



Center for Philosophy of Biology

Duke University

April 11-13 2003

Second annual Conference on Recent Work in Biology and Philosophy

Sponsored by Duke's Center for Rethinking Science and Technology ([CReST](#))

"Current Perspectives on Adaptationism: 25 years after the Panglossian Spandrels"

Location: R. David Thomas Executive Conference Center, Fuqua School of Business, Duke University

Friday April 11th

Saturday April 12th

Sunday April 13th

9:00am-9:30am Coffee

9:00am-9:30am Coffee

9:30am-11:00 am

Session 2

Alan Belk (Department of Philosophy, University of Guelph) "**Inference to the Best Explanation and Evolutionary Psychology**"

Stefan Linquist (Department of Philosophy, Duke University) "**Evolutionary Psychology, not as Panglossian as they say**"

Jonathan Kaplan (Department of Philosophy, University of Tennessee, Knoxville) "**Spandrels, Pendentives, and Squinches: Architecture and Biological Adaptation**"

9:30am-11am

Denis Walsh (Department of Philosophy, University of Edinburgh) "**Situated Adaptationism**"

11:00am-11:30am break

11:00am-11:30am break

11:30am-1:00pm

André Ariew (Department of Philosophy, University of Rhode Island) "**Adaptationism and its Alternatives: Explaining origins, prevalence, and diversity of organic forms**"

11:30am-1:30pm Discussion panel

André Ariew, Robert Brandon, Brian Hall, Mohan Matthen, Gerd Müller, Frederik Nijhout, Mark Rausher, Leigh Van Valen, Denis Walsh

1:45pm Welcome

1:00pm-3:00pm Lunch

1:30pm Lunch

April 11th 2pm-3:30pm Gerd Müller (Department of Anatomy, University of Vienna, Austria) "Spandrels of Innovation "	April 12th 3pm-4:30pm Leigh Van Valen (Department of Ecology and Evolution, University of Chicago) "How can we recognize adaptation when we see it?"
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3:30pm-4:00pm break

4:30pm-5:00pm Break

4:00pm-5:30 pm Session 1 Bence Nanay (Department of Philosophy, UC Berkeley) "Cumulative Selection and Adaptation" Roger Sansom (Department of Philosophy, Texas A&M) "Constraining the adaptationism debate" Anya Plutynski (Department of Philosophy, University of Utah) "Parsimony and the Fisher-Wright Debate"	5:00pm-6:30pm Mohan Matthen (Department of Philosophy, University of British Columbia) "Adaptationism and Reverse Engineering"
6:00pm Reception at Robert Brandon's house	7:00 pm Reception

ABSTRACTS (alphabetical order)

André Ariew

Department of Philosophy, University of Rhode Island

Adaptationism and its Alternatives: Explaining origins, prevalence, and diversity of organic forms

In the "Spandrels" paper Gould and Lewontin's critique of the so-called "Adaptationist program" is that practitioners often fail to consider alternative explanations. The essential questions of this essay are what does the Adaptationist program and its alternatives purport to explain and how do each purport to explain it? I start by identifying the "barebones" of the theory of natural selection. Out of the "barebones" I construct three distinct versions of the Adaptationist program each of which handle the three explanda that I have identified. Finally, I demonstrate how each of Gould and Lewontin's proposed alternative explanations contrast with one or another version of the Adaptationist Program that I have spelled out.

Alan Belk

Department of Philosophy, University of Guelph

Inference to the Best Explanation and Evolutionary Psychology

I want to apply Inference to the Best Explanation (IBE) to explanations in Evolutionary Psychology (EP). I take as my starting point that evolutionary theory is a semantic theory, so that an EP explanation somehow identifies a relation between the theory/model and the real world. Since EP is essentially an adaptationist program it must aim to identify features of the phenotypic expression of the (human) genotype, the underlying genetic basis and heritability of the features, the environmental influences which cause the features to be expressed, and the nature of the selective advantage of the feature. Critics claim that the identification of EP features is controversial, the effect of culture and learning on behaviours is distorting, and accounts of selective advantage are speculative (at best). I think that EP explanations are inferential, so that we can use some criteria to judge how acceptable a particular explanation is: basically, is it the "best" explanation. The process of inference is a black box, but the criteria for judging inferences include amongst other things an assessment of how well an inference fits a particular theory and how well it coheres with other accepted (pertinent) beliefs. I argue that EP explanations may include, in varying degrees, elements of evolutionary theory as model, experimental support, and similarity to behaviours of nonhuman species and that these may be judged in order to provide some level of acceptability. I use the idea of altruism to illustrate my case.

Jonathan Kaplan

Philosophy Department, University of Tennessee, Knoxville

"Spandrels, Pendentives, and Squinches: Architecture and Biological Adaptation"

Perhaps the strangest debate to emerge from Gould and Lewontin's famous anti-adaptationist piece, "The Spandrels of San Marco and the Panglossian Paradigm," is centered on the architectural feature they used in their introductory example, specifically, on the reason that the particular features (more properly called 'pendentives') were used in San Marco. Interestingly, many of the difficulties that arise when trying to understand why and how particular architectural features were used in 'ancient' buildings echo the difficulties with testing adaptative (and non-adaptive) hypotheses in the biological case. In each case, apparently plausible claims about the particular etiologies of features can be undermined by sloppy reasoning and inadequate testing. However, while it may not yet be possible to get 'final' answers in every case where we would like them, conceptual and methodological advances in each field are helping make rigorously testing particular hypotheses against reasonable alternatives easier.

Stefan Linquist,

Department of Philosophy, Duke University

Evolutionary psychology, not as Panglossian as they say.

There is a rather stark discrepancy between the image evolutionary psychologists uphold for themselves, and the one being portrayed by their critics. For those on the inside, evolutionary psychology is a new and flourishing science that promises to unify the disparate branches of psychology under a single Darwinian umbrella. To many of those on the outside, however, evolutionary psychologists trade in "just-so stories" that tend either to be obvious, or obviously false. In this paper I attempt to show how these two perspectives talk past one another. Insofar as evolutionary psychology lies at the boundary between proximate and ultimate levels of explanation, its proponents must engage in two different sorts of activities. Sometimes evolutionary psychologists present models of what the ancestral environment for humans was like. On other occasions they attempt to draw predictions about likely psychological adaptations, given what those models dictate. Critics who accuse evolutionary psychologists of Panglossianism often mistake the latter activity, of testing predictions about proximate mechanisms, for the former one, of providing support for the models from which those predictions are derived. Close attention to their methodology reveals, however, that this discipline is no more Panglossian than the broader field of behavioural ecology. When their predictions are borne out, evolutionary psychologists interpret human behaviour in terms of adaptive strategies. Although these interpretations conflict with folk accounts of human motivation, they are often warranted, I argue, due a relatively high degree of predictive success.

Mohan Matthen

Department of Philosophy, University of British Columbia

Adaptationism and Reverse Engineering

Contrary to most current characterizations, adaptationism is not a thesis about the power of natural selection vis a vis other evolutionary forces, and the anti-adaptationism of "Spandrels" does not imply that organisms are imperfectly adapted. Gould and Lewontin are better construed as advancing a thesis about what adaptation is and how it comes about. So construed, their position is perfectly compatible with "reverse engineering", as a study of competing positions on the adaptive value of colour vision illustrates.

Gerd B. Müller

Department of Anatomy, University of Vienna, Austria

Spandrels of Innovation

Spandrels in architecture served to attract attention to the topic of non-adaptive structures in biological organisms. Although this increased the awareness of biologists towards the existence of such structures, their possible crucial role in providing kernels of morphological innovation in phenotypic evolution is little appreciated. One reason for this is that character innovations are ill defined in evolutionary theory. Another reason is the prevailing notion that phenotypic evolution is strictly a consequence of a continuous and gradual modification of genetic programs. A third reason is the ongoing hegemony of the adaptationist paradigm. I will review the occurrence and definitions of morphological innovation as well as the proximate and ultimate mechanisms proposed to underly their origination. It will be argued that epigenetic and non-adaptive mechanisms have played a key role in morphological character origination, whereas evolving genetic programs and the biochemical canalization of developmental pathways primarily served to stabilize the novel phenotypes, ensuring the heritability and variation that underly adaptation.

Bence Nanay

Department of Philosophy, University of California, Berkeley

Cumulative Selection and Adaptation.

The aim of this paper is to clarify the debate about the role cumulative selection plays in explaining adaptations. Strong arguments has been given in favour of the claim that no selection process whatever can help explaining adaptations. First, there are selection processes without mutation, whereby the species contain completely similar individuals: there is no variation; therefore the most successful species may spread and make all the others extinct, but by doing so its individuals will not change. (Cf. Bedau 1991: 650-654, Walsh 2000: 142-143.) We have a selection process, but it does not lead to adaptation. I will argue that this argument is based on a mistaken premise. The second argument is more challenging. It claims that selection cannot explain adaptation, since the explanandum and the explanans are phenomena at different levels: selection is a population-level phenomenon, whereas adaptation occurs on the individual level. (Sober 1984, 1995, Walsh 2000). Selection can explain the frequencies of traits in populations, but it cannot explain why individual organisms have certain traits. (Sober 1995: 384.) Karen Neander has argued against the first of these claims and concluded that cumulative selection can indeed help explaining adaptations, but non-cumulative selection cannot (Neander 1995). After analysing the pro and contra arguments of the debate between Neander and Sober (see Nanay 2002), I will argue that the explanatory scheme they use is different. To put the difference very simply, Sober takes the explanandum for granted and is looking for an explanans, whereas Neander goes the opposite way: she regards the explanans as given, and asks about the explanandum. The two questions are orthogonal. Sober's claim is a version of the classic adaptationism argument, whereas Neander's argument is logically independent from the debate about adaptationism.

Anya Plutynski

Department of Philosophy, University of Utah

Parsimony and the Fisher-Wright Debate

In the past five years, there have been a series of papers in the journal *Evolution* debating the relative significance of two theories of evolution, a neo-Fisherian and a neo-Wrightian theory, where the neo-Fisherians make explicit appeal to parsimony. My aim in this paper

is to determine how can we make sense of these appeals. On some accounts, parsimony is a "global" virtue of theories - any theory that contains fewer entities or processes is preferable. On the account that I defend here, due to Sober (1990), parsimony is a "local" virtue. Scientists' appeal to parsimony is best interpreted as proxy for some other property of a theory; for instance, likelihood, or probability. I argue that the neo-Fisherians appeal is best understood on this interpretation.

Roger Sansom

Department of Philosophy, Texas A&M

Constraining the adaptationism debate.

This contribution to the adaptationism debate elaborates the nature of constraints and their importance in evolutionary explanation and argues that the adaptationism debate should be limited to the issue of how to privilege causes in evolutionary explanation. I argue that adaptationist explanations are deeply conceptually dependent on developmental constraints, and explanations that appeal to constraints are dependant on the results of natural selection. I suggest these explanations should be integrated into the framework of historical causal explanation. Each strategy explicitly appeals to some aspect of the evolutionary process, while implicitly appealing to others. Thus, adaptationists and anti-adaptationists can offer complementary causal explanations of the same explanandum. This eliminates much of the adaptationism debate and explains why its adversaries regularly agree with each other more than they would like. The adaptationism issue that remains is a species of the general issue of how to privilege causes in explanation. I show how a proposed solution to this general problem might be brought to bear on evolutionary explanations, and investigate some difficulties that might arise due to the nature of the evolutionary process.

Leigh Van Valen

Department of Ecology and Evolution, University of Chicago

How can we recognize adaptation when we see it?

Adaptation is sometimes said to be difficult to detect, but we do it all the time. It was even obvious to Aristotle, and it constituted a good argument for the existence of God, or the like, until Darwin and Wallace.

Different aspects of living organisms require partly different criteria for recognizing adaptation. After a real example illustrating some of the pitfalls that aren't always avoided, I discuss criteria which can give positive evidence in a variety of situations.

Natural selection always results in a net increase of adaptation, but we have to be careful about the proper units, levels, and time scales. A positive recognition of nonadaptive evolution is more difficult in most cases. I nevertheless suggest that in most classes of cases a feature should be assumed to be adaptive unless there is some reason to doubt it; a continuum of belief rather than the threshold of Neyman-Pearson decision theory is, as usual, appropriate.

Denis Walsh

Department of Philosophy, University of Edinburgh

"Situated Adaptationism" TBA