

## 9 Feelings as the Proximate Cause of Behavior

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Male chimpanzees spend considerable time patrolling their territories. Sometimes this behavior involves long scouting excursions around the periphery of a territory. At other times, it might involve quiet, watchful sitting. At still others, patrolling includes noisy displays, perhaps to frighten potential intruders.

It would be hard to believe that patrolling behavior, or any major part of it, is rigidly preprogrammed, or "hardwired." Scouting a territory's periphery, for example, can be undertaken in an almost limitless number of specific ways, varying from episode to episode in the precise path the chimp takes, in its body postures and the sounds it makes at each moment, and so on. The behavior seems too complex, too flexible, and too variable to be orchestrated by a biologically plausible program.

What is the alternative? What other types of proximate causes are available, in theory, to account for such complex and flexible behaviors? An obvious alternative, and perhaps the only one, is that such behaviors are "motivated." We might say that the chimpanzee experiences a kind of "patrolling feeling," a desire or inclination to behave in some way that satisfies some particular feeling, or group of feelings, associated with patrolling. In putting it this way, we are in effect inserting a new variable, an extra degree of freedom, in the (mostly unknown) chain of causation that leads to the behavior, in order to account for the observed flexibility. For this to work, I will argue, the relationship between feeling and behavior must be hierarchical in a special sense: it must be that of the general to the specific. More precisely, a feeling is a demand made upon an animal that some specific behavior be chosen that meets a set of general criteria prescribed by the feeling.

In psychology, feelings are generally understood to be one of three aspects of emotion. Emotion has a physiological aspect (e.g., an increase in heart rate during moments of intense fear). It also has outward manifestations (e.g., facial expressions). Finally, it has a subjective aspect, namely the feelings themselves. The first two can be studied directly, and for both, plausible and satisfactory suggestions have been offered regarding their function; for example, physiological changes might help prepare the organism for rapid action, and facial expressions might function as means of communicating internal states. The third aspect, arguably the least understood in functional terms, is the focus here.

The discussion will begin with a rough conceptual scheme in which I argue that feelings are (in organisms that have them) the proximate cause of conscious, deliberate behavior, with "cause" understood in a hierarchical sense. Then I offer a model from developmental and evolutionary biology to help explain this sense of causality. Applied to feelings and behavior, the model makes a number of testable predictions.

The scheme also provides an in-principle resolution of certain aspects of the nature-nurture controversy, a resolution that accommodates many of the most extreme claims both of universalists, who argue that human nature is relatively invariant across cultures, and culturalists, who argue that it is quite plastic. Ultimately, my claim will be that by introducing a variable that is causally "upstream" of behavior (the feelings), we can have it both ways. Specifically, to put it somewhat crudely, behavior is plastic; it is feelings that are universal. A longer explanation is necessary to see what sense this claim might make, and a number of caveats are required for it to be defensible.

The notion of universal feelings is not new. Indeed, it has a long and distinguished history, mainly in moral philosophy (McShea 1990; see also McShea and McShea *in press*). But it has not appeared, to my knowledge, in the most recent incarnation of the nature-nurture debate in biology and psychology, which spans the last two decades since E. O. Wilson's book on sociobiology (Wilson 1975). Both the proposed resolution of this debate and the conceptual scheme on which it is based are somewhat sketchy; much needs to be filled in, and significant changes may be necessary as thinking about it progresses. My motivation in presenting them here, perhaps prematurely, flows from the conviction that the core concept—that feelings are the proximate cause of behavior—will survive the necessary revisions, and that it has the potential now to change the terms of that debate in a productive way.

I am an evolutionary biologist and an outsider in the serious discussion underway in theoretical psychology and philosophy about the mechanisms and functions of emotions, and therefore, at least indirectly, of feelings. Thus it is difficult for me to determine to what degree the suggestion offered here is consistent with the various views that have been developed in that literature (Buck 1985; Damasio 1994; Frijda 1993; Griffiths 1997; Izard 1993; Johnson-Laird and Oatley 1992; Lazarus 1991; LeDoux 1996; Plutchik 1980; Sloman 1987; Solomon 1977; Young 1973; Zajonc and McIntosh 1992). Based on the sources just listed, at least, the present suggestion seems neither to have been proposed nor to have been ruled out. But for the present, I leave such judgments to scholars more appropriately positioned to make them.

Also, as an outsider, I am doubtless prone to certain kinds of errors, such as misusing terms with established technical meanings and mistakenly indicating by choice of words either affiliation or disaffiliation with this or that school of thought. I apologize for these gaffes and hope they will not draw critical attention from my main point.

## 1 Preliminaries

An example of feelings in action will help to illustrate the proposed scheme: a dozing mother cat awakens as a dog approaches the hiding place of her kittens. She sits up, her ears straighten, her tail swishes, and her gaze becomes fixed on the dog. As the situation develops, she might well relax and even begin to feel frisky and playful. On the other hand, she might experience a combination of fear for her own safety and a kind of "brood-defensive feeling." Which package of feelings is evoked will depend on her cognitive analysis of the situation, which might include an assessment of the dog's present mood and intentions, his position relative to the kittens and to herself, the likelihood that he will notice the kittens, and her own present condition and ability to defend herself. Also relevant are her memories of past encounters with dogs generally, and with this one in particular.

Suppose that she concludes the dog is hostile, and that she experiences both fear for her own safety and a brood-defensive feeling. Both feelings demand satisfaction, and a struggle for dominance ensues. One feeling eventually triumphs—suppose it is the brood-defensive feeling—and results in some behavior. What behavior, specifically? She might attack, but she might also run, not in fear but in an attempt to distract the dog's attention from the kittens. Her past experience and present cognitive analysis of the situation will have much to do with the behavioral choice she makes. But her goal is nothing other than the satisfaction of the brood-defensive feeling, and her chosen behavior is her best guess at which behavior will achieve that end. We will suppose that she decides to attack the dog.

The example is speculative, of course, in that I may not have correctly identified the specific feelings that would typically be evoked in a house cat in an encounter of this sort. But this is beside the point; its purpose is mainly heuristic.

### Two Distinctions

Two preliminary distinctions are necessary. The first is between, on the one hand, mental activities such as feeling and cognition, and on the other, behavior. Behavior here refers only to motor activity. The cat's swishing of her tail is behavior. Her fixed gaze is also behavior, because it involves muscle activity, even though no net movement occurs. Any vocalizations she makes are behavior; in humans, speech is behavior. But the cat's fear and her calculations and evaluations are not behavior. In what follows, I will use the term "behavior" in a slightly more restricted sense, to refer to motor activity that is both conscious and deliberate. For the cat, this would likely include her attack on the dog, but would probably exclude her tail-swishing.

The second distinction is between two categories of mental activity, cognition and feeling. A feeling is a conscious state of dissatisfaction or disequilibrium, more specifically, of desiring, wanting, or preferring. Notice that, in contrast with colloquial usage, in the present scheme a feeling is not a mood (i.e., not a feeling in the sense of "feeling good" or "feeling depressed"). Also, a feeling is an affective experience, not a form of knowledge or an awareness of knowledge, such as an intuition or insight—in other words, not a feeling in the sense of "having a feeling *about* something." The connection with emotion will be discussed later.

Cognition here is a wastebasket category to hold all of the nonfeeling (i.e., preference-neutral), conscious mental functions, such as perception, memory, reason, the various learning and language mechanisms, and so on. Thus the cat's brood-defensiveness was a feeling, but her recollections, spatial calculations, and evaluation of the dog's disposition were all parts of cognition.

### Peripheral Issues

**Feelings Are Physical.** My decision to focus on the subjective is not intended to have any dualist implications. I do not intend to suggest that the subjective aspect of emotion is not physical or that it is not translatable into physical terms. Indeed, it must be so translatable—at least in principle—if feelings are to be efficacious, if they are to cause behavior. However, the discussion here is agnostic about the nature of the physical basis of feelings—for example, about whether they occur in discrete structures within the brain or arise from activity more globally distributed (although some evidence on this matter exists; see LeDoux 1996).

**Feelings in Nonhuman Species.** At least some nonhuman animals have cognitive and emotional mechanisms sufficiently similar to ours that we can meaningfully speak of them as thinking and feeling in the same sense that we do. Humans have direct introspective evidence of their own feelings, of course. The claim that other species have them also is somewhat speculative but not entirely baseless. From an evolutionary standpoint, it would be surprising if our close relatives had utterly different brain mechanisms mediating their behavior. But it is an open question whether this closely related group includes only the great apes or extends to the rest of the mammals or perhaps to all vertebrates and other phyla as well. It is also possible that the existence of feelings is a matter of degree, that some species have more of them than other species, or that the degree of flexibility in behavior that they offer varies from species to species. Here, for the sake of discussion, I assume that feelings occur in and cause behavior in all mammal species; but this restriction is somewhat arbitrary, and the reasoning that follows does not depend on it.



## 2 A Rough Conceptual Scheme

### Three Basic Claims

The scheme is constituted by three basic claims; each is discussed further in the sections that follow.

- (1) Mammals use their cognitive abilities to sense and interpret the world and to anticipate future events. (In the above example, the cat "reads the situation" as the dog approaches.) These interpretations and anticipations in turn evoke feelings. (The cat experiences either playfulness or brood-defensiveness together with fear.)
- (2) The range of possible feelings that individuals routinely experience is large, and in any given situation, more than one feeling may be evoked, orienting the animal to a number of different purposes at once. (Again, in the story, brood-defensiveness and fear are evoked simultaneously.)
- (3) A struggle for supremacy occurs among the evoked feelings. Eventually one feeling, or coalition of feelings, triumphs over all others and causes some behavior. (Brood-defensiveness wins, and the cat attacks.)

The most important claim, for present purposes, is (3), the notion that feeling causes behavior. The evocation of the feelings and the range of feeling are side issues and are discussed briefly in the following subsections; I present them mainly to fill out the larger conceptual picture within which the central claim is to be understood.

**How Feelings are Evoked.** The various mechanisms by which emotions are evoked have been studied aggressively, especially recently (LeDoux 1996), but they are still only imperfectly known. The evocation of their subjective aspect, the feelings, is even less well understood, but in any case, a deep understanding is unnecessary for present purposes. Here, the only requirement is that feelings are reactions to interpretations of situations, and that therefore variations in how situations are interpreted may account for differences in which feelings are experienced. Thus two individuals of the same species with identical feeling repertoires (what I later call "feeling profiles") and who are placed in the same situation nevertheless may not experience the same feelings. For example, one cat may not have met this particular dog before, and may judge it dangerous based on its exuberant behavior, whereas a second cat may know the dog quite well and understand that, contrary to appearances, it is friendly and safe. Both cats experience the same *external* world, but as a result of their differing histories, their cognitive processes analyze that world differently, and

thus their feeling profiles are presented with different *interpreted* worlds. It is the interpreted world to which feelings react.

The suggestion that differences in which feelings are evoked (and thus ultimately in which behavior is caused) are the result of differences not in the underlying feeling profile but in the cognitive processes involved in interpretation will be a central element in the treatment offered later of the human nature-nurture problem.

**The Feeling Profile.** The repertoire of feelings that individuals in a given species normally experience, each weighted according to the degree to which it is experienced in the full range of problematic situations that individuals of the species normally encounter, constitutes the species' "feeling profile" (McShea and McShea in press). Thus the feeling profile for a house cat would consist of a set of feelings that cats typically experience, including the feelings mentioned in the example—playfulness, fear for one's own safety, and brood-defensiveness—and many more, along with the situations in which each is normally evoked. In addition, the profile would specify the situation-specific intensity with which each feeling is normally experienced.

I am inclined to believe that the feeling profile in most mammal species is complex—in other words, that the number of different feelings is large, and that in addition to some very general types, such as fear and envy, numerous variants also exist. Fear, for example, would seem to have a number of different subtypes; the fear produced in us by the rumble of thunder seems to be qualitatively different from the fear produced by a prolonged stare of a rival. Of course, the possibility remains that complex profiles are constructed or built up, neurologically, from a small set of elemental mental states. Conceivably, some group of basic states—perhaps closely paralleling the set of "basic emotions" that has been suggested—might combine in various proportions to produce the great variety of qualitatively different feelings we recognize subjectively. But this would not contradict the claim that the profile is complex, because it is the subjective variety of feelings that constitutes the profile.

Given this complexity, a complete description of the feeling profile of even a single species is out of the question. Attempting a partial description would be a useful exercise and an important part of a more fully developed theory of feeling, but I will not attempt it here. First, feelings are secondary qualities, like colors, and therefore they are extremely difficult to describe in words. My use of awkward expressions like "brood-defensive feeling" is a symptom of this inadequacy of language. And second, the flaws in my attempt would only introduce unnecessary controversy and distract from the main point, which is the causal relation between feeling and behavior.

Later I will argue that feeling profiles are likely to be very similar among individuals in a species. And finally, feeling profiles are presumably adaptive to some extent. However, the degree to which they are functional, the issue of whether profiles are optimal in some sense or merely minimally functional, is beside the point, at least at present. (Presumably, this varies from species to species anyway.)

### Feelings as Causes of Behavior

**Hierarchical Causation.** The precise mechanism by which the brood-defensive feeling causes the cat to attack the dog is unknown, but we can nevertheless characterize it in two ways. First, the feeling causes the behavior in the sense that it galvanizes the animal or energizes it to act. Second, the causation is hierarchical in the same sense that the flow of orders in a military chain of command is hierarchical. A vague or general order given at a high level (e.g., "Prepare the base for inspection!") evokes a range of specific commands and ultimately specific behaviors at lower levels (policing the lawn, painting the flagpole, etc.). Likewise, feelings orient or direct the animal toward vague or general goals, which can be understood as the causes of the behavior they precede.

Another way to understand hierarchical causation is to think of higher-level causes as boundary conditions on lower-level behavior (Salthe 1985). A balloon is the cause of, or determines, the spatial positions of the gas molecules it contains, but only to the extent of limiting their movements to within a small region. Within the balloon, their movements are free. If the balloon is falling, it causes the gas molecules to move downward (on average), but movement within the balloon is still unconstrained. Likewise, in a military chain of command, high-level orders are boundary conditions. Many different specific behaviors are consistent with the vague order to prepare the base for inspection. Indeed, the high-ranking officer may not have had any specific sequence in mind and may not care about the details (what procedure is used to police the lawn, who paints the flagpole, etc.), provided that the base is prepared.

Feelings are causes of behavior in just this sense; they are demands (or at least emphatic requests) that the range of behavioral choices be limited to those that achieve some end. Feelings limit behavior, but within the bounded range they specify no particular behaviors, no precise motor sequences. The brood-defensive feeling is a demand that the cat limit her behavioral choices—from the vast range of possible motor sequences—to those that are likely to result in the safety of her kittens.

Another analogy: Feeling causes behavior in much the same sense that the object and rules of a sport cause the activities of the players, not by specifying those activities in detail, but by constraining them. Indeed, feelings might rightly be called the

"object" of behavior in just this sense. That is, the object of behavior is the satisfaction of the feelings.

**Proximate vs. Distal Causes.** The notion that feelings are the proximate cause of certain behaviors does not rule out the possibility that those same behaviors have more distal causes as well. Ultimately, a tiger hunts because historically natural selection acting on tiger ancestors favored individuals who were predisposed to hunt and who did it effectively. More proximally, a tiger hunts because she is hungry. But even hunger may not be the most proximal cause, if—as seems to be the case with humans—tigers need not actually experience hunger during the act of acquiring food. Instead, a tiger hunts because she wants to, because she experiences a hunting feeling or an inclination to hunt. Such a feeling might be triggered initially by hunger, but the feeling itself and not hunger likely occupies the mental foreground while a hunt is in progress.

### A Developmental Model

Physical development in organisms is at least partly hierarchical in the following sense. Early in development, an embryo consists of a relatively small number of structures. These interact to give rise to more structures. Which in turn give rise to yet more, and so on, in a widening cascade. One result of this organization is that early structures have more structures developmentally downstream from them than later ones do. Thus variation occurring in early structures tends to produce long cascades of changes throughout the downstream portion of the developmental trajectory. Most of these changes are likely to be deleterious. For example, a variation early in the development of a human embryo in which the anterior neuropore of the neural tube fails to close produces widespread and catastrophic consequences, notably anencephaly, a condition in which the brain as a whole fails to develop properly. Finally, because the consequences of variation in early structures are often so widespread and deleterious, variation in them will on average be more strongly opposed by natural selection and thus will occur less often than variation in later structures.

This hierarchical outlook, or model, has been developed independently a number of times in biology in recent years, notably by Riedl (1977), Arthur (1984, 1988), Wimsatt (1986), Kauffman (1993), and Salthe (1993). In Wimsatt's terms, structures with many downstream developmental consequences are "generatively entrenched." Riedl describes such structures as "burdened." (See Raff 1996 for an alternative view.)

Based on the model, it should be easy to see that generative entrenchment—in combination with natural selection—might account for the conservativeness of cer-



tain features of organisms, both in their development and in their evolution. In particular, it might account for the basic or foundational similarities among groups of related species, for what are known as "bodyplans." For example, a two-part, six-legged body characterizes almost all of the many millions of insect species and constitutes a feature of the insect bodyplan. For the vertebrates, a dorsal, segmented, axial column—the vertebral column—is a bodyplan feature.

In standard usage, the term "bodyplan" is restricted to features that characterize a number of related species at a high taxonomic level, such as vertebral columns, but in principle it could be applied at lower levels. For example, in humans, a large brain (i.e., relative to body size) might be described as a bodyplan feature at the species level. The prediction of the entrenchment model would be that the structural features involved in a large brain arise later in development than the vertebral column, but earlier than features that are more variable within our species (e.g., eye color). More generally, the prediction is that both conservativeness of traits in development and how widespread they are among species in higher taxa, will be strongly associated with degree of entrenchment, with the more entrenched structures expected to be both more conservative and more widespread.

**Entrenchment, Vagueness, and Feelings.** For present purposes, the key property of entrenched structure is that they limit or constrain the form of less entrenched structures downstream—constrain them, that is, without precisely determining them. The limitation is similar to that of a foundation, which constrains but does not precisely determine the design of the house that will be built upon it. Likewise, I argue, feeling constrains behavior and is foundational for behavior in the same sense. A feeling is an attempt by the animal to impose a boundary condition, or a constraint, on its own behavior, an attempt to limit the behaviors actually performed to those that will satisfy it. Bodyplans are also foundational and constraining in this sense, and thus the feeling profile as a whole might be understood as a kind of "behavioral bodyplan." (Wimsatt 1986 has already described the sense in which the entrenchment model might apply to behavior. My proposal modifies his treatment to incorporate what I argue are the causes of behavior, viz. the feelings.)

Salthe (1993) provides a different language in which to make the same point. In his view, early embryonic structures have fewer features—or more precisely, fewer features that are regular in their appearance—that are reliably present from moment to moment. Thus, in a sense, their composition is less specific, less well defined. They are, in Salthe's terms, "vaguer" than later structures. As development proceeds and these early structures become elaborated, they also become more regular, that is,

they become better defined, more "specified." In his language, a feeling is behavior that is still vague, or behavior-not-yet-completely-specified.

We can make the connection between the developmental model and the feeling-behavior relationship more explicit. Imagine each feeling-behavior sequence in a human individual—each instance in which a feeling occurs and causes some behavior—as a miniature ontogeny, a short developmental subroutine. As such a sequence begins, some strong feeling has been evoked, by some mechanism unknown, and will cause some behavior, chosen from among the many that would satisfy it. The feeling acts as a constraint, limiting the range of acceptable behaviors to those that would satisfy it, but it does so without specifying precisely the behavior to be performed, just as the earlier-arising structure limits the range of later-arising structures without specifying them. The main difference is that in structural development, all of the terminal downstream structures are (eventually) expressed simultaneously in adult form, whereas in the brief feeling behavior developmental subroutine, only one behavior is expressed at a time; the entire range of behaviors satisfying a given feeling can only be expressed over time and exists at any one moment only as a set of potentialities.

We can now describe a sense in which feelings are entrenched with respect to behavior. Behaviors, like later-arising structures, may vary with few consequences; one behavior may be substituted for another in a behavioral repertoire, so long as it satisfies the constraints imposed by the feeling with which it is associated. However, a variation occurring in a feeling, one that even slightly changes the goal or purpose it represents, may have enormous consequences, perhaps rendering inappropriate all or most of the existing repertoire of behaviors associated with it. Thus feelings are entrenched in the sense that variations in them will tend to have more consequences and therefore will have more dire consequences than would variations in behavior.

### **Speculations and Predictions**

**The Specification of Feeling in Development.** The suggestion so far is quite modest: Causality has the same sort of hierarchical organization in both structural development and in the feeling-behavior relationship. More speculatively, we can draw a closer connection between development and feeling/behavior. Again, imagine each feeling-behavior sequence as a miniature ontogeny, a brief developmental subroutine. In the course of a lifetime, each subroutine will be run many times, and in each run, some behavior will be chosen or devised, in order to satisfy the feeling, from among the many possible behaviors of which the animal is capable. Eventually a set of fairly specific behavioral options will come to be associated with each feeling.

Presumably, the individual learns that one (or a small number of) behaviors are more effective than others in satisfying a given feeling, and eventually he will acquire the habit of behaving that way when that feeling is experienced. As an individual matures, habitual behavioral selections become more finely tuned. Also, behaviors become more elaborated, more routinized, and more fixed. The result is that, in effect, the upstream feeling becomes more entrenched, more specified. We might say that a feeling begins in childhood as a vague desire and becomes transformed into a specific desire, a desire to do one or a small number of particular things or to behave in a number of specific ways. Notice that a result of this progressive entrenchment is that the many-to-one relationship between feelings and behavior is gradually eroded; therefore, to the extent that my speculation here is true, the earlier discussion about the source of behavioral flexibility and variability is more applicable to *young* organisms and less so to older ones.

Another result of this progressive entrenchment is that as individuals age, change in the feelings becomes more and more unlikely, because the consequences of change become more and more severe. For example, consider an older but still pre-adolescent child, in whom the feeling profile has become somewhat entrenched. At this point, any change occurring in an entrenched feeling would be highly disruptive, rendering ineffectual all of the highly elaborated and specified behavioral options that have become fixed downstream of it. An entirely new behavioral repertoire would have to be developed to satisfy the modified feeling. Something like this may occur in human adolescence, at least for some portion of the feeling profile. Thus, given this admittedly speculative understanding of the ontogeny of feeling and behavior, the entrenchment model enables us to make a prediction: to the very limited extent that feeling profiles are susceptible to change, or even modifiable in some deliberate way, they should be more modifiable in younger mammals than in adults. And because behavior lies causally downstream of the feelings, behavior should be more modifiable than feelings at any age. In clinical terms, behavior modification should be easier than feeling-profile restructuring.

For these speculations, I have no evidence of the sort that would convince a skeptic. I present them mainly because they enable us to make some predictions that are potentially testable. (Obviously such variables as the modifiability of behavior and of the feeling profile would first have to be operationalized.) Also, the second speculation—that feelings are developmentally entrenched relative to behavior—will have a key role in my discussion of the nature-nurture problem. Importantly, the hierarchical model of behavioral causation does not depend on these speculations and would stand even if both were shown to be false.



**Disparity among Feeling Profiles.** Speculating even further, suppose that the physical brain structures that produce feelings, whatever they are, arise earlier than and give rise to the brain structures that produce motor activity. In other words, suppose that causal pathways by which feelings produce behavior, moment to moment, mirror the pathways by which the corresponding neurological structures are produced in embryology. The suggestion is that feeling structures are entrenched relative to behavior structures—entrenched in the original structural sense. Again a prediction follows, namely that, among individuals and across higher taxa, feeling profiles should vary less than behavioral repertoires. For example, feelings should be more similar than behaviors among members of the same species. All chimpanzees are expected to have similar feeling profiles, but the behavior of individual chimps will vary widely. And although differences in feeling profile are expected to increase at higher taxonomic levels—a mouse species profile will be very different from that of an elephant—the prediction is that disparity in behavior will grow much faster.

### **The Role of Cognition**

The mechanism by which cognition evokes feelings is unknown and will not concern us further here (see above). But more can be said about some of the many functions or roles of cognition. The discussion of these roles will necessarily be cursory, and a number of claims will be made with little supporting argument. My purpose is not to prove these claims, but rather to fill out the conceptual picture within which the view of feelings as causal was developed. For a more thorough treatment, see McShea (1990).

**Cognition as the Slave of the Feelings.** A major function of cognition is the perception of and interpretation of situations to which the feelings react. In humans (at least), cognition has the further mission of constructing hypothetical scenarios to which the feelings also respond. Consider the following somewhat outlandish example of cognition and feeling in action:

Walking along a city street, I encounter an armored truck parked at a local bank. The street is deserted, the back of the truck is open, the bags of cash are lying in full view, and the guards have mysteriously fallen asleep. In my imagination, I see myself grabbing the money, flying to some thieves' haven, safe from extradition and basking in the sun (and in the envy of my friends) on the deck of my yacht, while well-paid servants cater to my every whim. Some feeling or coalition of feelings reacts with approval to this imagined scenario.

But before any behavior results, my imagination races to prepare another scenario. I see the guards waking up, shots are fired, sirens are wailing, and I am rushed



to the hospital, and later—if I live—to jail. Some bundle of feelings reacts in horror to this imagined sequence of events. I walk right past the armored truck without pausing.

The point is that, among their many other functions, cognitive (i.e., nonfeeling) mental processes are involved in projecting possible futures and also in devising various behavioral options and anticipating their consequence. The difference between humans and cats is that our greater cognitive powers enable us, among other things, to pursue longer and more detailed imaginative sequences, to hold a number of such scenarios in mind at almost the same time, and to pause long enough for a larger proportion of the feeling profile to react, coalitions of feelings to form, and well-considered behaviors to be chosen or devised. But equally in humans and cats, cognition is nothing more than a tool deployed in the service of the feelings. The argument is originally Hume's, who wrote: "Reason is, and ought only to be the slave of the passions, and can never pretend to any other office than to serve and obey them" (1978, p. 415).

This view of reason as the slave of the passions raises the possibility (not to be explored in this essay) that an argument precisely parallel to the one about could be devised, the conclusion of which would be that feeling is the proximate cause of all conscious cognition, as well as of all conscious behavior.

**Cognition Alone Cannot Cause Behavior.** In humans, we commonly speak of thinking as causing behavior. For example, we might speak of an act resulting from and therefore being caused by an observation or a chain of reasoning or both. To see why the suggestion that cognition causes behavior is mistaken (if taken literally), consider a modification of the earlier example, substituting a human mother for the cat: The human mother sees the dog bounding toward her baby and responds by picking the baby up and carrying it indoors.

It might seem at first that her observation of the dog together with her reasoning about what it might do are possible causes of her behavior. But observations and reasoning alone are preference-neutral; they provide no motivating force. Like the cat, the human mother might use her cognitive powers to project the dog's probable path, assess the likelihood that the baby will be noticed, and judge the dog's probable behavior if it does notice. But no behavior follows directly from these calculations; her behavior can be seen to have a cause only by interposing an intermediate variable between preference-neutral cognition and action, only by interposing a feeling, in this case, a feeling of protectiveness for the child. The same argument applies to all other aspects of cognition—memory, language capacity, and so on—which likewise deliver no motive, no impulse to act, at least by themselves.

To see this more clearly yet, imagine a creature with great cognitive powers who is devoid of feeling, a pure intellect. Without feeling, such a creature would have no preferences, and therefore for it, no possible or imagined state of affairs in the world would be preferable to any actual state. Thus it would never have any motivation to *do* anything, not even to move about. Crucially, to only the subjective aspects of these processes are relevant here. Pure intellects (e.g., modern computers) can be physically constructed so that they do act, and it is possible in principle that our brains are so wired that, contrary to the evidence of introspection, behavior is caused by purely cognitive processes. And feeling might be epiphenomenal. The point here is that the connection cannot be made subjectively: logically, it is impossible to see how any behavior, any action, follows directly from pure cognition.

**Other Issues.** With the nonfeeling mental processes removed as sufficient causes, feelings become essential to conscious behavior, in species that have them. Consistent with this view, we can see decision making, choices among behavioral options, as essentially contests of feelings. Situations reported and interpreted by cognition, or hypothetical scenarios devised by cognition, evoke a number of feelings. In some cases, a single feeling instantly dominates: I see the bus bearing down on me and some variety of fear instantly overwhelms me. In others, no clear winner emerges right away. My house needs painting to appease my neighbors and to prevent the shingles from rotting, but paint is expensive and I am tired at the moment. Thoughts of peevish neighbors, leaking walls, a dwindling bank account, my aching muscles, and so on, evoke a flood of feelings, which then vie among themselves for dominance. A temporary coalition eventually forms, say, among the various fears associated with the neighbors and the leaks, and then I paint the house. A decision has been made. (I have simplified the process considerably, of course, omitting the role of memory, the consequences of further trains of thought inspired by the feelings themselves, which in turn evoke other feelings, and many other complications.)

These arguments run against the grain of the usual view of feelings in one respect. We ordinarily think of feelings as a source of bias in cognition and in behavior. Ordinarily, feelings are thought to cause only rash or "emotional" behavior, and to do so against our better judgment, against reason. Feelings are often considered the more "primitive" mental processes, which drive emotional behavior—for example, rage, which can cause violent behavior—whereas reason is said to underlie more temperate behavior. In the present scheme, these claims are seen to be non sequiturs. Feelings cannot bias judgment, because feelings are judgment itself in action. Feelings do not cause only emotional behavior while cognition causes temperate behavior; rather, feelings are essential in all conscious behavior. An appropriate alternative

distinction might be one between passionate feelings and calm feelings, or between the short-term feelings, which can only be satisfied by immediate action (e.g., getting out of the way of the bus), and the long-term feelings, which can only be satisfied by consistent patterns of behavior over long periods of time (e.g., care of children). Again, for further discussion of this issue, see McShea (1990).

### 3 The Nature-Nurture Problem

The understanding of feelings as distinct from behavior and cognition opens up some conceptual space in the nature-nurture controversy, creating the possibility of a new theoretical position, which I only outline here. Before turning to it, I should make clear that the controversy has a number of different aspects, such as the possible genetic basis of certain diseases, the modifiability of certain behavioral tendencies, and the efficacy of education in overcoming various innate predispositions. All are potentially relevant here, but I am presently concerned only with the debate between culturalists and universalists. Culturalists argue that because of the plasticity of the mind to environmental influences, human nature varies enormously from one culture to the next. The universalists contend that these differences are superficial, that beneath an outer layer of cultural variation lies an inner core of common characteristics, a human nature that is everywhere the same.

The new theoretical position follows from the conceptual scheme above. Cognition produces interpretations of life situations, which in turn evoke the feelings. In any given situation, multiple feelings may be evoked, but eventually one feeling or coalition of feelings triumphs and causes some behavior, chosen from the various options that have been learned or devised. The new position begins with a recognition that, in the realm of interpretation and behavior, culture is virtually omnipotent. We associate flag with country, and country with a strong, familial authority figure, thereby evoking—in certain contexts—reverence and awe in its presence. The associations are implanted by culture. Further, any of a large range of behaviors would satisfy these feelings, but culture has narrowed the range options to a context-specific few: on the right occasions, we might stand, perhaps at attention, and maybe we even sing. (Or we might choose *not* to stand or sing, perhaps in protest, but if so, it will be because other stronger feelings have also been evoked, also via associations implanted by the culture; cultures do not speak with one voice.)

Thus the basic culturalist insight is supported. By manipulating associations and circumscribing behavioral options, a culture can train people to say and do almost anything. Further, in moving from one culture to the next, we shift from one culturally structured system of interpretation to a different one. Different cultures serve up

entirely different symbolic worlds to the feelings. The visitor from a distant culture looks up at our proud symbol of national unity and sees only a bit of colored cloth, curiously mounted on a stick. Indifferent, he walks away. Both we and the visitor see the same flag, but on account of our cultural differences, our cognitive processes analyze that object differently. Our feeling profiles are presented with different *interpreted* worlds, different feelings are evoked, and different behaviors result.

Notice that none of this in any way contradicts the basic universalist insight. All that this shows is that differences in interpretative system and in behavior—the standard evidence against the universalist view—do not necessarily point to differences in feeling. It shows that individuals with identical feeling profiles may nevertheless be expected to behave very differently if they have different interpretative schemes. The conclusion is that cultural differences in behavior, in what people say and do, can be largely, if not wholly, accounted for *without* positing differences in feeling profile.

As the debate is usually framed, the culturalist and universalist views seem to contradict each other. For example, the universalist wants to claim that warfare and the care of children are human universals. But the culturalist points out that so-called warfare and child care differ so substantially among cultures in their meaning and in the practices they involve that there is hardly any commonality. Seemingly, both cannot be right.

However, if we make the appropriate distinctions, both *can* be right. Warfare involves simultaneously a set of feelings (motivations), a set of behaviors (practices), and a cognitive interpretative scheme (a set of culturally assigned meanings). In view of these distinctions, the universalist might revise her claim and argue not that warfare per se is universal, but rather that there is a common set of feelings that all or most cultures mobilize and which tends to produce intergroup violence of some kind. And the culturalist, in turn, might revise his claim, arguing that only interpretative schemes (the meaning of warfare to its participants) and practices (actual behaviors) vary significantly among cultures. Whether either or both is right is a purely empirical matter; the point here is that in principle they both could be, that they are not contradicting each other.

Given the existence of a common feeling profile, two consequences emerge. The first is that communication across cultures becomes possible. If we did not share a set of common interests arising from a common feeling profile, communication across cultures would be impossible, and not merely difficult as we observe it to be. The second consequence of a shared feeling profile is a common basis for evaluating alternative cultural interpretative schemes and sets of behavioral options. We ought, in principle, to be able to agree on which sorts of understandings of the world and



which courses of action tend to satisfy the feelings better in this or that situation. In other words, a common feeling profile gives us a common foundation for morality, for judgments about the better and the worse (McShea 1990; McShea and McShea in press).

### Clarifications

**Universality.** For convenience, I have presented the universalist argument as though it requires all individuals in a species to have identical feeling profiles. In fact, it does not. All traits are expected to vary (at least somewhat) in all species. Consistent with the developmental model, the expectation is that cognitive systems of interpretation and ranges of behavioral options will be shallowly entrenched and therefore highly variable both among individuals and among cultures. Feeling profiles are expected to be more deeply entrenched and thus less variable, but no trait is truly universal.

Also, some systematic differences in feeling profile are expected among cultures. The reason is that the development of the feeling profile in an individual is, like the development of any physical structure, a dynamic, interactive process, one undoubtedly requiring input from the environment, which includes the culture. The reason for not emphasizing these differences earlier is that the developmental model partly obviates them. That is, to the degree that feelings are entrenched, environmental variation is expected to have less effect, and feelings are expected to be less variable. (Genetic variation is also expected to have less effect; see below.) More importantly, given the much greater variability that the developmental model predicts for cognition and behavior, large cultural differences in feelings are unnecessary to account for the tremendous differences in behavior observed among cultures.

Finally, nonnegligible differences may exist in feeling profiles among age groups and between the sexes, but these matters require a much longer treatment that I can give them here.

**Genes vs. Environment.** In its most recent incarnation, the nature-nurture problem has taken the form of a debate over the relative importance of genes and environment to the determination of human nature. Arguably, the problem has been misconstrued. What really concerns us is not genes versus environment but the degree of flexibility in human nature and the extent to which a common nature is shared by all humans. For these issues, the relevant factors are the degree of hierarchical organization in behavioral development and the depth of entrenchment of the various behaviors in that hierarchy, not whether the source of variation happens to be genetic or environmental (Wimsatt 1986).

The present scheme embraces this critique. Both feelings and behavior (understood as motor activity) have essential genetic and environmental (i.e., cultural) components, and differences in their contributions are not significant in this context. For example, I have argued that the feeling profile is likely to be somewhat entrenched and therefore less variable than behavior within a species. But proper development of the profile could well require substantial information from the environment, information that is "expected," so to speak, in development (for example, in "critical periods") and that is perhaps just as essential as any genetic information. "Entrenched" does not mean the same thing as "genetic." Thus one of the main virtues of the developmental model is that it ignores the often misleading opposition between genes and environment (Oyama 1985).

#### 4 Summary

I have proposed a conceptual scheme in which feelings—the subjective aspect of emotion—are the proximate cause of all conscious behavior in species that have them, here assumed (for the sake of argument) to be limited to mammals. To see the sense in which this might be true, two preliminary distinctions are necessary: first, mental processes must be distinguished from behavior, which refers only to motor activity. Second, two types of mental process must be distinguished: feeling, which refers to wanting, preferring, desiring, etc., and cognition, which refers to all of the nonfeeling, or preference-neutral, conscious mental processes, including those described colloquially as memory, reason, language capacity, and so on.

In the scheme, the function of the cognitive processes includes perceiving and interpreting the world and anticipating future events. In species with highly developed cognitive powers, such as humans, these anticipations may involve long narratives and elaborate scenarios. But in all such species, cognitive processes are understood to be perfectly passive, completely powerless to cause any behavior, at least directly.

However, cognition evokes feelings, which do cause behavior. The list of the entire range of feelings that an individual is capable of experiencing, together with a specification of the situation-specific intensity with which each is experienced, is called the feeling profile. Feeling profiles in most species are complex, and in various life situations many different feelings may be evoked, orienting the animal to a number of different purposes at once. When this occurs, a struggle for dominance among the feelings ensues, and eventually one feeling or a coalition of feelings triumphs over all others.

The victorious feeling or coalition then causes some behavior. The causal relationship between feeling and behavior is hierarchical, which in the present context means that the range of behavioral options is constrained (to those that will satisfy the feeling), but no particular behavior, no particular motor activity, is specified. A model from developmental biology helps to explain this sort of hierarchical causation further, and with the addition of certain speculative assumptions, the model enables us to make some (at least in principle) testable predictions: first, as individuals age and behavioral sequences become more elaborated and less easily modified, the consequences of feeling modification become more severe. Second, at any age, modification of behavior should be easier to achieve than modification of the feeling profile. Further, it can be argued that if the developmental relationship between the physical brain structures involved in feeling and those involved in behavior mirrors their relationship subjectively, then feeling profiles should vary less than behavioral repertoires at all taxonomic levels.

Assuming this is true at the species level in humans, the feeling profile is expected to be less variable, more nearly universal, among individuals and across cultures than is behavior. Finally, the possibility of a nearly species-universal feeling profile suggests an in-principle resolution to the debate between culturalists and universalists over the degree to which human nature varies among cultures. The suggestion is that cognitive interpretative schemes and ranges of behavioral options vary among cultures, whereas the feeling profile is more nearly universal. The main virtue of this proposal is that it accommodates the widely shared intuition that both the culturalists and the universalists are right, that tremendous differences exist among cultures in mode of understanding and in behavior, and also that despite these differences, and underlying them, there is a human nature that is everywhere the same.

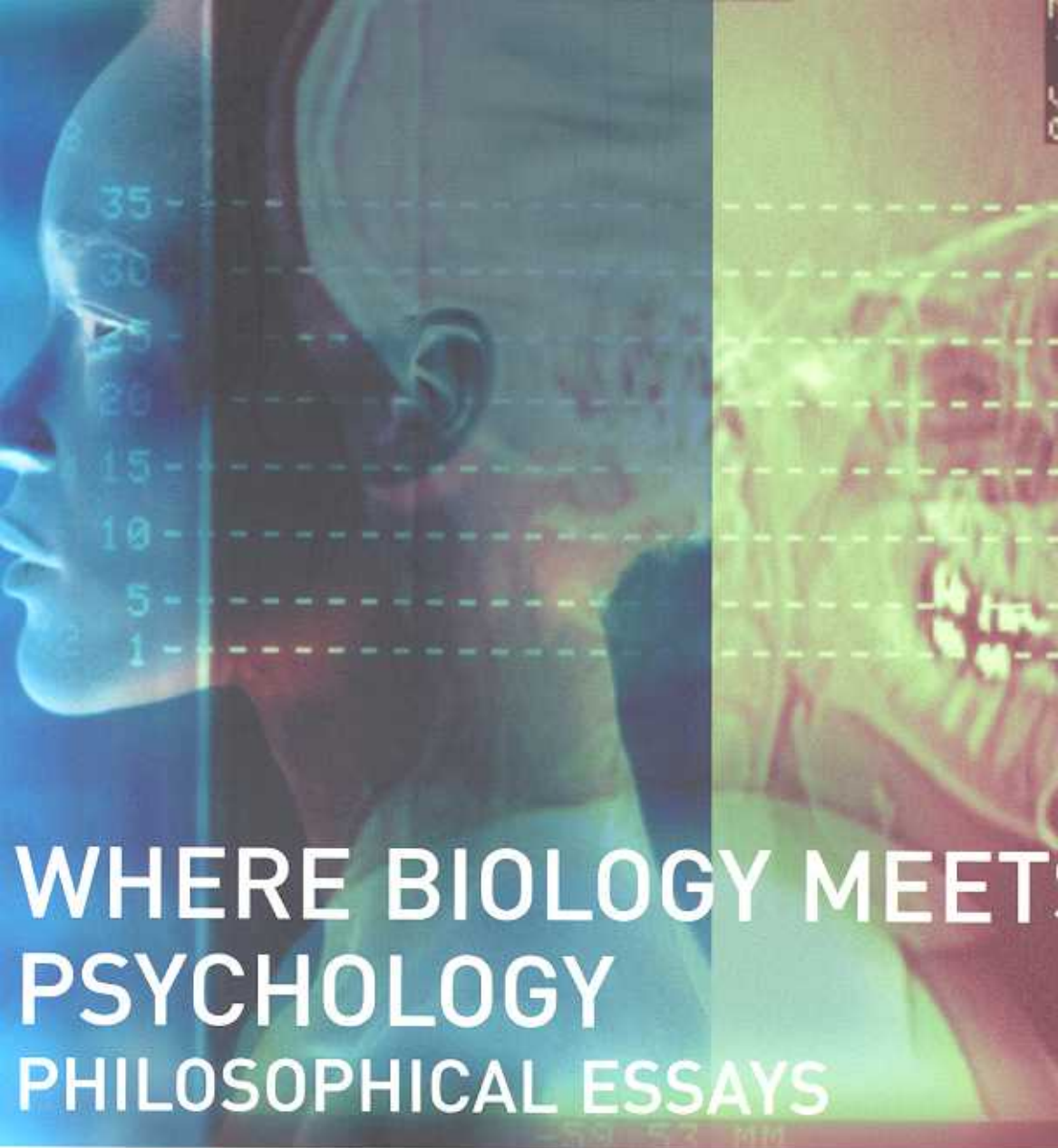
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# WHERE BIOLOGY MEETS PSYCHOLOGY PHILOSOPHICAL ESSAYS

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