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Review of Murray Clarke's *Reconstructing Reason and Representation*

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Reconstructing reason and representation is a no small ambition. Is Clarke up to it? His basic theoretical postulate is the massive modularity hypothesis, one of the Founding Articles of High Church Evolutionary Psychology (hereafter EP). Clarke defends the massive modularity hypothesis against its critics – well, to be precise, against Jerry Fodor. Fodor's main argument is that cognitive modules cannot do nondemonstrative (abductive) reasoning in an effective and economical way. The problem is that, given a particular problem and given that we have access to some large library of general knowledge, there seem to be no tractable rules for determining which items in the library are specifically relevant to the process of solving this particular problem. The trick is to know how to select, from the vast sea of irrelevant information in the library, the few bits of information that are relevant here and now. Modules don't face the problem of selecting relevant information from a large library of accessible information. They solve the relevance problem noncognitively: information encapsulation puts walls around a body of information and gives the modular system free access to everything inside the room.

The massive modularity hypothesis is that the (human) mind consists of a very large array of informationally-encapsulated problem solvers. The standard objection to this hypothesis is that a mind constructed along these lines might only be capable of solving a matching array of domain-specific problems. A massively modular mind is ill-prepared for novel problems or abstract and general problems. Arguably, what is unusual, perhaps unique about human cognition is that it is not tightly constrained by a repertoire of prepared cognitive routines. An old idea (and a good one) is that the kind of rationality

that we exemplify consists in a kind of intellectual freedom and flexibility that is not possible for animals whose minds are composed of arrays of more-or-less-fixed responses.

Fodor argues that a truly general intelligence has open access to all the information that is present to the mind. Insofar as the human mind is an approximation to a general intelligence, it cannot be modular through and through.

How does Clarke respond to Fodor? He argues that Cosmides and Tooby are not in fact committed to the extreme hypothesis that the human mind is nothing but a very big collection of domain-specific modules. Their official position is that the mind is 'largely' but not exclusively composed of modules. They countenance the possibility that we also possess a Fodorian general intelligence (but not a very big one). Modular intelligence kicks in when we are faced with problems that also bugged our ancestors in the Pleistocene. But if we don't have a specific module for some current problem, Fodorian general intelligence comes to our rescue.

It is not clear whether this counts as a defense of Cosmides and Tooby or as agreement with Fodor. That really depends, I think, on how big a role is played by general intelligence in our cognitive lives. The popular (but rather silly) idea that we have Stone Age minds is the idea that most of our thinking and feeling, and perhaps most of our behaviour, fall into patterns laid down for us in the fabled environment of the Pleistocene. But if you think that language and other symbolic technologies, and cultural practices and artifacts, are fundamentally important in the mental ontogeny of modern human individuals, then you might conclude that not very much of our mental lives actually consists in the running of Darwinian algorithms. Far from being slaves to Stone Age impulses, we are the subjects only of occasional nudges and winks from the Pleistocene.

Clarke describes two goals for his book (p. 1): to clarify and evaluate the empirical and conceptual credentials of evolutionary psychology (he means EP specifically), and to assess the implications of evolutionary psychology (i.e. EP) for some issues in epistemology, philosophy of science, and philosophy of mind. I will not comment on Clarke's pursuit of the second goal. If the foundations are defective, then that's it.

You don't have to read far into the book before you start hitting problems. Clarke seems to think that evolutionary thinking in psychology and EP are the same thing. But as anyone who reads the relevant literature knows, this is false. The premiss that the human mind is a product of evolution, even that it is predominantly a product of evolution by natural selection, does not commit you to the tenets of Evolutionary Psychology (roughly, adaptationism plus nativism plus massive modularity). Especially if you concede that general intelligence is biologically possible, then an obvious alternative exists: we are rational belief-desire agents who came to be through evolutionary processes. Because we are (to an approximation) rational, our thought and behaviour tend to be moderately successful. For instance, one of the lessons we learn as young individuals competing in the sand-pit is that cooperative enterprises are liable to be subverted by cheaters, so when as adults we are engaged in acts of social cooperation, we keep an eye out for signs of cheating. Similarly for many other bits of adaptive domain-specific knowledge (whether

declarative or procedural, it makes no difference): rational agents know stuff, and they solve problems by accessing (somehow) relevant stuff. You don't need modularity in order to have adaptively relevant domain-specific knowledge; you don't need innate knowledge if the social and cultural environment supports the relevant individual learning. To the extent that the Pleistocene-adapted mind produces rational responses, it is mimicked by rational agents. That is why the proponent of EP needs to focus on evidence of innateness (not so easy to come by) and on patterns of irrationality which can be interpreted as adaptations which are maladaptive in modern environments.

Fodor argues that there is a serious problem for any modular mind, namely, the input problem. How are specific cognitive problems assigned to their proper module? How does the mind know where to send incoming information? Suppose you are able to run all inputs through general intelligence first; then you can have general intelligence make judgements about the domain to which each particular problem belongs and so send it to the appropriate module. The form of this solution is that the input to the module is controlled by a system that is *more* intelligent (less domain-specific) than is the module itself. But this solution is not available if you are committed to decomposing general intelligence into a mass of more limited, specialist intelligences. How does Clarke respond to the input problem? He says (p. 25): "If there is a cheater detection module, then thought, conscious or not, is not required, because the module is triggered automatically by the contextual clues in the environment." This is hopeless. The input problem is generated precisely because there are no reliable perceptual cues marking out each of the various specific domains to which specific modules correspond. If 'social exchange' were just a complex sensory property, then life would be much easier all round. But the environment of human cognitive evolution, as Kim Sterelny has eloquently argued, is epistemically translucent. It is not in general to the advantage of other organisms to provide me with honest and reliable signals. Simple feature detection is not enough if you are going to survive in the rough and tumble of a hominid-style social environment. So the 'contextual clues' that Clarke relies on for his solution to the input problem are often not simple sensory qualities. The clues might be there, of course, but it often takes intelligence to interpret them. That's the problem.

Sadly, the shortcomings I have described seem all too characteristic of this part of Clarke's project. He is not well-acquainted with the critical literature on evolutionary psychology or with the alternatives, within the broad evolutionary fold, to the specific doctrines of High Church EP. It comes as no surprise that Clarke makes simple but irritating mistakes. For instance (p.9), he says that the basic methodology of EP is 'reverse engineering'. But what he goes on to describe is not reverse engineering: it is instead adaptationist reasoning. As the name itself implies, reverse engineering takes solutions apart in order to identify the problem they were designed to solve. Adaptationist reasoning goes in the other direction, from problem to solution: given an ancestral problem, what solution might have been devised by natural selection? Of course, adaptationist reasoning is itself subject to very significant methodological caveats, but Clarke shows little sign of appreciating this fact.

There is a lot more in the book, often depending on the idea that the modular structure of the mind creates object 'domains' which can be used to solve some old problems in epistemology. Perhaps the following conditional is true of this part of the

book: if the EP-derived foundations are sound, then the conclusions are important and interesting. But I am persuaded that the antecedent of this conditional is false.