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ALTERNATIVE APPROACHES TO EVOLUTIONARY PSYCHOLOGY

Introduction

The idea for this book had its genesis as the approach we call "narrow evolutionary psychology" first began to appear. "Narrow evolutionary psychology" refers to the specific program of research described and defended by scholars such as Buss (1995, 1999), Dennett (1995), Pinker, (1997), Symons (1979, 1987), and Tooby and Cosmides (1992; Cosmides & Tooby, 1997). This approach, however, is only one particular method among many that could be used to apply evolutionary concepts to psychology. We use the term 'narrow evolutionary psychology' to contrast it with the general question of how one would address psychological evolution, without specifying any particular approach ("broad evolutionary psychology" or simply "evolutionary psychology"). "Narrow evolutionary psychology" is a description meant to be evaluatively neutral, in essence meaning only the term "evolutionary psychology", narrowly construed to refer to one particular approach. By using this term, we mean to indicate only that this perspective operates with a narrower range of assumptions than the whole field of evolutionary psychology, broadly construed. The term "narrow evolutionary psychology" was independently arrived at by the editors and by one of the chapter authors (Wilson). For all other chapters, its insertion was instigated by the editors.¹

In the late 1980's and early 1990's, a number of papers using this approach appeared in the empirical psychology literature. For example, Cosmides' (1989) exhaustive examination of the Wason Selection Task argued for a Darwinian approach to reasoning; Buss' (1989; Buss et al., 1990) large cross-cultural study of preferences in mates argued for a set of universal gender differences; and Kenrick & Keefe's (1992) exploration of age and gender differences in mate preferences added life-history ideas to the tools appearing in the psychological literature.

¹ Previously, narrow evolutionary psychology has been called "inclusive fitness psychology" (Caporael, 2001), "cognitive adaptationism" (Scher, 2001), and, (tongue firmly in cheek), the "Standard Selectionist pSychology Model (SSSM; Scher, 1999b). Heyes (2000, p. 3) refers to what we are calling "broad evolutionary psychology" as "evolutionary psychology in the round".

At that time, one of us (Scher) joined the many other psychologists who reacted to this growing literature with doubts about its plausibility. Never doubting that humans were evolved creatures, these critics nevertheless questioned whether Darwinian concepts could be usefully applied to human psychology. Spurred by this skepticism, Scher began to read the more conceptual literature coming from the narrow evolutionary psychology camp (e.g., Buss, 1995; Crawford & Anderson, 1989; Kenrick, 1989; Tooby & Cosmides, 1990, 1992).

These conceptual articles were persuasive. They made a strong case that Darwinism did have something useful to say about human psychology. Furthermore, it was clear that many of the criticisms that were being leveled at (narrow) evolutionary psychology were inappropriate, based on stereotyped or outdated ideas about sociobiology. At the same time, a great many questions and criticisms still seemed to apply.

Meanwhile, Rauscher, a philosopher, had developed an interest in evolution as a result of his interest in the possibility of naturalism in ethics. While working on the nature of ethics in such Eighteenth-Century philosophers as David Hume and Immanuel Kant — one an early naturalist, the other a famous critic of naturalism — Rauscher noticed a similarity between debates about naturalism in ethics then and now. The philosophical debate on naturalism was highly critical of sociobiology (Kitcher, 1985) while at the same time holding out promise for some use of evolutionary theory to understand human behavior (Kitcher, 1993, 1994). Rauscher (1997) showed how evolutionary concepts are compatible with Kant's ethical ideas. A chance meeting between Scher & Rauscher (at a performance of African drumming) further broadened both author's exposure to approaches to applying evolutionary science to human affairs.

Meeting weekly (along with another philosopher, Grant Sterling) to read about and discuss issues in evolution and human behavior, we quickly became aware that despite the impression given off by authors such as Tooby & Cosmides, Buss, Pinker (1997), and Dennett (1995), there were a wide variety of ways in which one could think about the evolution of human (and non-human) psychology.

This lead directly to a symposium at the 1999 meetings of the American Psychological Association on alternative approaches to evolutionary psychology (Scher, 1999), and to the development of this book. In this book, we seek to add to the growing literature (e.g., Caporael, 2001; Heyes & Huber, 2000) which points out the variety of ways in which evolution and psychology might interact. As we described the book when we contacted potential chapter authors, our purpose is not to be critical of narrow evolutionary psychology but to offer positive alternatives to further the general field of evolutionary psychology. We are aiming to publicize a host of different methodologies for studying human psychology from an evolutionary perspective — some of which might be incompatible with each other. Our purpose is not to endorse any of them; rather, we wish to make them more widely known, in order to enhance the scholarly debate surrounding evolutionary psychology. We are happy to say that the contributions to the book not only meet this challenge, but in many cases exceed our expectations. These chapters do not

merely raise questions about some aspects of the narrow approach to evolutionary psychology, more importantly they offer distinct viable alternatives.

In our chapter, we present a historical overview of the ideas that came together to become evolutionary psychology, with a particular emphasis on the ideas that led up to narrow evolutionary psychology. We then provide a detailed discussion of the assumptions that define that approach, and we discuss how those assumptions represent the combination of particular approaches to psychology and to evolutionary biology. This allows us to consider how alternative approaches can be formed by adopting either alternative assumptions about psychology, alternative assumptions about biology, or alternative assumptions about the unique combination of these two disciplines.

Tim Ketelaar offers a defense of evolutionary psychology construed in the narrow sense against the challenges offered by opponents of the approach. He argues that most opponents of narrow evolutionary psychology are too quick to reject the entire approach when they discover one or two specific problems in its application. He links this tendency to a Popperian philosophy of science centered on falsifiability of theories. In its place he advocates an approach to alternatives more in line with a Lakatosian philosophy of science in which narrow evolutionary psychology is viewed as a layered set of hypotheses and predictions arranged around a core set of basic theoretical assumptions. When specific hypotheses or predictions are challenged, they may be modified without affecting the basic theoretical assumptions. Critics of narrow evolutionary psychology, he then concludes, must convince psychologists that the basic theoretical assumptions themselves are inherently flawed rather than merely citing disagreements with particular applications. For an alternative approach to be successful, it must show that its theoretical assumptions are superior on scientifically relevant criteria. (In light of Ketelaar's argument, we have attempted in our chapter to provide an organizational structure for alternative approaches by describing various places for alternatives within the larger theory of evolutionary psychology, broadly construed.)

In his chapter, David Sloan Wilson discusses a large number of particular methodological alternatives to narrow evolutionary psychology. He argues in favor of a broader role for group selection, culture/gene interaction, genetic variability, various other types of evolutionary processes, and behavioral plasticity in evolutionary psychology. His focus on morality and the human capacity for change and flexibility highlights how these issues are interrelated. Narrow evolutionary psychology's stress on individual selection overlooks the recent success in using group selection models to explain altruistic behavior. But groups of altruists do not necessarily share a genetic determinant of their altruistic behavior; rather, shared social norms might explain their behavioral uniformity, at least in interaction over generations with genetic evolution. Within the group, and certainly within the human species, genetic variation might also explain aspects of human psychology — a line of research, he claims, overlooked by narrow evolutionary psychology with its focus on the universality of the architecture of the human mind. Wilson also stresses that the process of evolutionary change appears to be both very rapid and very

diverse, operating beyond simply hard-wired behavioral determinations acquired during the Environment of Evolutionary Adaptedness (EEA). Plasticity of behavior allowing for flexibility in novel environments can also explain the rapid change in recent human cultural evolution and can explain different cultural and social norms operating on the basis of genetic components.

Like Wilson, Linnda Caporael urges evolutionary psychology to move beyond inclusive fitness theory with its exclusive focus on genetic inheritance. Inheritance is expanded, she notes, if we consider the way in which traits are assembled from a diverse collection of resources that include both elements internal to organisms (e.g., genes, proteins, hormones) and elements external to organisms (e.g., conspecifics, elements of the physical environment, cultural norms). This perspective points toward multi-level theories of evolution and selection. Wherever interaction between a particular entity and its environment reliably recreates some object, be it at the gene, cell, organism, group, or other level, selection and replication of particular entities can occur. Caporael refers to replicated objects as "repeated assemblies". A vocabulary of repeated assembly fits Darwin's emphasis on descent with modification better than a vocabulary of inclusive fitness, although the genes described by inclusive fitness are themselves among the entities which repeatedly assemble. Caporael stresses that the entities chosen for study as repeated assemblies are independent of any ontology, that is, she is not making metaphysical claims about the proper way to carve nature at its joints; rather, repeated assembly is a functional concept applied to any aspect of experience involving such replication and selection. The focus of evolutionary psychology ought to include the multiple levels of analysis within which objects repeatedly reassemble rather than exclusively discuss genetic selection.

Niles Eldredge objects to the adaptationist focus on reproduction in narrow evolutionary psychology. Reproductive functions, that is, those concerning behavior aimed at passing on genetic information to new generations, ought to be distinguished from what he calls "economic" functions, that is, those concerning behavior aimed at matter/energy transfers to sustain the individual organism's life. Although interdependent, these two types of functions lead to parallel, distinct hierarchical structures of organisms. In human beings (and possibly bonobos) there is further a third category of behavior because sex is disconnected from its merely reproductive function. These three components of human behavior interact in human culture (learned behavior), which Eldredge traces back to the Pleistocene era of accelerated human evolution. Thus Eldredge concludes that merely linking an observed behavior to its perceived reproductive function is not enough to determine that it is an adaptation; he cites rape in contemporary society as an example. Evolutionary psychology must instead turn from a focus on reproductive behavior to a more complex interplay among all types of behavior in human beings.

The context of adaptation is stressed by Sarah Blaffer Hrdy. She argues that rather than focussing strictly on the EEA as advocated by Buss and other proponents of narrow evolutionary psychology, evolutionary psychology ought to take into account the history of a possible adaptation. This history includes not only the

context of origin for an adaptation, but also its subsequent expression in different contexts which might reveal any inherent flexibility in the adaptative behavior. Hrdy offers the example of female mate preferences. Human females exhibit varying degrees of polyandrous behavior in different contexts. Cultural variations are only one possible explanation; the broader social environment and various levels of resources must also be taken into account during periods of possible acquisition of the adaptation. Hrdy's alternative focus on history not only expands the time period to be studied as the environment to which humans are adapted but also challenges the narrow modularity resulting from overlooking the context of an adaptation in practice.

Karola Stotz and Paul Griffiths offer a framework for any successful evolutionary psychology. Explanations in such a naturalistic psychology must (a) be causally explainable in reference to mechanistic physical entities, (b) be consistent with an historical account of the emergence of the features in response to unique circumstances (and not necessarily providing universal laws of nature), and (c) provide an understanding of the developmental processes which lead to the trait — both in terms of its ontogeny and its original appearance as an "evolutionary novelty". According to Stotz and Griffiths, narrow evolutionary psychology lacks these components because it relies on inadequate information about proposed specific historical niches and possible developmental pathways occupied by early humans. It is thus unable to identify psychological functions to the degree of certainty necessary for subsequent hypotheses about psychological mechanisms. Stotz and Griffiths recommend a study not of the past adaptive environment of human beings but of their current environment. For Stotz and Griffiths, this focus serves the goal of properly identifying the functional breakdown of the mind, independent of an analysis solely of the adaptive function. This approach fills in the information missing in narrow evolutionary psychology's approach. In order to naturalize evolutionary psychology, then, Stotz and Griffiths stress, like Caporael, the concept of extended inheritance — the concept that the development of phenotypic features involves a variety of resources both internal and external to the organism. They suggest that these resources are put together by a developmental system, which operates in part through a process of self-organization. Such an approach gives an active role to the organism in the process of selection, and shifts the focus of evolutionary psychology from the products of processes to the processes themselves.

Dominic Murphy's chapter begins with a defense of narrow evolutionary psychology's reliance on hypotheses about the distant past against charges that such hypotheses are unverifiable speculation. To do this he describes two types of adaptationism: backward-looking adaptationism and forward-looking adaptationism; the former begins with a current trait and postulates its origin in the environment of evolutionary adaptedness while the latter begins with speculation about the environment of evolutionary adaptedness and deduces hypotheses about current mental modules. Forward-looking adaptationism in particular, Murphy argues, can usefully provide testable hypotheses about current human psychology. But what this

method provides is evidence of particular psychological capacities. Not all psychological capacities, however, are discrete modules: they may overlap one another or exist in multiple modules, or they may be part of domain-general systems, for example. Like Stotz and Griffiths, Murphy further asserts that we can best understand psychological capacities and their underlying cognitive architecture if we attend to the developmental systems which create the capacities. Simply viewing them as innate structures does not provide adequate insight. Murphy thus holds out the hope that a developmental perspective advanced in light of hypotheses from forward looking adaptationism can provide a methodology for evolutionary psychology.

Steven Quartz also questions whether narrow evolutionary psychology can generate reasonable hypotheses about human cognitive architecture. He contends that a reasonable evolutionary psychology must integrate developmental cognitive neuroscience and developmental biology into an alternative he calls developmental evolutionary psychology. In particular, Quartz rejects narrow evolutionary psychology's *massive modularity hypothesis* as inconsistent with knowledge about the evolution and ontogenetic development of neural structures. He offers, instead, a view stressing the systematic effects that alterations to one step in a developmental program can have to the development of a complete neural system. As a result, possible evolutionary changes are constrained. Any possible cognitive evolution must thus be based on this deep structure of neural development; narrow evolutionary psychology's view of modules must be replaced with a behavioral systems view giving pride of place to neural development. Quartz concludes by reviewing arguments that the environment in which the hominid brain evolved was far more variable than is normally proposed by narrow-school evolutionary psychologists, and suggests that this variability is (a) more consistent with his approach, and (b) may underlie the capacity for complex cultural learning.

William Bechtel also objects to the characterization of modules in narrow evolutionary psychology, and also contends that they are inconsistent with our knowledge of the brain. By pairing psychological modules with postulated domains corresponding to certain tasks such as mate acquisition, the narrow approach makes modules too large. That is, they are rather coarse grained in comparison to the finer grained operations revealed by neuroscience. Coarse grained functions utilize many finer grained information processing operations distributed throughout the human brain. Further, coarse grained functions overlap one another by utilizing identical finer grained functions. The cognitivist model underlying narrow evolutionary psychology could therefore more usefully be replaced with a model incorporating finer resolution of specific mental processes and their interconnections. Such a model could still employ evolutionary reasoning regarding the coarse modules, but to do so it would require the input of neuroscientific and phylogenetic information. New coarse-grained modules may evolve through the incorporation of increasingly specialized fine-grained operations, or through the reorganization of pre-existing components. Study of modules in light of their neuroscientific structure, and their phylogenetic history would reveal the constraints acting upon coarse modules

conforming to the actual structure of primate brains and their possible relations through evolution. Coarse modules could then be seen as arising as adaptations through incremental changes among relations of the finer modules.

Like Quartz and Bechtel, Jennifer Mundale questions narrow evolutionary psychology's model of cognitive architecture. She stresses that evolutionary psychology ought to avoid undue reliance on functionalist accounts of psychological mechanisms. Information processing models of the mind which assume multiple realizability of cognitive structures in different possible materials prevent the proper integration of evolutionary psychology with other, lower level sciences (particularly neuroscience). Since integration with other sciences, particularly biology, is a goal of narrow evolutionary psychology, Mundale advocates rejecting this aspect of that approach in favor of an approach which stresses the concrete results of biology, neuroscience, and similar disciplines. Information processing accounts can be retained by invoking them at different levels, retaining the very general multiply realizable level while adding lower levels with more detail, such as claims about specific brain systems or neural pathways. The more specific information processing accounts could be derived from adaptive claims corresponding to very specific domains, even more specialized than those currently hypothesized in narrow evolutionary psychology, such as particular steps in a psychological task for a particular species. Neurobiology can be integrated with evolutionary psychology at this level, avoiding some of the problems associated with overreliance on functionalist information processing accounts.

Domenico Parisi advocates two closely-linked methods for evolutionary psychology. First, he argues that connectionism offers a better model for mental behavior than cognitivism. Connectionism's use of neural networks and similar devices more closely match the physical structure of the brain, and the emphasis on physical structure makes evolutionary psychology more easily integrated with the physical sciences it purports to apply to human psychology. Second, Parisi wants to expand the sources of particular hypotheses and methods used to confirm them by adding computer simulations of selective environments and adaptations. These two methods are united in "Artificial Life" computer simulations, which allow particular modeled sets of neural networks to respond to extended artificial environments over many generations, thus providing a proving ground for various hypotheses within evolutionary psychology. In his chapter, Parisi discusses a number of such simulations as examples, including models which incorporate both learning and innate knowledge. This approach allows tests of claims about the way in which cognitive abilities have evolved.

The twelve chapters in this book provide a heterogenous set of approaches to doing evolutionary psychology. Since evolutionary psychology is still a young field, highlighting these variations can only enhance it by allowing all methods to be explored and compared.

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