Macquarie Monographs in Cognitive Science

From Mating to Mentality

Evaluating Evolutionary Psychology

edited by
Kim Sterelny
and Julie Fitness

Psychology Press

FROM MATING TO MENTALITY

Macquarie Monographs in Cognitive Science

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Kim Sterelny grew up in and near Sydney, doing both his degrees at Sydney University. He taught philosophy at various places and times on Australia's east coast before moving to New Zealand in 1988. Since 1999 he splits his time between New Zealand and the Australian National University in Canberra. His interests have always been on the border between philosophy and the natural sciences; most recently, evolutionary biology and psychology.

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Preface

Evolutionary psychology is an innovative approach to the study of the human mind and human social behavior that is currently the focus of passionate interest and debate within both academia and the wider lay community. To its enthusiasts, the rise of evolutionary psychology heralds an exciting new era of enquiry that promises to illuminate the origins and functions of the human mind. To its detractors, evolutionary psychology is a reductionist, determinist creed that at best, represents a simple-minded predilection for post hoc, "just-so" storytelling, and at worst, promulgates an insidious form of what was once referred to as "Social Darwinism." To the interested but healthily skeptical observer, evolutionary psychology raises as many questions as it attempts to answer, and some of its answers have been justly criticized for being glib and impossible to substantiate. (Not to mention "insensitive," although that is, of course, a political, rather than scientific criticism.) On the other hand, evolutionary psychologists are not guilty of every aspersion cast in their direction, and misconceptions and misunderstandings are rife in this field.

In an attempt to clarify some of these issues and to explore a variety of approaches to evolutionary psychology, the Macquarie Centre for Cognitive Science (MACCS) sponsored an interdisciplinary workshop in July 2001 in conjunction with the Philosophy Program, Research School of the Social Sciences, Australian National University (ANU), Canberra. Organized by Professor Kim Sterelny (Philosophy, ANU) and Dr. Julie Fitness (Psychology, Macquarie University), the aim of the workshop was to bring together a group of internationally acclaimed scholars with interests and expertise in various aspects of evolutionary psychology for discussion and debate.

The workshop participants hailed from a diversity of academic backgrounds, including social, clinical, developmental, and comparative psychology, philosophy, anthropology, and biology; and their papers covered some of the most currently contentious and intriguing aspects of evolutionary psychology, including such topics as the evolution of language, theory of mind, the mentality

of apes, and human mate selection strategies. Throughout the proceedings, presenters paid particular attention to the implications of their research and theorizing for the broader field of cognitive science and for the ways in which an evolutionary psychological approach might enrich our understanding of the origins, workings, and functions of the human mind.

The current volume comprises the output from the workshop, along with an additional couple of chapters from scholars who were unable to attend but who were invited to contribute. As would be expected from such a multidisciplinary gathering, a variety of different, and frequently critical, perspectives are represented here. Evident throughout every chapter, however, is the contributors' manifest enthusiasm for grappling with challenging theoretical and methodological issues and their profound fascination with the "why" of human behavior.

We would like to sincerely thank a number of people for their contributions to the resounding success of the workshop and the production of this volume. In particular, we wish to thank the staff of the MACCs Centre, with a special mention to Professor Max Coltheart for his unstinting support, and to Suzanne Mendes for her superhuman (and successful) efforts to keep track of, and look after, such a large number of international visitors. We would also like to thank the philosophers (in particular, Michael Smith and Martin Davies) and the administrative staff (especially Di Crosse) of the Research School of the Social Sciences at ANU, Canberra, for their enthusiastic support, including the provision of such a beautiful location for the workshop. Finally, we express our deepest appreciation to all the workshop participants for their generosity in coming so far to share their ideas, and for their stimulating, thought-provoking contributions. We are confident that the chapters in this volume will continue to fuel lively debate among academics and lay people alike who have an interest in the evolving discipline of evolutionary psychology.

Julie Fitness

Kim Sterelny

1
Introduction
The Evolution of Evolutionary Psychology

KIM STERELNY
JULIE FITNESS

THE ADAPTED MIND PROGRAM

*T*he publication of *The Adapted Mind* saw the canonical formulation of an important version of evolutionary psychology (Barkow, Cosmides, & Tooby, 1992). This collection both articulated and instantiated a very bold program for integrating evolutionary theory with cognitive psychology; an integration free of the defects of previous attempts to create an evolutionary theory of human nature. In comparison with its predecessors—especially Wilsonian sociobiology and its relatives—the Adapted Mind program had many attractions. In particular, see the following points.

The aim of this program was to identify and explain the computational mechanisms of the mind. Its focus was on the cognitive devices that generate behavior, not patterns in human behavior themselves; thus, this program shared the same explanatory focus and explanatory tools as contemporary cognitive psychology. Moreover, the adopted paradigm of the Adapted Mind adherents was chomskian linguistics. Over the last 40 years or more, Chomsky and his coworkers have developed a theory of language that is: (a) nativist, emphasizing our innate endowment for language acquisition; (b) cognitivist, in that the task is to specify the information possessed by speakers about their native language rather than to predict actual linguistic behavior; and (c) domain-specific, in that the cognitive mechanisms that explain our core linguistic abilities are used only for language.

This paradigm has been enormously influential in cognitive psychology: modular, nativist theories of (for example) the child's theory of mind (Baron-Cohen, 1995; Leslie, 1994; Leslie & German, 1995) or of folk biology (Atran, 1998) are applications of Chomsky's picture in new domains. And despite Chomsky's own lack of interest in evolutionary questions, this picture dominates the Adapted Mind program too. Adapted Mind evolutionary psychologists ask

different questions about our cognitive equipment, and use different heuristics to identify telling experiments. They aim to explain why we have the proximate mechanisms we do, and they exploit the evolutionary scenarios they construct to guide their experimental program. But they share with orthodox cognitive psychologists the conviction that the apparatus of the mind consists of domain-specific computational tools. This agreement about the fundamental mechanisms of the mind makes an evolutionary cognitive psychology possible.

Its defenders argue that the focus of the Adapted Mind program on cognitive mechanism brings with it a second advantage: testability. Specifically, Adapted Mind hypotheses (the idea goes) can be tested by the techniques of experimental psychology. For example, Cosmides and Tooby confirmed their hypothesis that we have domain-specific specializations for social exchange (they argued) by showing that we have *differential* inferential abilities. We reason better about social exchange contexts than others, for we have special adaptations for such domains (Cosmides, 1989; Cosmides & Tooby, 1989, 1992).

In contrast, Wilsonian conjectures are outrageously information-hungry. Consider, for example, one of the most provocative conjectures to emerge from the Wilson program: Thornhill's conjecture that rape is a facultative adaptation to sexual exclusion (Thornhill & Thornhill, 1987). To confirm this hypothesis, we would need to measure the fitness effect of rape on rapists, and because the offspring of an act of rape may be themselves doomed to low fitness, that entails measuring that fitness in the second generation. We would have to count rapists' grandchildren, and then compare that count with a population of nonrapists matched for their other relevant characteristics. And it gets worse, because we would have to project these fitness effects back in time. This is because the claim that rape is an adaptation is a claim about the evolutionary history of that behavior; its effect in ancestral populations on the fitness of males with the facultative propensity vis-à-vis those that lacked it. Moreover, we would need to show that the propensity is heritable. Therefore, even if the conjecture were right, assembling the evidence needed to confirm it would be virtually impossible. In short, Wilsonian conjectures are intrinsically difficult, perhaps impossible, to confirm. If it is really true that Adapted Mind conjectures can be tested by the methods of experimental psychology, then this is an enormous advance over its predecessor.

The Adapted Mind program is nativist, but it avoids all hint of genetic determinism by emphasizing the role of conditional strategies and by underlining the role of the environment in setting the parameters for innately struc tured modules. In its emphasis on the universality of human cognitive design, intentionally or not, the Adapted Mind program has avoided some of the political mud that stuck to Wilson and to those interested in the phenotypic effects of genetic variation in human populations. Whatever its other failings, no one can claim the Adapted Mind program is racist.

EVIDENTIAL ISSUES

It is thus by no means surprising that over the last decade the Adapted Mind conception of the mind as an ensemble of adapted, innately specified, domain-specific, computational subsystems has set the agenda for integrating psychology and evolutionary theory. This picture is compelling and bold. But, most important of all, is it really empirically tractable? Because historical processes destroy evidence about their own dynamic, testability is a perennial problem for any theory seeking to reconstruct evolutionary history. For example, the morphological trajectory that links the last common ancestor of humans and chimps is only partially preserved.

Moreover, information about the selective environments that drove those changes is both patchy and difficult to interpret. We do have increasingly well-documented evidence about the *physical habitat* of hominid evolution: landscape, climate, vegetation, and ecology. But to a very considerable extent hominids construct their own selective environment (Odling-Smee, 1994; Odling-Smee et al, 2003; Sterelny, 2003). The size of hominid groups; whether they were sedentary or nomadic; their mating and child care practices; the extent of lethal intergroup conflict; the extent to which group life was cooperative (e.g., in supporting sick or injured members) are all factors that profoundly influence fitness and hence hominid evolutionary trajectories. Yet sociocultural organization is hard to read off pollen counts and handaxe abrasion patterns.

The tendency of hominids to modify their selective environments in ways that are invisible in the palaeoecological record is a problem equally for the explanation of morphological and cognitive evolutionary trajectories. We cannot fully explain those trajectories if critical features of the selective environment have left no trace. However, the problem of identifying the trajectory to be explained is far more challenging for cognitive evolution. We now have a fairly good picture of the broad outline of morphological change in the hominid lineage over the last 3 million years (Klein, 1999). That is not true of the evolution of cognition. We cannot put firm dates to the first appearance of language; to the evolution of teaching and imitation learning; or to the formation of enduring pair bonds and paternal investment. Thus, the trajectory through which human cognitive capacities were assembled must be reconstructed from the physical traces of the behaviors generated by ancient minds. However, we are three ways removed from those minds. We see, not the behaviors themselves, but only the physical products of those behaviors. Worse: We see only a sample of those physical products. Moreover, the sample that survives is further modified; we get nothing in mint condition.

Our task, then, is to infer the nature of ancient minds from a small sample of their decayed products. This might seem a difficult ask, especially when we recall how controversial the hypotheses of cognitive psychology often are, despite unobstructed experimental access to subjects' actions, and the opportunity to experimentally intervene, prompting action of special interest in

controlled circumstances. Cognitive psychologists are not doomed to passively observe the actions that happen to emerge from the cognitive stew of the agent. Even so, they argue.

These considerations are not meant to suggest that palaeontology is valueless; far from it. Indeed, two chapters in this volume (Corballis & Brockway) make pretty serious attempts to grapple with the trajectory problem for key human cognitive capacities (language and theory of mind). These considerations give us cause to squeeze as much information as possible out of living humans and their relatives. This brings us to perhaps the prime experimental showcase of the Adapted Mind program; the Wason selection task. In its original form, the Wason selection test presents subjects with a rule and a set of potential tests of that rule. One version might go like this. The subject is presented with the rule "If there is a square on the left side of the card, there is an even number on the right side" and four cards, each of which is half masked and half visible. The subject can see the left side of two of the cards. Of these, one shows a square, the other a circle; the right-hand side is masked. The other two cards have their left side masked, and on the right are the numbers 8 and 11. Subjects are asked what cards they must see in order to test the rule. Subjects do very badly. Yet Cosmides and Tooby were able to show that if subjects are given a logically equivalent test about social monitoring and norm enforcement, they do much better. If subjects are asked which of these individuals they should check:

> Sue is 16 and is drinking what?
>
> Kate is 20 and is drinking what?
>
> Samantha is drinking a Coke and is how old?
>
> Louise is drinking a margarita and is how old?

and if the rule to be tested is: "If you are drinking alcohol, you must be over 18," they do fine.

They used this experimental finding as a key part of their argument for a social exchange module. This seems like a very impressive case for the Adapted Mind program. First, this is a surprising datum: in contrast (perhaps) to some of the results about human mating preferences, no one can accuse Cosmides and Tooby here of just dressing folk prejudice in Darwinian clothes. Second, it seems very elegantly explained by the idea that the mind is a set of domain-specific modules, because that hypothesis predicts that our cognitive performance will be highly variable across logically equivalent problems. Thus, it seems quite reasonable to argue that these results provide some support, not just for the claim that our reasoning capacities are content sensitive, but also for the evolutionary scenario that promoted the Cosmides-Tooby experiment. Specifically, they argued as follows: We evolved in social environments in which cooperation and exchange were essential to survival, but where free riding was a threat. We would have been under selection to cooperate; to trade, but

warily. The unconditionally trusting would not have done well, but nor would those who did not trade at all. We should be adapted to reason well about social exchange; in particular, we should be alert to free riders and their ilk.

This scenario is the *best explanation* of the Wason selection phenomenon, and hence is confirmed by that phenomenon. That confirmation, of course, would be strengthened by parallel cases. In particular, we should look to other inferential tasks to see whether we observe the same patchy performance, but with improved performances showing up on problems about the same topics. For example, we are notoriously fallible probabilistic reasoners, being subject to a variety of gambler's fallacies and the like. The Adapted Mind case for a domain-specific adaptation is strengthened to the extent that other tendencies to poor reasoning disappear when reasoning about policing social exchange.

In the language of philosophy of science, then, the Adapted Mind inference from domain-specific reasoning skills to the confirmation of an adaptationist hypothesis about those skills is an "inference to the best explanation." Such inferences are tested by attempting to develop alternative explanations, and the chapters in this volume by Sperber and Gray exemplify this strategy. These authors argue that, as it stands, this experimental program does not reveal the existence of domain-specific reasoning skills, because there are alternative explanations of elevated performance on the Wason test. In particular, they argue that a number of relevance heuristics make the possibility of cheating especially salient in the "rule violation" versions of these tests but not in the neutral controls. The ability to use these heuristics is itself quite likely to be an adaptation, but it is a much broader spectrum one than one specifically designed to monitor social exchange. Accordingly there is no adaptationist inference to the best explanation of these reasoning skills.

THE SHADOW OF THE PLEISTOCENE

The chapters in this volume also signal a rapprochement between evolutionary psychology and human behavioural ecology. Around the time the Adapted Mind program was developing, there was a vigorous exchange of views about adaptive behavior (especially in a special issue of volume 11 of *Ethology and Sociobiology*). The Adapted Mind program has no special interest in the extent to which contemporary humans act adaptively. Human cognitive machinery (their idea goes) evolved in the ecological and social world of Pleistocene hunting and gathering. None of us now live in the Pleistocene, and very few of us live in huntergatherer social worlds of any kind. Thus, measuring (say) the birth spacing of Polynesian women in the Cook Islands would test no evolutionary hypothesis. Suppose, for example, we were to discover that their birth spacing is adaptive, tending to optimize the expected number of their grandchildren by approximating the right trade-off between the number of children and the investment per child. So what? We have no idea, from that, what spacing pattern the proximate mechanisms that determine birth spacing decisions would deliver

in the very different environment of the Pleistocene. Still less do we know whether that pattern would be adaptive in that environment. Adaptations to past environments might well drive actions that are now maladaptive as a result of environmental change. Fondness for sugar and fat are favorite examples, but Siegert 's chapter is a much more ambitious example of this genre. Indeed, it is largely concerned with this possibility: He explores the hypothesis that psychological disorders (in particular, depression) are the result of cognitive mechanisms misfiring maladaptively because of a mismatch between current and ancestral environments. Moreover, currently adaptive behaviors can have similar explanations: Adaptations to past environments might generate fortuitously adaptive behavior in response to evolutionarily novel phenomena. According to this perspective, only the past explains the present.

In contrast, anthropologists with evolutionary interests (dating from Alexander and Chagnon) have always been interested in the extent to which the behaviors of contemporary humans are adaptive (Betzig, 1999). Those anthropologists have not developed very explicit models of human cognitive capacities. But their working assumption has been that human capacities to respond adaptively across a wide range of social and physical environments are not sharply constrained by innate constraints on our reasoning and motivation systems. Thus, they expect to find humans responding adaptively to many of the challenges they face. Moreover, they expect those findings to be evolutionarily significant, although, not, of course, in the sense that current patterns of action explain existing cognitive mechanisms. Rather, they expect contemporary behaviors— and especially the spread of adaptive responses in a range of different social environments—give us a good guide to the fitness challenges faced by our ancestors and how those challenges were met. According to this perspective, then, the present is a guide to the past (Downes, 2001; Irons, 1999; Smith & Borgerhoff Mulder, 2001).

This volume sees that gap between these two views narrowly dramatically. In particular, the chapters by Simpson and Oriña, Fletcher and Stenswick, and Kenrick et al. (all on aspects of mate choice) signal a move to synthesize these once competing alternatives. They contrast with earlier versions of evolutionary anthropology in developing explicit hypotheses about the cognitive mechanisms involved in mate choice and relationship maintenance. But they also accord with evolutionary anthropology in emphasising the multiplicity of human mating strategies—in particular, the extent of intrasexual variability—and the extent to which different individuals acting within the constraints of their actual situations succeed in acting adaptively.

For example, Simpson and Oriña see women's sexual strategy as dominated by the trade-off between seeking good genetic resources and economic investment from their mates. Male strategies make it difficult in general for women to optimize both types of resource at once; therefore, often one trades off against the other, with the appropriate trade-off being very sensitive both to environmental factors and to women's specific circumstances. Moreover, their

data suggest that women make these trade-offs astutely and adaptively. To the degree that they make predictions about the extent to which agents act adaptively (and the chapters vary somewhat in this), these theorists increase the empirical content of their hypotheses.

Our guess is that it is no accident that mate choice is the leading edge of this synthesis; it is most unlikely that mate choice in the Pleistocene was simple. Thus, we are not surprised by Gray's data suggesting that male attractiveness judgments, including the response to waist-to-hip ratios, are developmentally plastic rather than being wired in. In contemporary hunter-gatherer societies, such choices are constrained and complicated by idiosyncratic features of the group's culture (e.g., their outbreeding rules); the extent to which individuals can choose autonomously rather than being constrained by family and group norms; and the agents' assessments of their own position and that of others on the relationship market (Lee & Daly, 1999). There is no reason to believe that Pleistocene environments were any less variable, and hence no reason to believe that there are sharp innate constraints on the mate choice situations to which humans can respond adaptively.

THE COMPARATIVE CONTEXT

No one expects to understand the evolution of the human mind through observations of contemporary humans alone. Comparative biology is now central to testing adaptationist hypotheses, for (as in the menstruation hypothesis Gray discusses) such hypotheses often make very clean predictions about the origin and distribution of traits on a phylogenetic tree. Human cognitive evolution must be placed in a comparative and historical context. One role of that context is to establish cognitive baselines; that is, to determine the cognitive capacities that evolved in the hominid lineage. Comparative biology is the standard tool for establishing such baselines. If a particular capacity—for example, mirror self-recognition—is found in both sapiens and the great apes, then the most parsimonious hypothesis is that this capacity existed in the last common ancestor of sapiens and the great apes, and that these species inherited this capacity from that ancestor rather than evolving it for themselves.

Suddendorf and Whiten, Corballis, and Brockway, in different ways attempt to paint in a comparative and historical background. Corballis takes on the notoriously difficult problem of language, whereas Brockway and Suddendorf and Whiten address an equally crucial human skill: our ability to interpret others. In the trade, this capacity is variously known as "theory of mind" or "mind reading" (as opposed to mere behavior reading), though both these terms are somewhat tendentious. The "theory of mind" is so because the term begs the question in favor of the contentious claim that our capacity to predict and explain the actions of others depends on a genuinely theorylike representation of human cognitive architecture; "mind-reading" because it suggests a sharp dichotomy

between the capacity to represent behavior and the capacity to represent others' mental states.

It is precisely this dichotomy that Suddendorf and Whiten reject. They argue that the mind reader/behavior reader distinction is *too coarse.* Although there is little or no evidence that great apes have beliefs about beliefs, they argue that there is evidence (of a preliminary kind) that great apes have a range of capacities to represent their environment in relatively abstract ways; a range the Suddendorf and Whiten group together as "secondary representation". Secondary representation includes factive but referentially displaced representation: representations of how the agent takes the world to be at other times and places. It includes indicative mood but nonfactive representation: representations of how the world might be, or of how the world will be, if certain conditions are or were met. It includes abstract representations of how the current environment actually is. It includes an agent's ability to represent the goals of his or her actions. Something like a "theory of mind" has evolved in the hominid lineage: We do have beliefs about beliefs. But if Suddendorf and Whiten are right, this hominid invention takes off from the rich representational capacities of the last common ancestor.

In virtue of making claims about a process that in part destroys its own causal history, evolutionary psychologies face a testability challenge, and so far in this Introduction we have emphasized that fact. But they face (at least) two other challenges as well. One is the origin problem: When a cognitive ability has a social function, we need to explain how it can be adaptive when it is rare. This is a notorious challenge facing evolutionary theories of cooperation: how could the disposition to cooperate (however judiciously) be selectively advantageous in an uncooperative world? Theories of the evolution of language— especially those that emphasize innate constraints on language—face a similar challenge. How could a mutation that (say) enabled a speaker to use modal terms be advantageous in a world in which no one else used or understood that vocabulary? The second is the trajectory problem: How can a complex capacity like language be built incrementally? To paraphrase the late Stephen Jay Gould, of what use is 5% of a relative clause?

Corballis does not address the trajectory problem. But his chapter is an indirect attack on the origin problem: He argues that the core innovation that makes language possible is recursion, because recursion makes syntax possible. And recursion, he argues, is a more general capacity than language. It lies behind our interpretative capacities; our capacity to project ourselves in thought forward and backward in time, and, perhaps, some of our capacities to manipulate our physical environment. This adaptation, then, makes language possible. But it makes other capacities possible too. So when it is still rare, it does not have to be selected for its language-making potential. It could be established in the population through boosting planning, interpretative and manipulative skills, and then be exapted for language.