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What is Cognition?

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Many philosophers and some scientists are cognition conservatives. When they say a psychological process is cognitive, they mean it's got something fundamental in common with cherished varieties of human thought. For conservatives a cognitive process involves reasoning. It operates on propositions (sentence-like mental representations), involves beliefs, desires and other intentional mental states, and is typically available to conscious awareness. Like most scientists, I'm now a cognition liberal [1]. When we say a process is cognitive, we mean that it handles information in an adaptive way and can be modelled usefully as a form of computation [2].

Both positions are legitimate and valuable in some contexts, but they also have key weaknesses. The conservative view has a venerable history in Western thought but it's out of kilter with contemporary scientific practice. It implies that much of the research done by those who identify as cognitive scientists – for example, work on the behaviour of plants, shoals of fish and swarms of bees – has nothing to do with cognition. The liberal view matches the labelling of people, departments and journals, but it is famously vague. What exactly is information, computation, representation?

Philosophers offer a variety of answers to these questions, and most cognitive scientists get along just fine without knowing them. That's probably because the concept of cognition isn't doing, and doesn't need to do, much scientific work. It's just a generic term for a bunch of phenomena that are more precisely defined - like learning, memory, perception, attention, categorisation and motor control. And each of *those* terms is a generic for a set of yet more precisely defined processes. It's important to tighten up as you drill down, but - like 'life', 'force' and 'species' – the job of 'cognition' is merely to gesture towards a domain of investigation [3].

To a first approximation, cognition is what is studied by cognitive scientists, just as life is what is studied by life scientists [4]. The legitimacy and value of extending cognition-talk to new domains depends on the productivity of the research programmes built around the extension [3].

In my experience, trouble arises only when liberals and conservatives get their wires crossed – when L-cognition gets confused with C-cognition. For example, rooks that drop stones in water to

reach a floating worm [5] are undoubtedly using L-cognition – handling information in an adaptive way – but they're no more likely than rats that press levers for food pellets to be engaged in C-cognition. Either all reinforcement learning involves reasoning, an eccentric view [6], or the rook paper made it into a prestige journal because reinforcement learning, a variety of L-cognition, got confused with reasoning, C-cognition.

A familiar sort of moral looms: When we talk about cognition, we should be clear about whether we are being liberal or conservative. In the conservative case we should also say exactly what the agent is supposed to 'know' or 'understand', and why reasoning is a more likely explanation for their behaviour than another (cognitive) process.

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