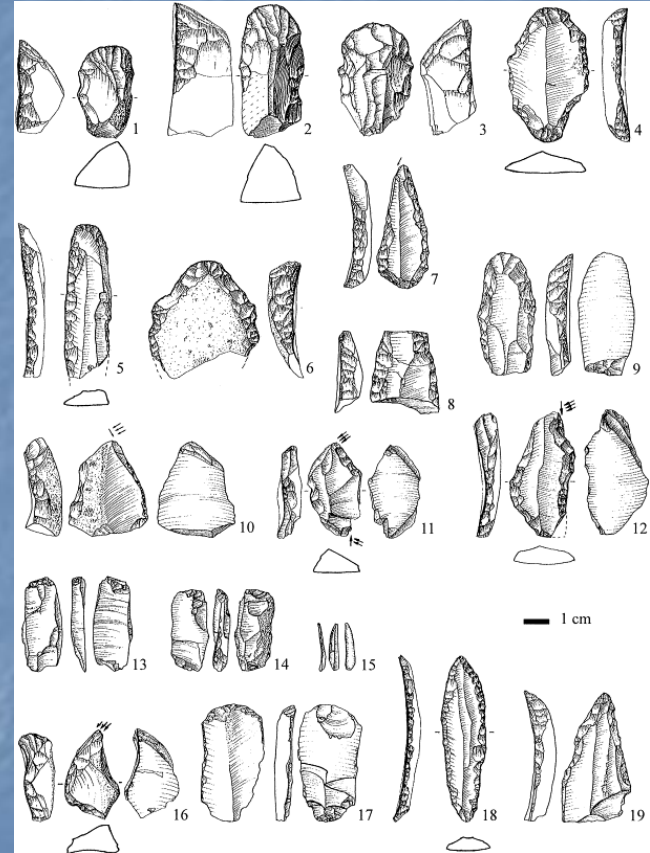
Earliest direct evidence of refined skill: the master toolkit (tools to make tools)



- 2,500,000



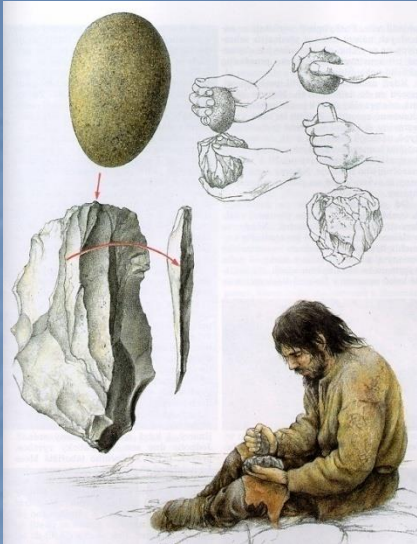
- 1,800,000

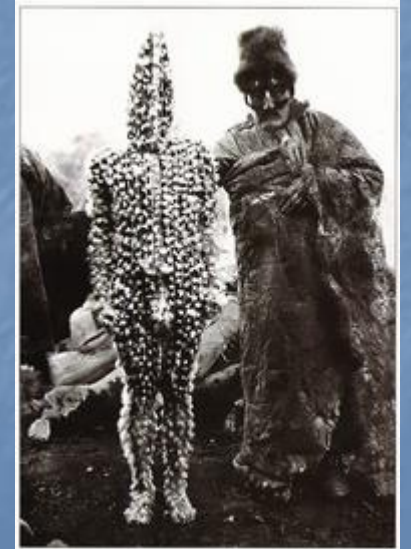


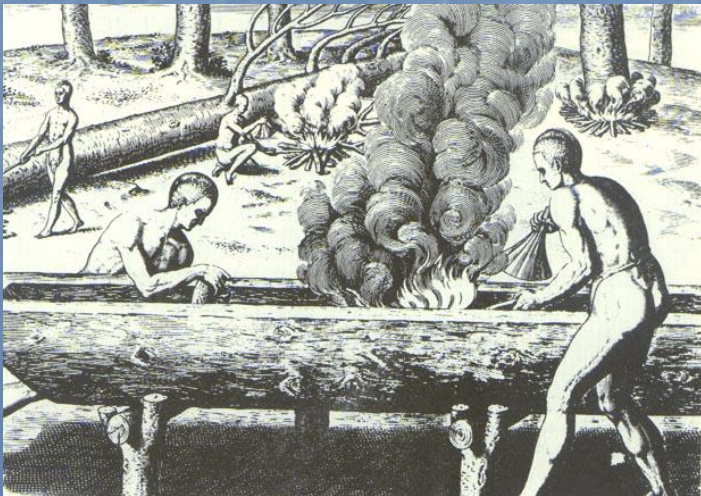
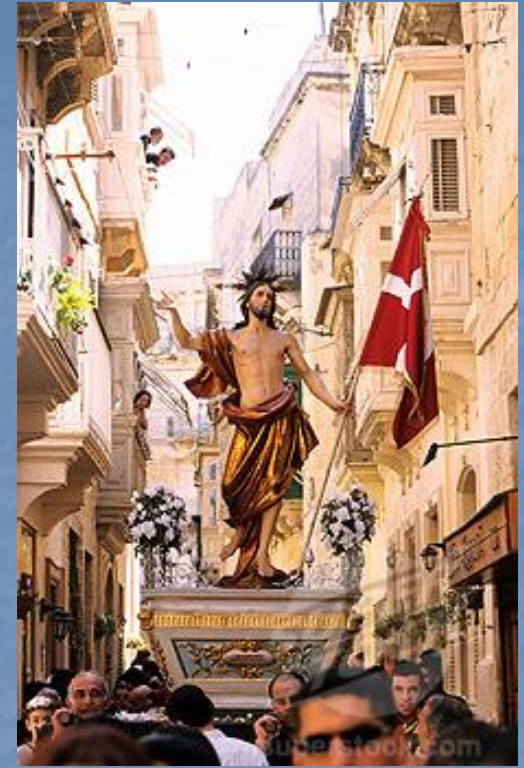
- 35,000

REFINED SKILLS













Erin Kelly von Madsen as Charlotte in Shakespeare's *Hamlet*.
Photo: William Klein/Montybrun.com





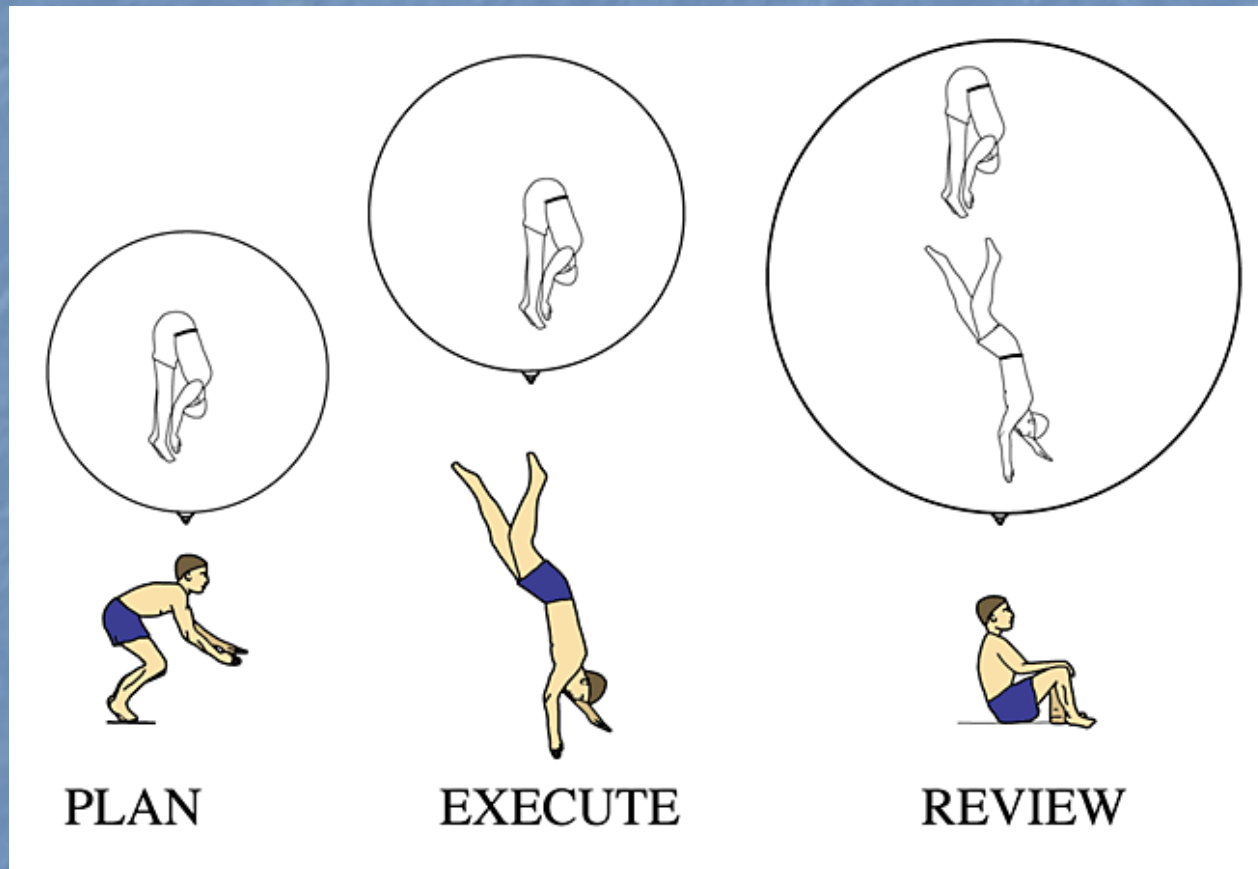
Summary

1. Autocuing appeared very early in the domain of skilled toolmaking
2. First evident at least 2.6 Mya, possibly 3.5 Mya (in a. Afarensis)
3. More advanced in h.Erectus 1.8 Mya
4. Main anatomical change: expanded connectivity between PFC, IPL & lateral cerebellum

Basis of modern memory architecture

1. Autocuing of event-memory: supports recall and rehearsal of whole-body event-memories
2. The remaining changes to the primate memory systems are all scaffolded on this adaptation
3. The later are later products of a series of culturally-imposed reorganizations of the hominid brain
 - first by oral culture
 - then by material culture

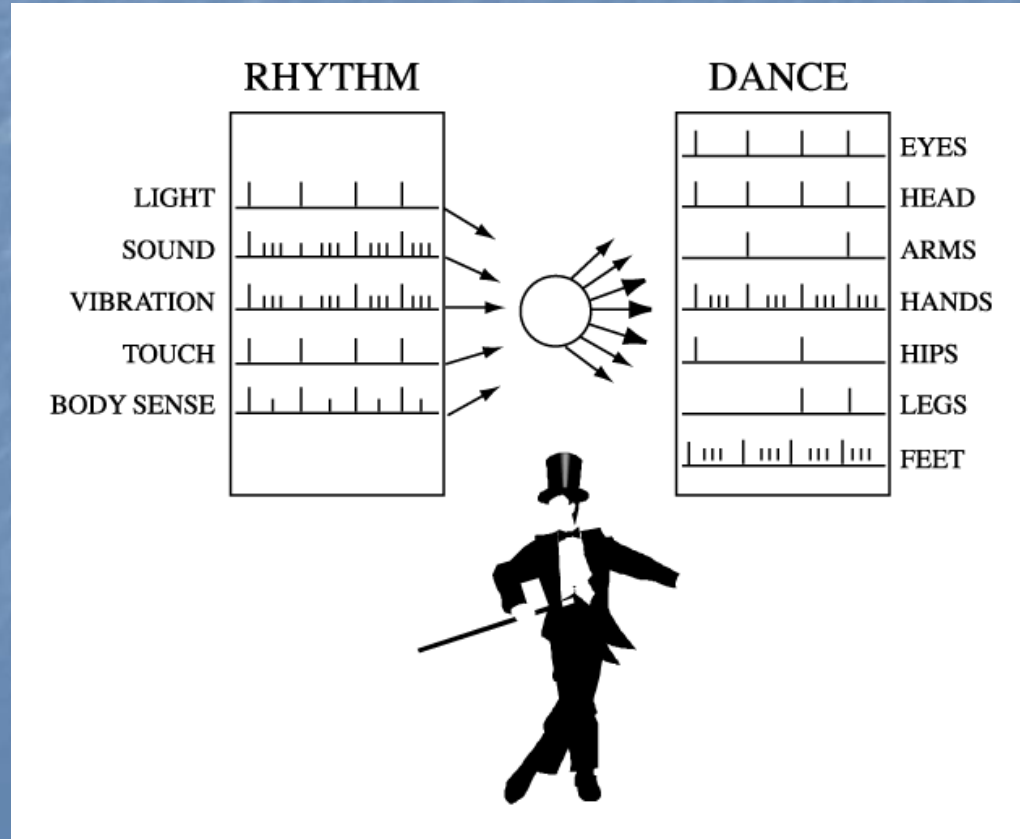
Autocuing enables mimetic imagination to recall and modify very specific action patterns



(approximating an ideal of performance)

Mimesis: translating event-percepts into motor plans

Supra-modal meta-supervision of voluntary action

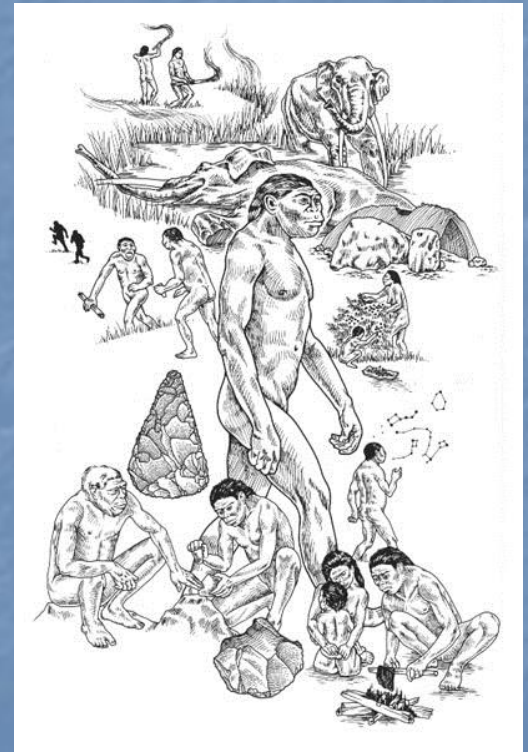


Autocuing exploited the “outside-in” principle

- All conventions begin as modified actions
- Cultural conventions: negotiated interactively
- Generated outside the brain in a creative space
- They originate in modifiable action-memories
- Distributed in networks of practice
- This also applies to language

1st cognitive-cultural networks: Mimetic culture (~2 Mya)

- The actor is born: refined skill, linked to material culture
- Skilled, complex society
- Creative, embodied, dramatic
- Contagion, pressure to conform
- Networks of practice related to tools



Lumsden & Wilson, 1983

Networks of practice constitute distributed embodied memory systems



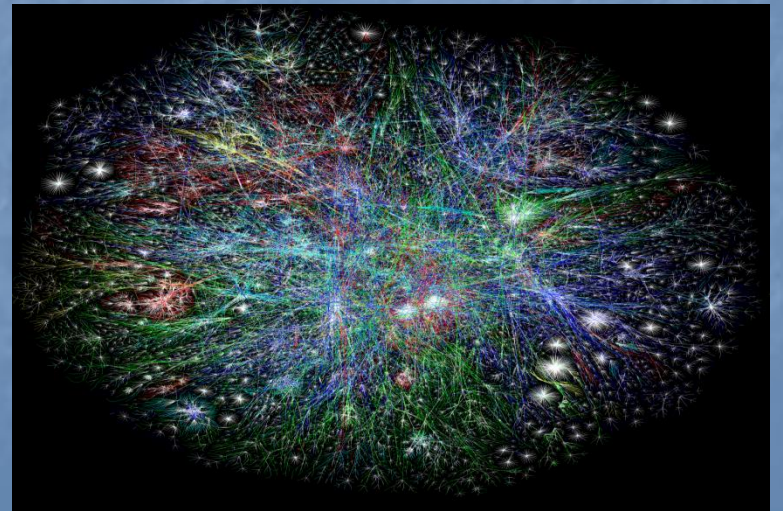
Special role of material culture

(Tools, built environment, artifacts, documents)

- All manufactured tools are implicitly instructive & interactive
- External symbolic storage (ESS) systems are key components in modern representational systems
- Essential components of hybrid cognitive ecosystems (biological + artificial components)



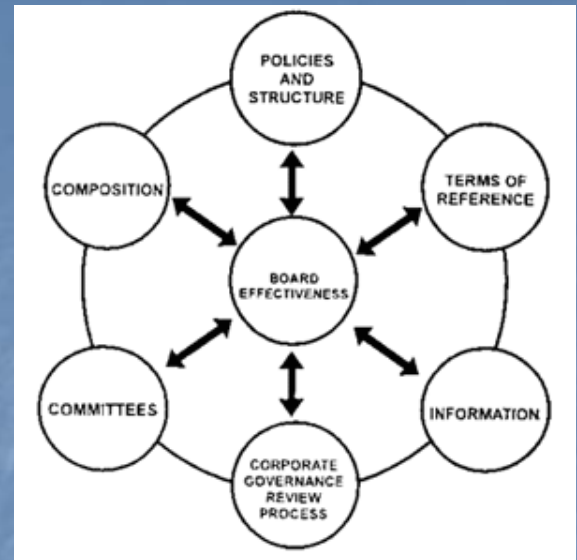
Hybrid cognitive ecosystems encompass all 3 domains



The Internet

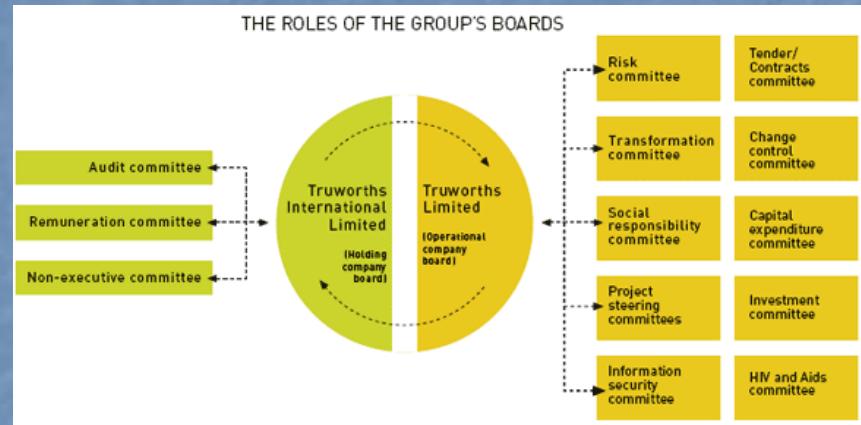
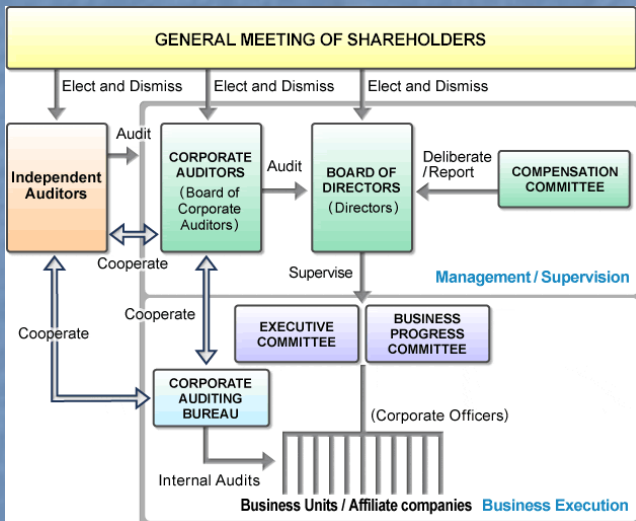


Material culture driving global cognitive adaptation



Novo Nordisk Danish

Yukon-Nevada Gold Canada

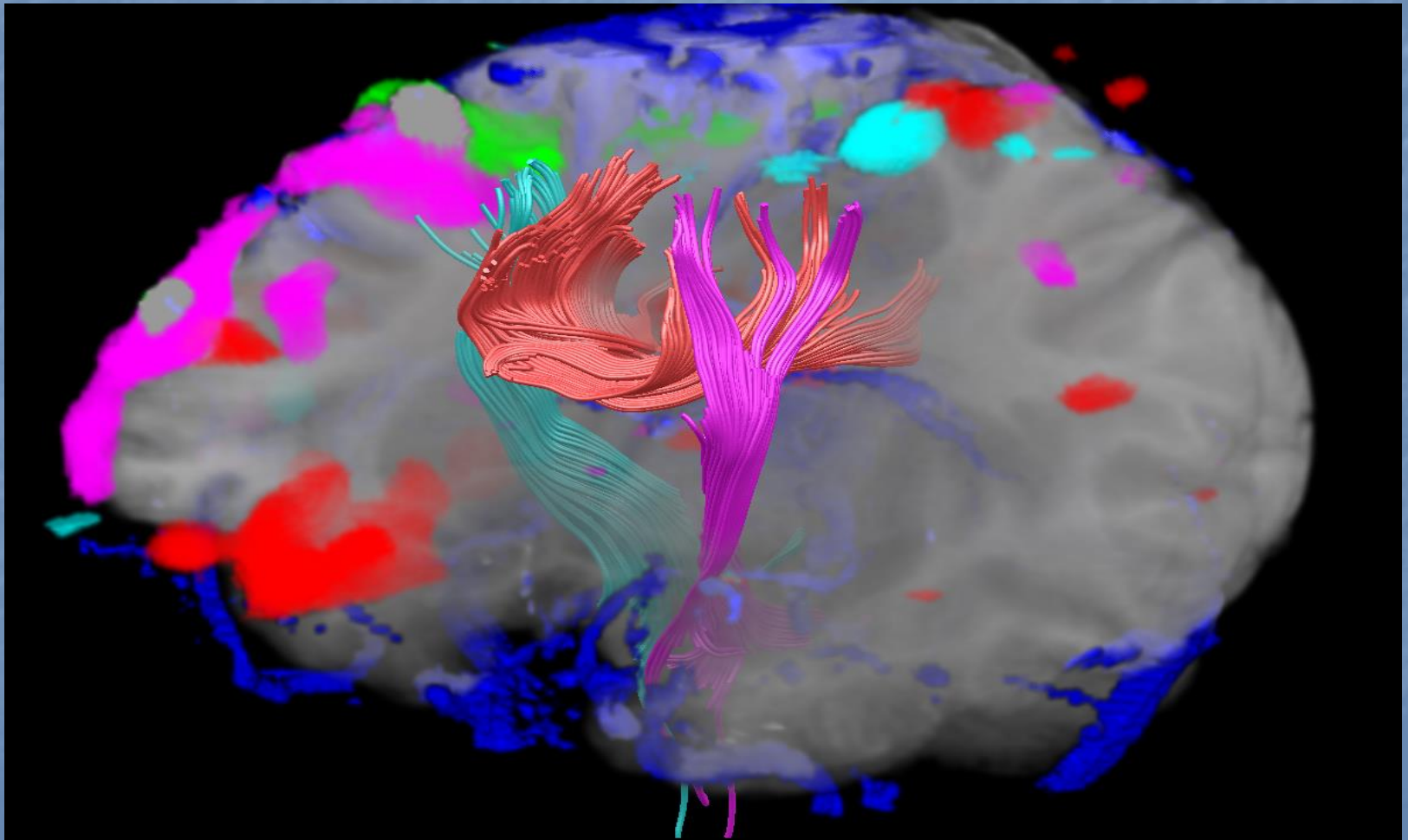


NEC Japan

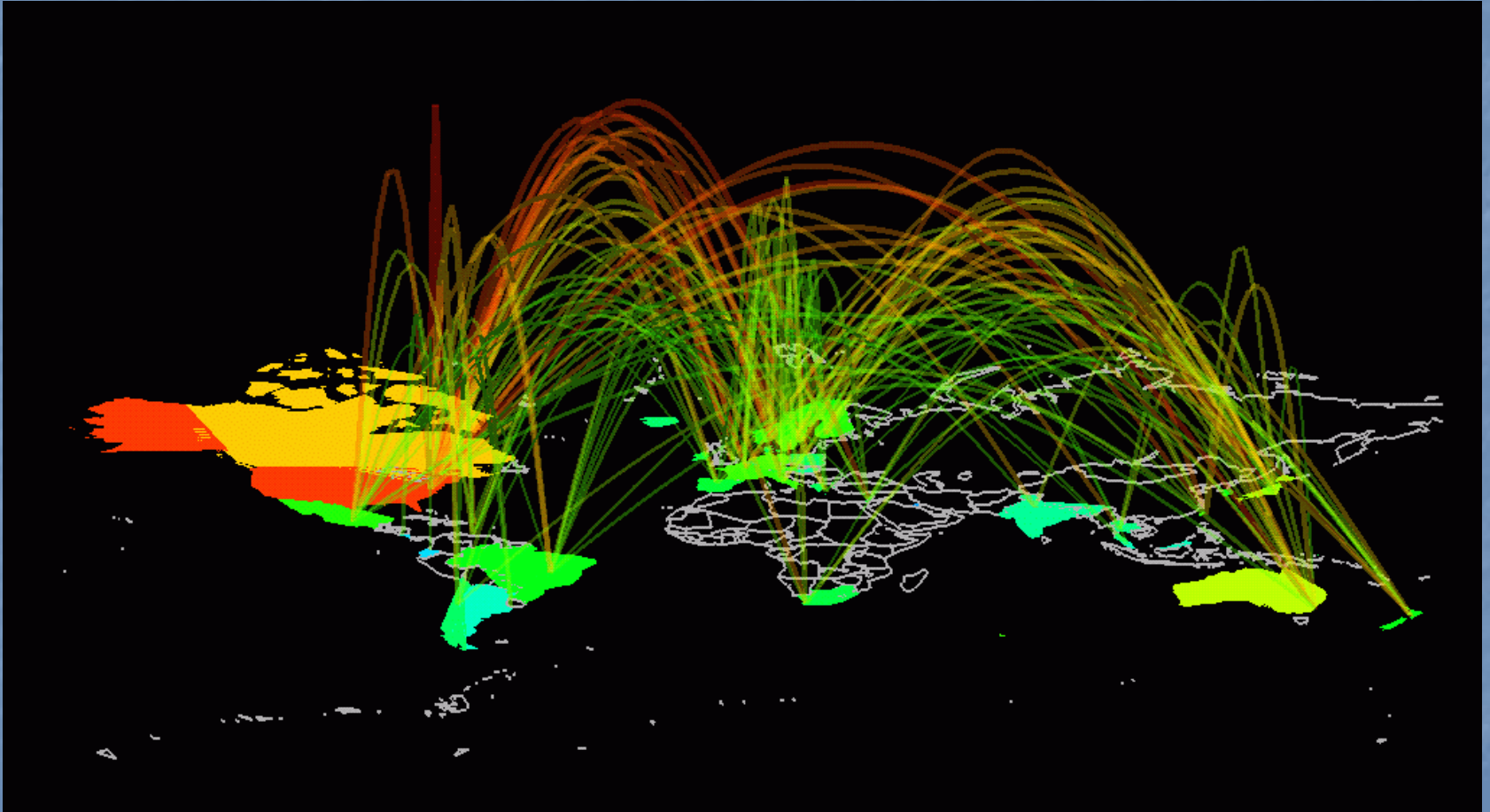
Truworths USA

Corporate instantiations of hybrid cognitive ecosystems

Capitalizing on developmental neural and cognitive plasticity



Global networks shape the brain



Distributed global governance of cognition

- Massive semiotic ecosystems in distributed networks:



Supremacy of mind over matter, or vice-versa?

Challenge #1: Strong externalization of influence

IT devices expose the mind to sophisticated cognitive engineering: is our mental autonomy threatened more than in the past?

Semiotic analysis of the conditions for mental autonomy: where would it differ from psychological or sociological methods?

Challenge #2: Anonymity and extreme individuality

- Common belief: Anonymity in cyberspace defeats evolved protection mechanisms against cheaters and predators
 - Semiotic indices of isolation, insecurity, mistrust might be developed
 - Is there such a thing as a pathological semiotic system? If so, how might it be “diagnosed?”

Challenge #3: Defensive conservatism

Economic systems are increasingly machine-driven (vs human-centered)

- Unregulated competition for cognitive resources is already a reality; turnover rates outstrip our organic capacity for tracking change
- The new ecology could threaten our basic norms and standards of self-cultivation (ie, civilization)

Potential applications of cognitive semiotics

Develop new methodologies, combining objective and subjective approaches, to build an adequate model of large-scale cultural-cognitive systems

Track the nature of the changes in the semiotic ecology, and their impact on cognition