

What is the Philosophy of Cognitive Development?

Why do we need it?

Studying cognitive development

What's the motivation?

- Gain insights into the nature of the mind
- ... by studying how minds could develop.
- Start simple and build up (Brooks 1999).



What is an account of cognitive development?

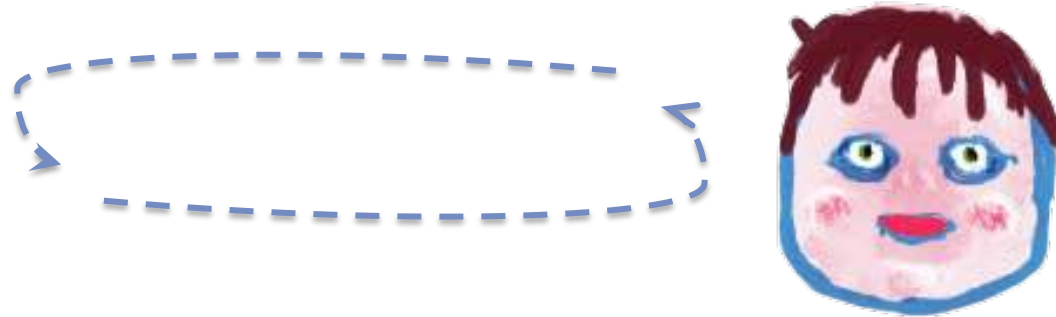
- Model of cognitive abilities of individual at T^1
↓
- Model of cognitive abilities of individual at T^2
- Characterisation of (key stages in) transition:
 - internal states of developing individual
 - external states and interactions



Individual learning

external: state of the world

internal: cognitive resources

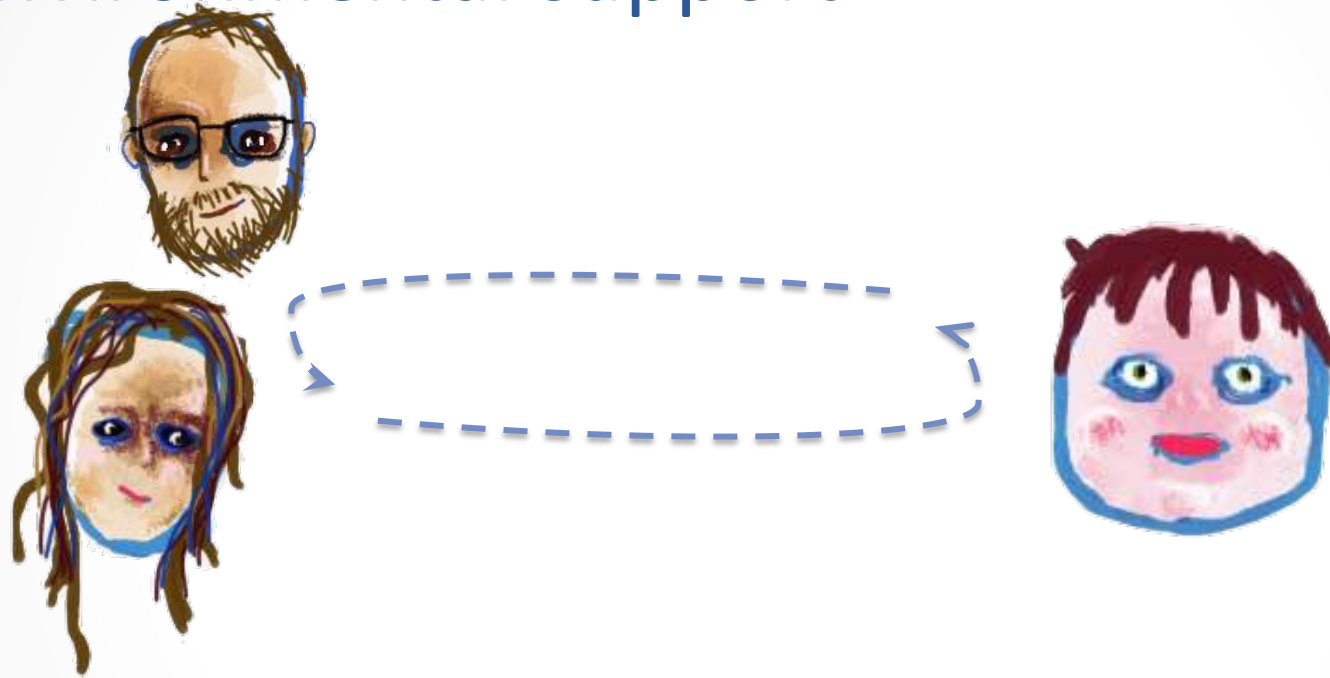


A (e.g. juvenile) subject S acquires knowledge about its environment.

→ Process of **internalisation**

- transition from S 's state of ignorance to knowledge
- model of the internal states that enable S 's learning

Environmental support



Models may incorporate environmental contributions

- Social learning – e.g. teaching (Csibra & Gergely 2009; Sterelny 2012)
- Non-social factors – e.g. diet and ecology (Hare & Tomasello 2004)

Grist and Mills* (Heyes 2018)

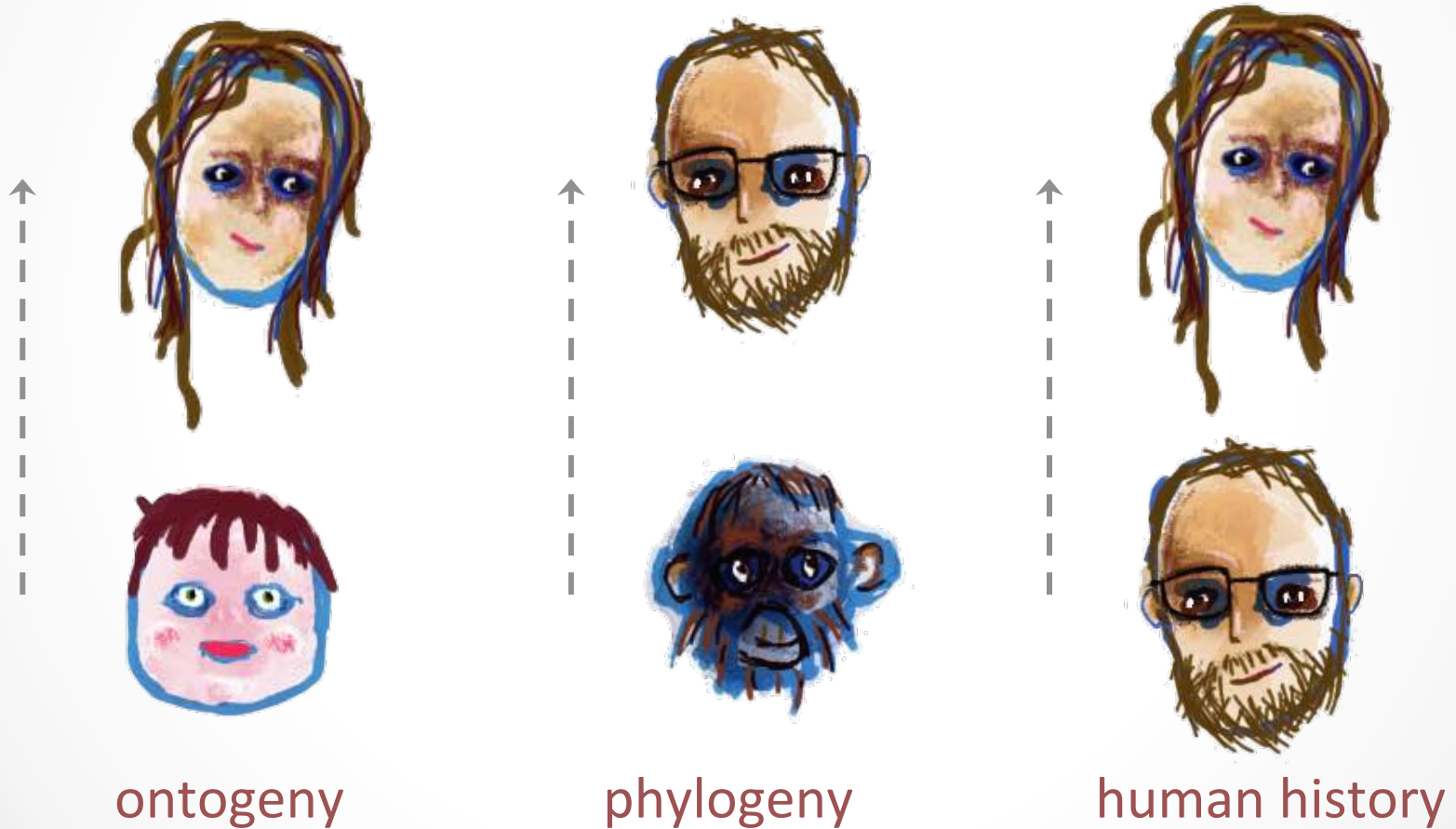
Transitions may include:

- **Grist** – information about the world (e.g. propositional contents)
- **Mills** – cognitive technologies/mechanisms (e.g. calculation)



*Heyes's distinction may not ultimately be workable

Three kinds of (cognitive) development



Cognitive development in ontogeny



What is it?

- Learning over an **individual lifespan** – e.g. language acquisition

Primary mechanisms

- Whatever cognitive states can be attributed to infants and children
- Environmental ‘scaffolding’

Cognitive development in phylogeny



What is it?

- The evolution of distinctively human cognitive traits across generations

Primary mechanisms

- Genetic factors – **adaptation**, exaptation (Sterelny 2007)
- Non-genetic factors – e.g. epigenetics (Laland et al. 2014)

The great ape family tree



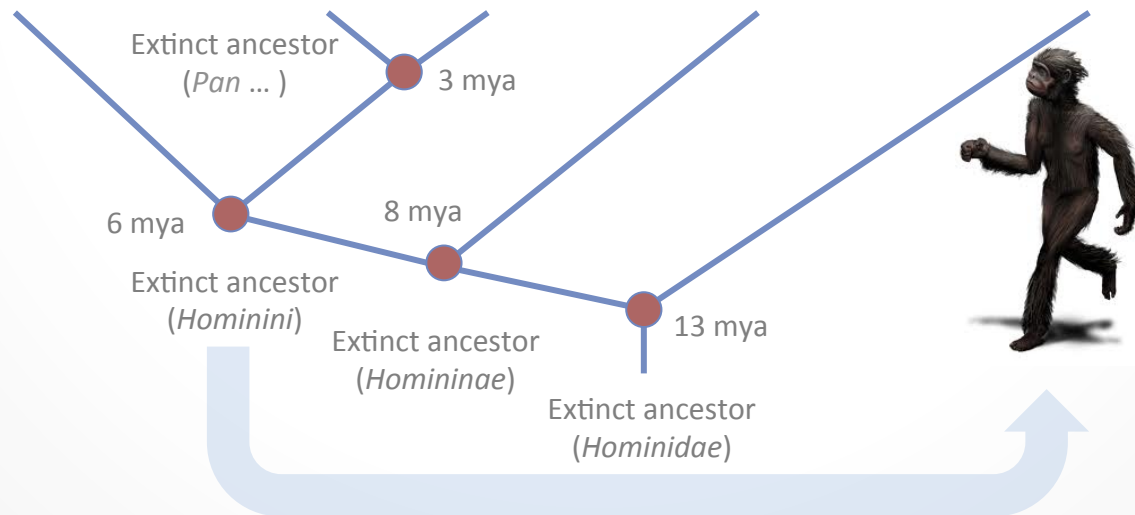
Human
(*Homo sapiens*)

Chimpanzee
(*Pan troglodytes*)

Bonobo
(*Pan paniscus*)

Gorilla
(*Gorilla gorilla*)

Orang-utan
(*Pongo pygmaeus*)



Cognitive development in human history



What is it?

- The historical development of distinctively human cognitive traits over and within generations

Primary mechanism

- Cultural evolution (Richerson & Boyd 2005; Henrich 2017; Heyes 2018)



The cultural evolution of mental arithmetic

- Counting systems are a **cultural invention**.
- Ishango bones → basic arithmetic **c.20kya**
- Calculating $97 \div 3$ is much more recent.
 - **Egyptian/Babylonian** arithmetic
≈2,000 BC



An Account of Cognitive Development

Balancing explanatory trade-offs



What do cognitive models look like? (e.g. Tomasello 2008)

- Philosophical accounts of the **cognitive and motivational prerequisites** taken to explain behaviour
- Indexed to **key developmental stages**
- Supported by **reference to empirical data**

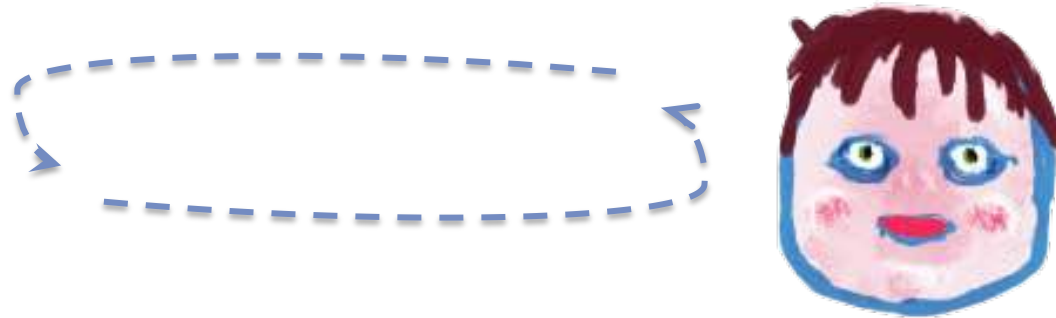
Current data underdetermine models →
disagreement/debate about correct explanations



Rationalist/nativist views (often internalist)

external: state of the world

internal: cognitive resources



Attribute to child **rich starting set** – e.g. sentence-like representational resources, including propositional attitudes

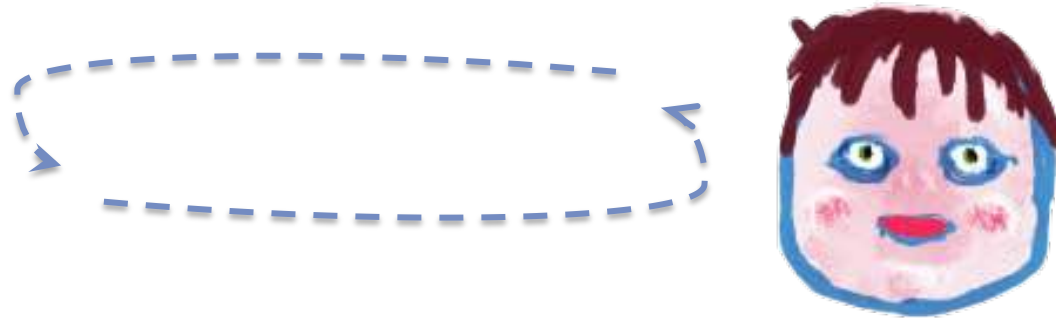
Such accounts make explanation of learning easy ...

- ... but learning plays only minor role in ontogenetic development.

Empiricist views (often externalist)

external: state of the world

internal: cognitive resources



Attribute to child **minimal starting set** of cognitive resources – e.g. ability to track associations

Makes learning harder to explain ...

- ... but preserve intuitions about cognitive change over lifespan.

Rationalism in phylogeny



- Positing **adaptations** to explain cognitive development in ontogeny can be appealing ... until one takes phylogeny seriously.
 - → shifting the bump in the rug
 - explanatory burdens left unaddressed (except by just-so stories)

What is the Philosophy of Cognitive Development?

- Study of how we should construct models of the mind, via its developmental transitions.
- Requires **interpreting empirical data** ...
- ... in light of **theoretical constraints** on development.
- → Maximally coherent model of the mind



Conceptual puzzle I: The paradox of language development

STANDARD VIEW

- Language requires ToM
- ToM requires language

→ paradox



14-months

Conceptual puzzle II: ToM in Ontogeny



- explicit ToM (3-4yrs)
(Wimmer & Perner 1983)
- Implicit/minimal ToM (Onishi & Baillargeon 2005)
- If implicit and explicit ToM tasks are testing the same thing (false belief example), how should we make sense of this seeming disparity?

Debates in the literature

- empiricism vs. nativism
- internalism vs. externalism
- domain general vs. modular cognition
- genes vs. culture



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