

# Cerebrum

The Dana Forum on Brain Science

---

Volume 6 ■ Number 3 ■ Summer 2004

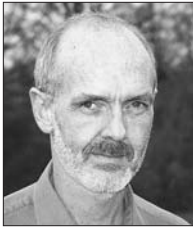
## REVIEW

### Asking “How?” Versus Asking “Why?”

*Why Men Won't Ask for Directions: The Seductions of Sociobiology*

by Richard C. Francis

Reviewed by David F. Sherry



#### *About the Reviewer:*

David F. Sherry, Ph.D., is professor of psychology at the University of Western Ontario, Canada, where he is on the faculty of the Graduate Program in Neuroscience. He is editor of *Animal Behaviour* and investigates the evolution and ecology of memory, cognition, and the brains of birds and mammals.

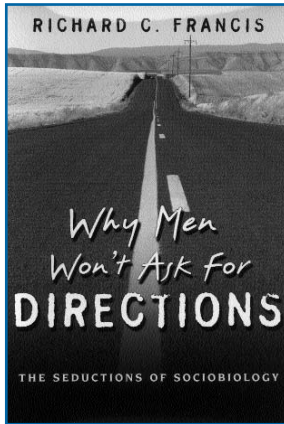


©2004 Dana Press  
The Dana Foundation  
[www.dana.org](http://www.dana.org)

---

REVIEW

Asking “How?” Versus Asking “Why?”



*Why Men Won't Ask for Directions:  
The Seductions of Sociobiology*

by Richard C. Francis

Princeton University Press, 2004

325 pages, \$29.95

**Reviewed by David F. Sherry, Ph.D.**

When looking at the extraordinary diversity of animal life, most of us, whether scientists or not, search for explanations. How do animals function, and why do they have the structure and behavior that they do? Questions about “why” are usually answered in terms of Darwin’s theory of natural selection. Inherited variation in structure and behavior, coupled with selection by the environment, can produce adaptations that serve specific functions promoting reproduction and survival. But this view that the living world is made up of biological adaptations has its critics.

Not even the late biologist Stephen Jay Gould, Ph.D.—the arch critic of

adaptationist thinking in biology—accused his opponents of being mentally ill, but that is how Richard Francis begins his attack on adaptive explanations of animal and human behavior in *Why Men Won't Ask for Directions*. Paranoia is the charge, and the argument goes like this: Scientists interested in adaptive explanations for life’s diversity subscribe to teleology, according to Francis, who is a freelance science writer with a Ph.D. in neurobiology. Teleology, meaning “discourse on ends,” is the idea that the goal or purpose of something is also its cause. Aristotle had a teleological view of the world, as does anyone who supposes that there is purpose or design, natural or otherwise, in our world. Paranoia is the belief that behind every occurrence lies a purpose, an intention, or a design. Therefore, adaptationist thinking is paranoid. “Darwinian paranoia” is Francis’s opening salvo at adaptationism and the title of the first chapter of *Why Men Won't Ask for Directions*.

Francis’s diagnosis notwithstanding, the appearance of purpose or design in nature presents no dilemma for most natural scientists. Behavior such as birdsong has a function and appears to be designed for that function as a result of the action of natural selection. The same is true of a structure like the *pappus* or parachute of a dandelion seed that looks like the product of sophisticated engineering. But the appearance of design is deceptive; in reality, there is no design, no purpose, and no intention. Random variation in the heritable genetic components of behavior or structure, coupled with greater reproductive success

enjoyed by individuals inheriting advantageous variants, results in change—on an evolutionary time scale—in structure and behavior.

This, of course, was Charles Darwin's insight into the way natural processes can produce adaptations in behavior and structure that perform a function, such as attracting a mate (in the case of birdsong)

---

*The problem with adaptation, as Gould saw it, was that not all behavior or structure in the natural world is an adaptation. Traits can become widespread in a population even though they make no contribution to reproductive success.*

---

or catching an updraft and dispersing a seed (in the case of a dandelion pappus). A song that more effectively attracts a mate, or a pappus that more effectively catches an updraft, can increase reproductive success and will, over time, replace behavior and structure that perform the same function less successfully. Not all evolutionary change is due to natural selection, but traits that do serve specific functions originate in this way and for this reason give the appearance of design. Birdsongs and dandelion seed parachutes, glial cells and cactus spines, the brain stem auditory nuclei and the nest-building behavior of wasps are all adaptations, and even the most casual student of natural

history or the life sciences can probably name hundreds more.

The problem with adaptation, as Gould saw it, was that not all behavior or structure in the natural world is an adaptation. Traits can become widespread in a population even though they make no contribution to reproductive success. Nonadaptive traits can become widespread because a gene can affect multiple traits. When that happens, natural selection favoring one of those traits can cause that gene to increase in frequency, and the other traits are carried along for the ride. In other cases, a trait can occur in most members of a population not because it is adaptive but because the first individuals to colonize an area happened to possess that trait (the founder effect) or because alternative traits can be lost purely by chance in a small population (genetic drift). Some traits can be the baggage of a long evolutionary history. Although the three-part body plan of adult insects might have been the outcome of natural selection at an early stage in the evolution of life, it makes little sense to seek a current adaptive value in, say, dragonflies.

#### **SEEKING THE CAUSE OF BEHAVIOR IN BIOLOGICAL PROCESSES**

Francis's central point in *Why Men Won't Ask for Directions* is that much current research on evolutionary adaptation in animal and human behavior is a misguided search for something that does not exist. The alternative to adaptation that most interests Francis is biological causation. Behavior that appears beguilingly adaptive

might not have any adaptive function at all, according to Francis, but be instead the result of well-understood neural, hormonal, or developmental processes. Nine chapters are devoted to sexual or reproductive behavior, for which proposed adaptive explanations are wrong, says Francis, because these behaviors all have straightforward causal explanations. He calls adaptive and functional adaptations “anemic,” because they do not do justice to the causal processes at work. Explanations based on what causes a behavior are, in contrast, “robust.” The examples Francis examines are human female orgasm, parthenogenetic reproduction in lizards and fish, sex change in fish,

---

*Refraining from breeding in the presence of dominant animals increases the probability that the subordinate will survive and eventually become dominant and breed successfully. The alternative—attempting to breed in the presence of dominant animals—is likely to fail or result in the subordinate’s injury or death.*

---

alternative reproductive strategies, reproductive suppression, vocal mimicry by birds, species differences in the hippocampus, sex differences in human cognition, and the remarkable pseudo-penis of the female spotted hyena.

Consider reproductive suppression. In some social groups, breeding is restricted

to dominant or territory-holding animals. In African elephants, naked mole rats, olive baboons, and the Lake Tanganyika cichlid fish *Haplochromis burtoni*, subordinate animals or animals without a territory do not breed. In the presence of dominant animals, reproduction is suppressed in subordinates. Subordinates can come into breeding condition and reproduce only if dominant animals are removed from the group. How should we explain this? The adaptive explanation is that refraining from breeding in the presence of dominant animals increases the probability that the subordinate will survive and eventually become dominant and breed successfully. The alternative—attempting to breed in the presence of dominant animals—is likely to fail or result in the subordinate’s injury or death.

But Francis rejects the idea that reproductive suppression is an adaptation. He argues, instead, that it is a consequence of how the hypothalamus and pituitary regulate both the stress response and reproduction. In olive baboons, acute stress in subordinate animals increases the release of corticotrophin-releasing hormone, which causes a reduction in gonadotropin release from the pituitary and initiates a cascade of consequences that depress reproduction. With such a causal explanation available, Francis argues, no functional or adaptive explanation for reproductive suppression is necessary. To explain reproductive suppression in this cichlid fish, we need only assume the same causal mechanism is at work as that found in olive baboons. The causal explanation, in Francis’s terms, “trumps” any adaptive explanation.

## INTRODUCING THE “JUST BECAUSE STORY”

This account of reproductive suppression illustrates the fundamental misunderstandings that run through *Why Men Won't Ask for Directions*. They turn what could be an informative account of current research on sexual and reproductive behavior in animals and humans into a misleading and largely polemical work.

The first misunderstanding concerns the distinction between cause and function. When we ask why a particular behavior occurs, in animals or in humans, we probably have in mind one of two different questions. We could be asking what environmental or internal neural or hormonal events cause the behavior to occur. Alternatively, we could be asking what function does the behavior serve in the life of the animal. If, as scientists, we want to know why birds migrate from southern wintering grounds to northern breeding grounds and back again, it is important to be clear on whether we are seeking a causal answer (in terms of neural, endocrine, photoperiodic, and other causes of migration) or a functional answer (concerning the benefits to survival and reproduction of breeding at a high latitude and wintering nearer the equator). Both are good scientific questions, but it is necessary to be clear which one we are asking.

That is not always easy. Students do not always grasp the distinction, and even professional researchers can get muddled to the point of arguing about whether a functional or a causal explanation for a behavior is the “real” one. Unfortunately, Francis is seriously muddled.

This is not to say that Francis is always off the mark in his critique of proposed functions and adaptations. Hypotheses about adaptation can be wrong and some widely accepted adaptive accounts probably are. Adaptive hypotheses can be simply implausible or logically inconsistent (just as hypotheses about causation and mechanism can); a critical review of such ideas is worthwhile. But Francis supposes that the existence of a causal or mechanistic explanation makes an adaptive or functional explanation unnecessary.

---

*Francis introduces a new kind of story, the causal explanation without empirical support—the “just because story.”*

---

This brings us to the second fundamental problem with *Why Men Won't Ask for Directions*. Biologists call adaptive explanations of behavior that are advanced without empirical support “just so stories,” a label first applied by Stephen Jay Gould and an allusion to the fanciful accounts of animal origins in Rudyard Kipling's *Just So Stories*. Adaptive accounts of behavior with no evidence to support them deserve the label. In *Why Men Won't Ask for Directions*, Francis introduces a new kind of story, the causal explanation without empirical support—the “just because story.”

As I described earlier, nonterritorial male cichlid fish show suppression of reproductive activity in the presence of dominant territorial males. When provided with a territory, they undergo a behavioral and

physiologic transformation, which is triggered by the effects that their change in social status has on their circulating levels of gonadotropin-releasing hormone and which brings them into breeding condition. How does this transformation show that suppression of breeding might not be adaptive in these males? According to Francis, it refutes the adaptive explanation because acute stress reduces the circulating level of gonadotropins in low-ranking male baboons. Francis writes, “Barring compelling evidence to the contrary, we should assume that the same is true of nonterritorial *Haplochromis burtoni* males.” Stress, not any adaptive benefit, suppresses reproduction. Perhaps the interaction between stress and reproduction is the same in these fish and in olive baboons, perhaps it is not. But to assume that it is and to use this assumption as a causal explanation for the suppression of reproduction in the fish is a “just because story,” an explanation with no direct empirical support.

Later, in a footnote, Francis points out that reproductive suppression is more likely to be an adaptive response in the subordinate African wild dog, dwarf mongoose, ring-tailed lemur, wolf, marmoset, cynomolgus monkey, cotton-top tamarin, and in some female teleost fish, because in these animals the suppression is independent of levels of stress hormones. This undermines the whole message of the chapter, however, which is that adaptive explanations are suspect in general, not just suspect for one species of cichlid. This contradictory message has less to do with reproduction in *Haplochromis burtoni* than with the supposition that causal and functional explanations are in competition.

#### *Why Men Won't Ask for Directions*

abounds with “just because stories.” What function does vocal mimicry serve in mockingbirds? None, according to Francis; it is a consequence of how mockingbirds learn their songs and “it can’t be helped.” Unfortunately for this “just because story,” no data are available on song learning in mockingbirds, and no evidence supports his claim. Why do alternative mating strategies occur in some species? Not because of the adaptive consequences of these alternative forms of behavior but because of the migration patterns in the developing brain of neurons containing gonadotropin-releasing hormone, says Francis. This, too, is a “just because story.” At present, writes Francis, not enough information is available to judge the importance of this proposed mechanism.

#### **FROM AN “ANEMIC BRAIN ECOLOGIST”**

Full disclosure: One of the research areas in which Francis attempts to debunk adaptive explanations is my work and that of my colleagues on species and sex differences in the size of the hippocampus, an area of the brain associated with memory. Food-storing birds have a larger hippocampus, relative to their brain size, than birds that do not store food. In the brown-headed cowbird, females have a larger hippocampus than males, a sex difference not found in closely related blackbirds. In voles, males have a larger hippocampus than females, but only in polygynous species (in which males have multiple female mates) not monogamous species. Finally, food-storing kangaroo rats have a larger hippocampus than nonstoring species, and, as in voles, males have a larger

hippocampus in polygynous but not monogamous species. Something interesting is going on here.

We have tested various adaptive explanations for these species and sex differences in the size of the hippocampus. The pattern we find is that differences in hippocampal size are associated in each case with performance of a spatial task. Food-storing birds create thousands of scattered food caches and retrieve them by remembering where they put them. Male voles have larger home ranges than females in polygynous species but not in monogamous species. Brown-headed cowbirds lay their eggs in nests of other birds. Females search for such nests, but males do not. Kangaroo rats that store food in widely scattered places have a larger hippocampus than kangaroo rats that do not, and sex differences resemble those in voles: A larger hippocampus occurs in males than in females when males have a larger home range than females. We have tested alternatives to the spatial hypothesis: differences in diet, migratory behavior, development, diurnal pattern of activity, social organization, and brain and body size. But the factor that consistently emerges as correlated with greater hippocampal size is performance of a spatial task.

This research, according to Francis, is the work of “anemic brain ecologists” because—unlike that of “robust evolutionary neurobiologists”—it does not examine the neural and developmental processes that cause a larger hippocampus in these animals. I do not dispute that it is better to be robust than to be anemic. But the work that Francis dislikes is a search for the function of greater

hippocampal size in these animals; it is not a search for causes of greater hippocampal size. The goal of this research is to test adaptive, not causal, hypotheses about species and sex differences in hippocampal size.

---

*We learn a great deal about the author's dislikes in *Why Men Won't Ask for Directions* and the book at times proceeds like a giant-killing quest.*

---

When not testing adaptive hypotheses about the hippocampus, the same groups of researchers also examine neurogenesis, the activation of immediate early genes, the distribution of neurotransmitters and neuropeptides, connectivity, development, and the effects of experience and stress hormones on the hippocampus. Perhaps we become a little more robust at such times. The distinction between the anemic and the robust is, in the end, a distinction between research questions that interest Francis and research questions that do not. In fact, he regards two of the leading “anemic brain ecologists,” Alan Kamil, Ph.D., and Sara Shettleworth, Ph.D., as quite well-grounded in their appreciation of causal processes but still “...far too committed to teleological adaptationism from my perspective.”

#### **SLAYING GIANTS AND STRAW MEN**

We learn a great deal about the author's dislikes in *Why Men Won't Ask for Directions* and the book at times proceeds like a giant-killing quest. He dislikes the reasons for atheism of Richard Dawkins, D. Phil., which

are “extremely narrow and provincial.” We learn that “the entire enterprise of psychology has been poisoned through its Cartesian roots” and that *Darwin’s Dangerous Idea* by Daniel Dennett, D. Phil., is a “regrettable book.” The notion of cognitive modularity advanced by Jerry Fodor, Ph.D., is “computational Freudianism.” Ernst Mayr, Ph.D., is confused about proximate and ultimate causation, and Francis is not happy with Stanford biologist and neuroscientist Russell Fernald, Ph.D.

Francis makes frequent use of the debater’s ploy of attributing to the opposing side mistaken views they do not hold, then showing that these views are mistaken. Researchers interested in the adaptive significance of sex differences in cognition assume that testosterone levels alone are solely responsible for sex differences, according to Francis. But it would not be easy to find a serious researcher in the area, adaptationist or not, who holds this view. Researchers interested in the hippocampus assume it serves no cognitive function except spatial memory, according to Francis. In fact, those with even a peripheral interest in the hippocampus know there is a multitude of ideas about its cognitive function.

In a revealing passage, Francis writes, “Much of what we know about the hippocampus derives from the extreme misfortune of a man known only by his initials H.M.” Although the work of William Beecher Scoville, M.D., and Brenda Milner, Ph.D., with H.M. was an important impetus for much of the current interest in the hippocampus and in temporal lobe amnesia in general, almost nothing of what we know

about the hippocampus derives from the work with H.M. Instead, it comes from the enormous body of research on rodents and nonhuman primates.

The book’s title question is addressed in a chapter that is strangely ambivalent about sex differences in human cognition, dismissing them as both unreliable and trivial before going on to explain how they are caused socially, not biologically. The explanation advanced by Francis for sex differences in cognition is sociocultural, but no data are given to show how this might work. To Francis, it is obvious that, because males and females are treated differently from birth, cognition can differ between the sexes in adulthood. It would be more persuasive if he could provide research results demonstrating that different treatment of the two sexes is sufficient to cause differences in cognition. One’s personal experience and assumptions are not science.

If Francis’s arguments against adaptation fall short, that does not mean there are no good arguments against excessive use of the idea of adaptation, especially in the absence of supporting evidence. George Williams, Ph.D., made this point in 1966 in the book *Adaptation and Natural Selection*. E.O. Wilson, Ph.D., did introduce sociobiology, accompanied by the prophecy that it would soon swallow the life sciences whole. It has not turned out that way.

Francis is quite right that far-fetched evolutionary scenarios can be found in published literature, although it is not clear that they are any more common than far-fetched causal scenarios. Some psychologists interested in adaptive explanations of human



behavior have, indeed, devoted a lot of energy to telling other social scientists they have missed the boat by not incorporating evolutionary ideas into their thinking. I can sympathize with the impulse to give a frank assessment of whether the boat is even seaworthy. Francis's criticisms often miss the mark, however, while evolutionary biologists and psychologists can be their own strongest critics. There is intense

---

*The book is a missed opportunity. A great deal of fascinating science—evolutionary, neural, hormonal, developmental, and social—has gone into the book, but this has not resulted in a clear view of current research on either adaptation or causation.*

---

debate over genuine unresolved issues in these fields, but Francis does not succeed in identifying them.

Is *Why Men Won't Ask for Directions* worth reading? There is little for anyone actually interested in why men won't ask for directions, or more broadly, whether men and women differ in cognitive abilities. The book is a missed opportunity. A great deal of fascinating science—evolutionary, neural, hormonal, developmental, and social—has gone into the book, but this has not resulted in a clear view of current research on either adaptation or causation. The goal of debunking the functional approach to behavior produces no serious attempt to

describe the aims, methods, and findings of this kind of research. Causal research does not fare much better. Causal ideas, sometimes entirely speculative ones, are presented only to rebut a functional or adaptive hypothesis that has drawn Francis's ire.

At the heart of the book lies a failure to understand what adaptive hypotheses are and what they are not. They are not attempts to provide causal explanations for sex change, vocal mimicry, the relative size of brain areas, or any other phenomenon. Indeed, they cannot provide such explanations. They are attempts to formulate and test adaptive explanations of behavior with ecological, behavioral, and neurobiological observations and experiments. Research of this kind is fair game for critique, like any other scientific enterprise, but Francis's insistence that causal explanations "trump" adaptive explanations will not leave the general reader with any better understanding of the strengths and weaknesses of the study of adaptation. ■

**EXCERPT**

From *Why Men Won't Ask for Directions: The Seductions of Sociobiology* by Richard C. Francis. © Richard C. Francis. Reprinted with permission of Princeton University Press.

Adaptationists are distinctive among natural scientists in the way they query nature: they use “why-questions”—not just generic why-questions, as in “why is the sky blue”, but why-questions of a particular sort. Here are a few examples of their why-questions that we will examine in this book: Why does the male mockingbird mimic the songs of other bird species? Why do female spotted hyenas have male-like phalluses? Why do women have orgasms? And yes, why won't men ask for directions?

What these why-questions have in common is that they require answers of a particular form: answers that refer to ends as opposed to means and to effects as opposed to causes. Answers of this sort are often referred to as reasons, functions, intentions, or purposes, all of which fall into a category known as “teleological.” Teleological thinking is the norm in our everyday interactions with each other, but in the realm of science its status is controversial. Indeed, teleology is steadfastly eschewed in most of the natural sciences, including most of biology. But evolutionary biologists of the adaptationist persuasion rely heavily on teleological thinking and increasingly flaunt it. I will argue that despite its undeniable heuristic value, teleology is a distorting lens through which to view the evolutionary process. I will further argue that questions such as “Why won't men ask for directions?” are often the wrong questions to be asking.

Such questions seem so natural, however, that many people find it difficult if not impossible to resist asking them. They seem so natural because all of us, scientists and non-scientists alike, are teleologists at the outset. As children, we found it most natural to explain things by connecting them to the intentions, purposes, and goals of some agent analogous to ourselves. Hence, our curiosity is expressed in the form of teleological why-questions. Among the why-questions posed to me by my 10-year-old son of late are: “Why are there mosquitoes?” “Why do mockingbirds sing at night?” and “Why do I have to go to bed now?” Each of these questions is a request for a teleological explanation, an explanation that explains by identifying intentions, purposes, reasons, or goals. It is only gradually that he will learn to differentiate those questions for which the teleological perspective is appropriate, such as why he must go to bed now, from those for which the teleological perspective is misguided, such as why there are mosquitoes. Learning when the teleological perspective is warranted and when it isn't is an important part of normal cognitive development. In part, this learning entails knowing when teleological why-questions should be resisted and replaced by questions of a different sort, “how-questions,” for example. How-questions, as a child learns, are requests for a quite different sort of explanation: what the cause is or how it came to be.

This transition is not easy; it takes a certain kind of discipline. Many adults, in fact, never learn how to resist looking for teleological explanations. I have been asked more than

once by adult acquaintances why mosquitoes exist. This question was motivated less by my perceived biological expertise than by the teleological perspective of my interlocutors. They presumed that, as a biologist, I could explain the benefit mosquitoes provide in the grand scheme of nature, their purpose. God, or Mother Nature, must have had a reason for creating mosquitoes; they must be doing something useful. My attempts to answer this question from outside the teleological perspective—for example, that mosquitoes exist because they are good at what they do—were not well received. My answers seemed lame, the equivalent of “these things happen.”

Though we all pass through a teleological stage, most of us come to recognize that at some point the teleological perspective can become problematic; in fact, excessive teleology is an important aspect of the pathology known as paranoia. The paranoid is convinced, in a visceral way, that everything happens for a reason of the sort requested by “why” questions. The paranoid’s reasoning is deemed unreasonable not just because it reflects a sense of persecution, nor because it is ego-centered, but because of the assumption that behind every occurrence there are intentions, a purpose, a design.

You don’t need to be paranoid to have a paranoiac mindset. Wherever the teleological perspective is used to devalue casual explanations, wherever it is believed that the answers to teleological why-questions trump all others, you will find evidence of the paranoiac explanatory style, and its characteristic distortions. Most religions, for example, foster the paranoiac mindset in their insistence on

teleological “ultimate explanations.” But scientists, on the whole, are especially careful to guard against these teleology-induced distortions; indeed, scientists tend to be the least paranoiac citizens among us. By the time a child becomes a scientist, he or she has usually abandoned the teleological perspective, at least for the purposes of doing science. The glaring exception is evolutionary biology; in that field, some adaptationists rely heavily on teleology in their own search for ultimate explanations. ■