Lecture 01 : Methodological Foundations and the Philosophy of Cognitive Development : Origins of Mind

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Contents

1. What Is The Philosophy of Cognitive Development?

Lecturer: Richard Moore

- What are models of cognitive development?
- Phylogeny, ontogeny and human history.
- Rationalist and empiricist/internalist and externalist approaches to the explanation of cognitive development.
- What can Philosophy contribute to the study of cognitive development?

1.1. Reading: general recommendations

Boyd, R., Richerson, P. J., & Henrich, J. (2011). The cultural niche: Why social learning is essential for human adaptation. Proceedings of the National Academy of Sciences, 108(Supplement 2), 10918-10925.

Brooks, R (1999) Cambrian intelligence: The early history of the new AI. MIT Press.

Csibra, G & Gergely, G (2009) Natural pedagogy. TiCS, 13(4), 148-153.

Hare, B & Tomasello, M (2004) Chimpanzees are more skilful in competitive than in cooperative cognitive tasks. Animal Behaviour, 68(3), 571-581.

Heyes, C (2018) Cognitive gadgets: The cultural evolution of thinking. Harvard UP.

Henrich, J (2017) The secret of our success: How culture is driving human evolution, domesticating our species, and making us smarter. Princeton UP.

Laland, K et al. (2014) Does evolutionary theory need a rethink? Nature News, 514(7521).

Onishi, K & Baillargeon, R (2005) Do 15-month-old infants understand false beliefs? Science, 308(5719), 255-258.

Richerson, P & Boyd, R (2008) Not by genes alone: How culture transformed human evolution. Chicago UP.

Samuels, R (2004) Innateness in cognitive science. Trends in Cognitive Sciences, 8(3), 136-141.

Sterelny, K (2007) Dawkins vs. Gould: Survival of the fittest. Icon Books.

Sterelny, K (2012) The evolved apprentice. MIT Press.

Tomasello, M (2008) Origins of human communication. MIT Press.

Tooby, J & Cosmides, L (2005) Conceptual foundations of evolutionary psychology. In Buss (ed.) The handbook of evolutionary psychology. Wiley.

Wimmer, H & Perner, J (1983) Beliefs about beliefs. Cognition, 13(1), 103-128.

The books listed above are all classics. If you read any of them you'll benefit. Sterelny (2007) is a general introduction to evolutionary theory. The others are all influential and compelling approaches to explaining cognitive development in history/phylogeny. It doesn't particularly matter which one you read - but the Richerson & Boyd can be quite maths-heavy.

2. Parsimony and the Formulation of Developmental Hypotheses

Lecturer: Richard Moore

- Introducing Morgan's Canon

  Problem 1: What are 'lower' cognitive processes?

  Problem 2: When is it necessary to appeal to 'higher' cognitive processes?

- Introducing Cladistic Parsimony

  Illustrative case: Cladistic parsimony and Morgan's canon can pull in different directions

  Tentative conclusion: Appeals to parsimony must be argued for carefully and on a case by case basis

2.1. References

Andrews, K & Huss, B (2014) Anthropomorphism, anthropectomy, and the null hypothesis. Biology & Philosophy, 29(5), 711-729.

Buckner, C (2013) Morgan's Canon, meet Hume's Dictum: avoiding anthropofabulation in cross-species comparisons. Biology & Philosophy, 28(5), 853-871.

Meketa, I (2014) A critique of the principle of cognitive simplicity in comparative cognition. Biology & Philosophy, 29(5), 731-745.

Mikhalevich, I (2015) Experiment and animal minds: why the choice of the null hypothesis matters. Philosophy of Science, 82(5), 1059-1069.

Shettleworth, S (2010) Clever animals and killjoy explanations in comparative psychology. Trends in cognitive sciences, 14(11), 477-481.

Sober, E (2005) Comparative psychology meets evolutionary biology. In Daston & Mittman (eds.) Thinking with animals: New perspectives on anthropomorphism. Columbia UP.

Starzak, T (2017) Interpretations without justification: a general argument against Morgan's Canon. Synthese, 194(5), 1681-1701.

Wynne, C (2004) The perils of anthropomorphism. Nature, 428(6983), 606-606.

3. Course Outline

Lecturer: Stephen A. Butterfill

A quick look at the topics this course will cover.

I explain why we selected the topics for this course. The key idea is that understanding the emergence in development of knowledge will eventually require somehow bringing together the abilities that infants manifest in the very first months of life concerning physical objects, minds and actions and their abilities to act jointly with, and perhap to communicative with, those around them.

3.1. Two Breakthroughs

Support for this idea comes from the fact that the last decade or so has seen two major breakthroughs in research on ontogenetic development:

1. *Joint Action* Preverbal infants enjoy surprisingly rich social abilities. These may well facilitate the subsequent acquisition of linguistic abilities and enable the emergence of knowledge (e.g. Csibra & Gergely 2009; Meltzoff 2007; Tomasello et al. 2005).
2. *Core Knowledge* Infants in the first year of life enjoy sophisticated abilities to track causal interactions, numerosity, actions, mental states and more besides in infants in the very first months of life (e.g. Spelke 1990; Baillargeon et al. 2010).

Whereas these are often treated in isolation, understanding developing minds probably requires combining them.

3.2. Shared document

We may occasionally want to edit a document together (e.g. to formulate questions).

Please open the document `week01` under the `files` menu in the Origins of Mind teams channel. In case it saves you time, Here is a direct link to the document:

week01

3.3. Assessment

We will also mention assessment. You will be offered individual meetings to gain feedback on outlines and drafts of your assessed essay.

To get an idea of the topics, you can see sample questions:

- sample questions for assessed essays

You do not have to answer any of these questions. You will be able to formulate your own question in individual discussion with your supervisor. The sample questions will give you an idea of the kinds of question you might answer. (And you may choose to write on any of these questions if you wish.)

3.4. More information

Much of this year's course will overlap with the 2020 version, so you can get an idea of how some of the topics will be covered by considering the outline of lect ures (or even the slides) for that version of the course.

4. Davidson's Challenge

Lecturer: Stephen A. Butterfill

There is an obstacle to understanding the emergence of knowledge in development. As Davidson (1999, 11) puts it, 'We have many vocabularies for describing nature when we regard it as mindless and we have a mentalistic vocabulary for describing thought and intentional action what we lack is a way of describing what is in between.'

My aims in this section are to explain why studying development involves facing broadly philosophical problems, and to introduce one of the central problems.

4.1. What Is Knowledge?

I start with two uncontroversial premises about knowledge.

First, knowledge is constitutively linked to practical reasoning and to inference. It is the kind of thing that can typically influence how you act when you act purposively, and it is the kind of thing that can influence purposive actions in any domain at all. Knowledge is also the kind of thing that you can sometimes arrive at by inference, and which can enable you to make new inferences in any domain at all.

Second, knowledge states are inferentially integrated with other attitudes like beliefs, desires and intentions.

4.2. Uncomplicated Account of Minds and Actions

For any given proposition [There's a spider behind the book] and any given human [Wy] ...

1. Either Wy believes that there's a spider behind the book, or she does not.
2. Either Wy can act for the reason that there is, or seems to be, a spider behind the book, or else she cannot.
3. The first alternatives of (1) and (2) are either both true or both false.

Discoveries about how abilities to track unperceived objects develop form a pattern sometimes described as paradoxical. This is because those discoveries conflict with the Uncomplicated Account.

4.3. Unperceived Objects

When do humans first come to know facts about the locations of objects they are not perceiving? (This ability is sometimes called object permanence.)

The answer depends on how we measure their abilities:

> look (habituation): by 4 months of age or earlier (Baillargeon 1987).
>
> look: by around 2.5 months of age or earlier (Aguiar & Baillargeon 1999, Experiment 2)
>
> search: not until after 7 months of age (Shinskey & Munakata 2001)

Could the discrepancy be entirely due to infants' difficulties performing actions? Probably not: 'action demands are not the only cause of failures on occlusion tasks' (Shinskey 2012, p. 291).

In short,

> 'violation-of-expectation experiments, using looking-time measures, suggested that infants have object permanence in occlusion conditions; but simplified-search studies confirm that infants fail to reach towards occluded objects, suggesting that infants do not have object permanence in occlusion conditions. This discrepancy, however, is only the tip of the iceberg. Results of studies attempting to measure infants' cognitive abilities using reaching measures often contradict results gained while using looking-time measures' (Charles & Rivera 2009, p. 994).

4.4. Davidson's Challenge

'if you want to describe what is going on in the head of the child when it has a few words which it utters in appropriate situations, you will fail' (Davidson 2001, pp. 127–8).

'The difficulty in describing the emergence of mental phenomena is a conceptual problem [...] In [...] the evolution of thought in an individual, there is a stage at which there is no thought followed by a subsequent stage at which there is thought. To describe the emergence of thought would be to describe the process which leads from the first to the second of these stages. What we lack is a satisfactory vocabulary for describing the intermediate steps' (Davidson 2001, p. 127).

'We have many vocabularies for describing nature when we regard it as mindless, and we have a mentalistic vocabulary for describing thought and intentional action; what we lack is a way of describing what is in between' (Davidson 1999, p. 11)

4.5. Core knowledge

Some researchers have proposed that understanding the developmental emergence of knowledge requires postulating novel kinds of mental state. In this course we will focus on proponents of core knowledge:

> 'there is a third type of conceptual structure, dubbed "core knowledge" ... that differs systematically from both sensory/perceptual representation[s] ... and ... knowledge' (Carey 2009, p. 10).

There are also more radical suggestions:

> 'there are many separable systems of mental representations ... the task ... is to ... [find] the distinct systems of mental representation and to understand their development and integration' (Hood et al. 2000, p. 1522).

Does understanding developmental require postulating novel kinds of mental state?

Glossary

core knowledge For an individual to have core knowledge concerning a domain such as physical objects, actions or minds is for her to have a core system specifically for this domain. For someone to have core knowledge of a particular principle or fact is for her to have a core system where either the core system includes a representation of that principle or else the principle plays a special role in describing the core system. Core knowledge is not knowledge, and you can have core knowledge of things that are untrue (for this reason Carey (2009, p. 10) recommends the term 'core cognition' for states of core knowledge). 7

core system This course uses a nonstandard, minimally informative notion of core system on which a 'core system' for a particular domain is simply whatever it is that underpins the earliest abilities infants manifest in that domain (see **??**). This allows that core systems may lack uniformity across domains and unity within a domain: that is, different kinds of system may qualify as 'core' in different domains, and a core system may comprise two or more largely distinct systems (see **??**).

However, core systems are standardly identified by giving a list of features. The lists vary between researchers and times. Carey & Spelke (1996, p. 520) assert that core systems are largely innate, informationally encapsulated (that is, their operations are largely unaffected by things you know or believe, and by core knowledge in other core systems), largely unchanging over the course of development (so adults and infants alike have the same core systems). They also say that the inputs to core systems are the outputs of perceptual systems, so that architecturally core systems in human adults occupy a position between perception and knowledge. Finally, core systems are also held to arise from systems already present in the evolutionary ancestors of modern humans. Carey (2009) adds that the representations in core systems are iconic representations. 8

habituation Habituation is used to test hypotheses about which events are interestingly different to an infant. In a habituation experiment, infants are shown an event repeatedly until it no longer holds their interest, as measured by how long they look at it. The infants are then divided into two (or more) groups and each group is shown a new event. How much longer do they look at the new event than at the most re-

cent presentation of the old event? This difference in looking times indicates *dishabituation*, or the reawakening of interest. Given the assumption that greater dishabituation indicates that the old and new events are more interestingly different to the infant, evidence from patterns of dishabituation can sometimes support conclusions about patterns in how similar and different events are to infants. 6

iconic representation A representation is iconic if parts of the representation represent parts of the thing represented. Pictures are paradigm examples of iconic representations. For example in a picture of a flower, some parts of the picture may represent petals while others represent the stem. 8

inferential integration For states to be *inferentially integrated* means that: (a) they can come to be nonaccidentally related in ways that are approximately rational thanks to processes of inference and practical reasoning; and (b) in the absence of obstacles such as time pressure, distraction, motivations to be irrational, self-deception or exhaustion, approximately rational harmony will characteristically be maintained among those states that are currently active. 6

innate Not learned. While everyone disagrees about what innateness is (see Samuels 2004), on this course a cognitive ability is innate just if its developmental emergence is not a direct consequence of data-driven learning. 8

object permanence the ability to track objects while briefly unperceived. 6

References

Aguiar, A. & Baillargeon, R. (1999). 2.5-month-old infants' reasoning about when objects should and should not be occluded. *Cognitive Psychology*, *39*, 116–157.

Baillargeon, R. (1987). Object permanence in 3.5-and 4.5-month-old infants. *Developmental psychology*, *23*(5), 655–664.

Baillargeon, R., Scott, R. M., & He, Z. (2010). False-belief understanding in infants. *Trends in Cognitive Sciences*, *14*(3), 110–118.

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Carey, S. & Spelke, E. S. (1996). Science and core knowledge. *Philosophy of Science*, *63*, 515–533.

Charles, E. P. & Rivera, S. M. (2009). Object permanence and method of disappearance: looking measures further contradict reaching measures. *Developmental Science*, *12*(6), 991–1006.

Csibra, G. & Gergely, G. (2009). Natural pedagogy. *Trends in Cognitive Sciences*, *13*(4), 148–153.

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Davidson, D. (2001). *Subjective, Intersubjective, Objective*. Oxford: Clarendon Press.

Hood, B., Carey, S., & Prasada, S. (2000). Predicting the outcomes of physical events: Two-year-olds fail to reveal knowledge of solidity and support. *Child Development*, *71*(6), 1540–1554.

Meltzoff, A. N. (2007). 'like me': a foundation for social cognition. *Developmental Science*, *10*(1), 126–134.

Samuels, R. (2004). Innateness in cognitive science. *Trends in Cognitive Sciences*, *8*(3), 136–41.

Shinskey, J. L. (2012). Disappearing décalage: Object search in light and dark at 6 months. *Infancy*, *17*(3), 272–294.

Shinskey, J. L. & Munakata, Y. (2001). Detecting transparent barriers: clear evidence against the means-end deficit account of search failures. *Infancy*, *2*(3), 395–404.

Spelke, E. S. (1990). Principles of object perception. *Cognitive Science*, *14*, 29–56.

Tomasello, M., Carpenter, M., Call, J., Behne, T., & Moll, H. (2005). Understanding and sharing intentions: The origins of cultural cognition. *Behavioral and Brain Sciences*, *28*, 675–735.