Philosophy and the Sciences

Introduction to the Philosophy of the Cognitive Sciences

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Stone-age minds in modern skulls: evolutionary theory and the philosophy of mind

How did human brains and human cognitive structures evolve?

Natural selection and adaptations

Which are the most important scientific interpretations of how our minds evolved?

Our agreed starting point is that our brains are a product of natural selection. In order for a physical feature or behaviour to be a product of natural selection three conditions have to be in place:

i. There needs to have once been variation in a population regarding that feature.
ii. The feature must confer some reproductive or survival advantage to those organisms that have it.
iii. The feature must be heritable.

Features of organisms that are products of natural selection are known as adaptations. Natural selection need not be a 'passive' process As well as adapting to their environment, organisms potentially shape their environment, and therefore shape the selective pressures they adapt to. This process is known as niche construction.

Evolutionary Psychology

Evolutionary psychology (EP) is the view that our brains evolved in a very specific way. It claims that:

i. That different cognitive capacities evolved to solve specific recurring problems in the environment.

ii. The recurring problems were those found in the Environment of Evolutionary Adaptation (the Pleistocene era).

iii. The human brain has not had sufficient time to adapt to solve those problems which face us in our modern, urban environments.

iv. Therefore we have **stone-age minds** in modern skulls. If you are committed to EP, this means you study the brain by hypothesising about the problems which faced our ancestors and how current cognitive capacities might have evolved in response to them.

Mind as a series of mini-computers

EP is committed to the mind having a particular structure. The mind consists in a series of 'mini-computers' each of which evolved to solve a particular problem. This means that one of the 'mini-computers' can be damaged, e.g. the mini-computer that allows you to solve social problems, while others remain intact One need not be committed to the mini-computers having a fixed location in the brain.

Cheater detection: an EP case study

As social hominids it was really important to have strong group relations. One way of ensuring this is to make sure you detect those who are 'cheating': taking the advantages that group living affords while not contributing to the group. So perhaps we evolved a cognitive ability to detect cheaters.

The fact that we are better at solving problems which involve someone cheating or violating a social rule than we are at solving problems which are purely abstract is taken to support this hypothesis (Cosmides and Tooby 1989).

The mini-computer which deals with detecting cheaters can't be co-opted to solve abstract logic puzzles, even though they have the same structure as the cheater-detection problems.

Culture and other routes of inheritance

Transmission of genes from parents to offspring is not the only route by which **adaptive behaviours** and knowledge can be transferred between individuals. We also inherit knowledge and behaviours via **social learning.**

Many species do social learning, which produces culture (sets of knowledge or behaviour transmitted by social learning). However, only humans seem to have cumulative culture: complex (and usually adaptive) technologies and behaviours formed via the gradual accumulation of modifications over many generations.

As a consequence of our suite of complex **culturally-transmitted behaviours,** humans make substantial alterations to our environment.

This can insulate us from **selection pressures** (e.g. by wearing clothes and building shelter we reduce selection favouring biological adaptations for living in harsh environments) and also lead to new selective pressures.

Human genes adapt to these selective pressures, a process known as **gene-culture co-evolution**. Some studies suggest that the rate of human evolution may have increased in the last 40,000 years, a result of natural selection in response to changes in human lifestyle driven by our capacity for culture.

Biology and culture in the evolution of language

Human language is a uniquely powerful and flexible system for communication. Evolutionary psychologists would explain language as a biological capacity, an adaptation enabling us acquire, process and produce language. Languages change as a result of their transmission via social learning, and therefore might change and evolve through the process of **cumulative culture**. In particular, languages have to be:

i. **Learnable**: in order to survive, languages have to make it into the minds of language learners, who simplify, regularize and systematize languages as they learn them.

ii. **Expressive**: language users want their language to enable them to convey the distinctions they care about, and will modify their language during use in order to make it fit their communicative needs.