# ANSWERS FOR ARISTOTLE

How Science *and* Philosophy Can Lead Us *to a* More Meaningful Life

MASSIMO PIGLIUCCI

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for

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**Also by Massimo Pigliucci**

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*Nonsense on Stilts: How to Tell Science From Bunk*
*Making Sense of Evolution* (with Jonathan Kaplan)
*Denying Evolution*

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How Science and Philosophy
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More Meaningful Life

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# CONTENTS

# SCI-PH I AND THE MEANING OF LIFE

"Everything must have a purpose?" asked God.
"Certainly," said man.
"Then I leave it to you to think of one for all this," said God. And He went away.

—KURT VONNEGUT, *CAT'S CRADLE*

WHEN I WAS A CHILD I WAS CHUBBY. THIS WAS A cause of major distress, between the tauntin of some of my friends and the obvious disapproval of my parents, who kept bringing me one diet doctor after another. Mind you, by the standards of today's obesity epidemic m condition would have been barely noticeable, and it is quite amusing that nowadays I have to order m clothes online because it is difficult to find clothes in stores that are small enough to fit me. Still, th problem significantly affected my quality of life from the time I can remember being conscious of (when I was in elementary school) to my early thirties, when I decided that I ought to do somethin about it, my way.

I began by doing the obvious things: I read about the problem, signed up for a gym membershi and started forming an aesthetic and healthy relationship with food, as opposed to seeing it as a sourc of consolation for whatever might be going wrong in my life at any particular moment. It took effo and to some extent it still does, but my quality of life—both physical and psychological- significantly improved in the span of mere months. Without knowing it yet, I was practicing what this book I call "sci-phi"—short for the wisdom (and practical advice!) that comes fro contemplating the world and our lives using the two most powerful approaches to knowledge th human beings have devised so far: philosophy and science.

The basic idea is that there are some things that ought to matter, whatever problem we experienc in life: the facts that are pertinent to said problem; the values that guide us as we evaluate those fact the nature of the problem itself; any possible solutions to it; and the meaningfulness to us of tho facts and values and their relevance to the quality of our life. Since science is uniquely well suited deal with factual knowledge and philosophy deals with (among other things) values, sci-phi seems lik a promising way to approach the perennial questions concerning how we construct the meaning of o existence.

So, for example, let's go back to the problem of diet and weight gain. As you might imagin science has quite a bit to say about this subject, and yet the public is hardly aware of most of th knowledge, which is drowned out by shouts about yet another miracle diet, another miracle pill, another superficially easy solution to the problem. For instance, Gina Kolata, in her 2008 *Rethinkin Thin: The New Science of Weight Loss*, describes a landmark study by Rockefeller Universi researcher Jules Hirsch, who subjected a group of obese people to a monitored diet while they live for a grueling eight months at the Rockefeller hospital. Hirsch started out knowing that obese peop have much larger fat cells than people of normal weight, and he wondered what would happen to tho cells after a rigorous diet: Would they degenerate? Would they get smaller? The results were clea

the fat cells of formerly obese patients had shrunk considerably by the end of the experiment, reachi standard size. Now that his subjects were back to normal, Hirsch thought, not only in overall weig but even on the cellular level, surely they would be able to stay thin, their problem solved. (This w 1959, much earlier than the current obesity epidemic.)

But things did not quite work out as Hirsch predicted: within a few months, all of his former obese subjects had gone back to approximately their original weight, despite the fact that they *want* to maintain their newly achieved thinness. Since this was science, and the patients were studied from variety of perspectives under controlled conditions, the researchers were able to figure out what ha happened. The metabolism of an obese person is actually normal, meaning that it is calibrated by th body to maintain the status quo. When the researchers put their obese subjects on a severe diet, they course lost weight (simply as a result of basic laws of physics), but their metabolism slowed dow enormously compared to that of a naturally thin person. In other words, their bodies interpreted th new regime as one of starvation, and a basic survival mechanism (keep the metabolism dow consume less) kicked in. Once the dietary restrictions were lifted, the subjects' metabolism leve went back to normal, they felt an uncontrollable hunger, and they ate their way back to obesity.

Later studies not only confirmed these findings but uncovered the symmetrical truth that th people who attempt to gain weight (sometimes by eating as much as an astounding 10,000 calories day!) cause their metabolism to accelerate dramatically. As soon as they stop overeating their bodie burn all the extra fat, and they are back where they started. (Lucky bastards, one might add.) This kin of research, as well as studies on the genetic inheritance of body mass index (a function of yo weight, and your height), all point to the conclusion that most of us have a "set range" in terms of bo our metabolism and our weight and that our bodies become increasingly resistant to attempts to mov much above or below our natural range. This most certainly does not mean that the environment ha nothing to do with our weight, or that we cannot do anything about it. But it does mean that not on are there limits to what we can do, but there is a cost to be paid for doing it in terms of the precio psychological resource of willpower (more on that in Chapter 9). If people were more widely aware this sort of research, they would have more realistic expectations about how to handle their weig problem, they would devise smarter ways to deal with it, and they would stop pursuing the chimera a "silver bullet" that will quickly make them happy. Then again, the huge cottage industry that ha flourished by exploiting people's weaknesses about food would probably collapse overnight, wi presumably disastrous consequences for all those who keep making money out of the craze for eas diets.

So much for the science. Where does the philosophy come in? All the facts about the inheritanc of human weight, rates of metabolism, the size of fat cells, and so on are of only academic intere until they affect the lives of real people. But why do these facts affect our lives? One answer come again, from science: there are negative health consequences to being seriously overweight or obes People who suffer from severe weight problems are more prone to diabetes and heart conditions, the life expectancy is significantly shorter, and of course the quality of that life is much diminishe Moreover, there are practical consequences for society, which devotes significant financial and oth resources to treating conditions related to obesity.

But that is, of course, only part of the story. I was never obese, not even close, and yet the proble of being overweight has been with me my entire life. And I am most certainly not an isolated case: multimillion-dollar industry of diets and exercise machines exploits the obsession with weight share by millions of Americans. What is going on is that we make judgments concerning the issue weight, judgments that range from aesthetic to moral in nature, and both aesthetics and ethics a

branches of philosophy, not science.

If we feel ugly because we are overweight, it is because—probably unconsciously—we deploy certain aesthetic theory of what an attractive human being should look like. This theory is informe of course, by the culture in which we live (the concept of physical beauty has demonstrably chang over space and time throughout human history) and perhaps to some extent even by basic biologic instincts. (There is evidence, for instance, that we prefer symmetrical features in a potential partn because such features are a reliable indicator of healthy genes that could be transmitted to o progeny.) Similarly, if we blame our excess fat on our lack of self-control, we are making a mor judgment about how we *ought* to live and behave, what we should strive for in life, and how much our resources (both mental and financial) we should invest in achieving certain aesthetic standard We are doing philosophy without realizing it, and there is a distinct possibility that bad philosophizin may make our lives more miserable than they perhaps should be.

This idea that philosophy and science can be combined to give us the best possible knowledg about the world and how to act within it is an old one, encapsulated by the classic concept of *scienti* a Latin word that means "knowledge" in the broader sense, encompassing both the sciences and th humanities. In German, a similar term is *wissenschaften*, which also refers to more than just th English "science." Arguably the first philosopher in the Western tradition to take the concept o scientia (or what I call sci-phi) seriously was Aristotle (384–322 BCE), a fellow whom the reader wi see popping up throughout this book (which explains the title of the same). What is important abo Aristotle and some of his fellow ancient Greek philosophers is not the content of their science, whic has been dramatically outpaced by the developments of the past twenty-four centuries, and not eve some of their specific philosophical positions, which are also no longer tenable in light of subseque discussions. Rather, what is crucial to the idea of this book is the ancient Greeks' fundamental concep that life is a project and the most important thing for us to do is to ask ourselves how we are to pursu it. In a sense, then, Aristotle was among the first to approach the big questions in both a philosophic and a scientific manner, and we are now beginning to have some good (if still provisional) answers those questions.

For Aristotle this project meant engaging in a quest for *eudaimonia*, a Greek word that literal means "having a good demon" and that is often translated as "happiness," though it should mo properly be understood as "flourishing." Eudaimonia is achieved by engaging in virtuous behavior- that is, doing the right things for the right reasons—throughout one's existence. Since life thu conceived is a project, a full assessment of a life's worth is actually not possible until we reach th end, a notion that still has a powerful intuitive appeal for us moderns. For instance, the lifelon reputation of someone who led a good life up to a certain point but then engaged in unethical behavi is diminished or crippled, and vice versa: we consider praiseworthy someone who began by falterin but then regained a high ethical ground.

Aristotle, a good psychologist, realized that it is often difficult to align our rational assessment what we ought to do with our emotional inclinations toward doing what comes easily to us or pleasurable. Going back to our example of physical well-being, we all know that it is good for o long-term bodily (and psychological) fitness to eat moderately and exercise regularly. Yet ou penchant for immediate rewards pushes us to overindulge our appetites and makes us lazy when it time to get on the treadmill. Aristotle never saw a fast-food joint, but he knew about human fallibilit Indeed, he thought that the major obstacle to increasing our eudaimonia was something the Greek called *akrasia*, translatable as "weakness of the will." In a sense, to be virtuous means to rise abov one's weaknesses to do the right thing, both for ourselves and for others. That is the way towa

human flourishing.

It should be clear, then, that eudaimonia is not "happiness" in the generic sense of a positiv emotion, but that it is value-laden—that is, it is an intrinsically moral concept. The ancient Gree would have argued, for instance, that a life devoted to the exclusive pursuit of physical pleasures, wealth, or power, is not eudaimonic, regardless of how "happy" the person seeking such pleasure wealth, or power might feel. In an important sense, these pursuits would all be distractions fro eudaimonia, because the individual in question has done nothing to improve himself or to affect th world in a positive manner. Eudaimonia should not be confused with the Christian virtue asceticism, or with Buddhist detachment: the Greeks from Aristotle to Epicurus (341–270 BCE thought that physical pleasures like good food, love and friendship, and even a good dose of luck we all necessary ingredients of a eudaimonic life. They also thought, however, that we are best able pursue the eudaimonic life by taking the time to reflect on it.

All of this notwithstanding, to most people these days philosophy seems like a quaint activity be left to a bunch of old white men with a conspicuous degree of social awkwardness. This is the twenty first century: if science tells us that a certain weight range is good for our health and another is like to trigger disease, shouldn't a rational human being simply follow the doctor's orders, philosophic disquisitions about aesthetics, ethics, and the meaning of life be damned? I don't think the answer this question is quite so simple, because of a crucial and much underappreciated distinction betwee facts and values. To derive the latter from the former is a type of logical error known as th "naturalistic fallacy" (because one is attempting to equate what is natural with what is good). One the first to discuss the naturalistic fallacy (though he didn't use that term) was the eighteenth-centu Scottish philosopher David Hume (1711–1776) in his aptly titled *A Treatise of Human Nature*. Hum noticed that some people who wrote on a variety of factual issues (what is/what is not) eventuall seamlessly, and without explanation switched to an altogether different kind of discourse concerne with ethical imperatives (what ought to be/what ought not to be). Hume is not saying that there is n connection between facts and values, but he points out that a person invoking such a connectio should explicitly justify it.

Hume's conception of the naturalistic fallacy informs this book and its central idea that th conjunction of science and philosophy has much to offer in making the lives of reasonable huma beings significantly better. Taking the naturalistic fallacy seriously, we acknowledge that scienc (dealing with matters of fact) is not enough; we also need philosophy (dealing with matters of value But our philosophy can and should be informed by the best science available, and vice versa: our que for scientific knowledge should be guided by our values. Our aesthetic judgment may want our bodi to be close to a particular weight range, and our moral judgment may fault us for not quite gettin there. But a serious understanding of the biology of human metabolism will help us cut ourselv some slack and reach a compromise between what we would like to do and what biological reali allows us to do. Here science helps us revise our philosophical intuitions. That science should in tu be guided by our philosophical choices is also clear upon a moment's reflection: why does so muc money go into research on human weight loss and gain? Because according to our aesthetic and ethic values, that sort of investment is justified, presumably at the expense of other possible kinds medical research, considering that our societal resources are not unlimited. Philosophy, then, guide the general direction in which science (and science funding) goes.

Of course, a clear distinction has been made between science and philosophy only rather recent in human history; not so long ago, in the seventeenth and eighteenth centuries, people like Galile Galilei (1564–1642) and Isaac Newton (1642–1727)—who today would be considered scientists—sa

themselves as “natural philosophers.” If science and philosophy were once one and the same, how c
we account for their peculiar evolution so that nowadays they are treated as distinct enough to often l
housed in different colleges on university campuses? And what can I possibly mean by “sci-phi,” th
attempt to bring them back together in the service of human flourishing?

The evolution of science is perhaps easier to understand, if for no other reason than that mo
people are familiar with its products, from its discoveries about the nature of the world to th
technological and medical applications of its principles. This familiarity notwithstanding, there a
many misconceptions about science, which I tried to clear up in *Nonsense on Stilts: How to Te*
*Science from Bunk*. To begin with, there is no such thing as the “scientific method.” Science is
somewhat methodical enterprise, but every practicing scientist has one basic guiding principl
whatever works. Scientists are by nature pragmatic, and they will approach a problem from a varie
of points of view, deploying an array of methods of investigation, until they reach a satisfacto
answer to their questions.

One of the uncanny things about science is that, in often reaching improbable conclusions abo
how the world works, it repeatedly defies common sense and provokes widespread rejection of i
findings. We now think, for instance, that quantum effects (in particular, the Pauli principle) ar
responsible for the fact that solid objects occupy space; we know that our planet is a speck of dust
the periphery of a giant galaxy, itself just one of many billions that populate the universe; and we hav
excellent reasons to believe—contrary to a surprisingly still popular opinion—that human beings a
very close relatives of chimpanzees and gorillas. Science proceeds in a way similar to Sherlo
Holmes’s explanation to Dr. Watson in “The Adventure of the Beryl Coronet”: “It is an old maxim o
mine that when you have excluded the impossible, whatever remains, however improbable, must b
the truth.”

Another commonly misunderstood characteristic of science is that it is not in the business
delivering permanent truths, but offers instead provisional conclusions that have a certain probabili
of being true. So, for instance, when I said in the previous paragraph that we know that our plan
orbits around an average star in the suburbs of the Milky Way galaxy, what I meant was that this is th
best supported conclusion arising from a myriad of astronomical observations and from o
theoretical understanding of planets, stars, and galaxies. It is certainly possible that either th
observations or our theories (or even both!) may turn out to be wrong or deeply flawed in som
manner, and that future generations of astronomers will look upon us with the same condescendi
smile that we reserve for Ptolemy’s idea that the earth was the center of the universe and the rest o
the cosmos went around it, moved by invisible celestial spheres.

The tentativeness of scientific conclusions is a source of continuous inspiration to scientists, b
also of perennial frustration and misunderstandings for policymakers and the general public, all
whom would much rather be told “the Truth” by scientists and be done with it—especially aft
paying millions of dollars to finance scientific research. And yet there is a profound lesson in humili
to bring home here. It is rather ironic that science is often portrayed as the ultimate refuge of th
arrogant, but that scientists themselves keep trying to explain to us the limits inherent in the huma
quest for knowledge about the world (discussed in Chapter 8).

What, then, constitutes science as a distinct field, separate from philosophy, literary criticism, o
whatever else? Although a precise definition of science is probably impossible because of the natu
of the beast itself, I would say that science is a form of inquiry into the natural world characterized b
the continuous refinement of theories that are in one way or another empirically verifiable. It is th
unique blend of theorizing and empirical investigation that is at the core of the scientific enterpris

As the philosopher Immanuel Kant (1724–1804) famously put it, “Experience without theory is blin
but theory without experience is mere intellectual play.” If science were just about facts, it would b
the same as stamp collecting, but if scientific theories were not continuously checked again
empirically verifiable facts (through either experiment or observation), they would quickly degenera
into pseudoscience, the kind of thing we see with astrology, parapsychology, or creationism.

What about philosophy? If science is difficult to define precisely, the task is pretty much hopele
in the case of philosophy, a much older discipline that has evolved along very distinct and sometim
contrasting lines. Broadly speaking, philosophy is traditionally divided into a number of branches th
deal with questions concerning the nature of reality (metaphysics), our access to that reali
(epistemology), what we ought or ought not to do (ethics), how we should reason (logic), and what
beauty (aesthetics). More recently, the emergence of a spate of new fields—typically labele
“philosophy of science,” “philosophy of mind,” “philosophy of religion,” and so on—has advanc
concerns with the philosophical aspects of other disciplines.

One of the most influential philosophers of the twentieth century, Ludwig Wittgenstein (1889
1951), said, “Philosophy is a battle against the bewitchment of our intelligence by means
language,” and that is certainly a good way of looking at what philosophers do. What Wittgenste
meant was that human language is by its nature imprecise and prone to confusion (providing an eve
renewable source of material for comedy, which in turn has seriously been compared
philosophizing) and that we therefore ought to be perennially on guard against being misled by ho
we use words. Then again, it can also be argued that sophisticated thinking about the world simp
cannot be achieved without language, so we seem to be in a bind. The problem is no different,
principle, from the one that scientists encounter in their line of work: every tool they use is b
necessity limited and flawed in some respect, and yet they need to use those tools to move forwa
with their investigations. The difference is that philosophy, in this way of looking at things, deals wi
the power and limits of the ultimate human tool: language itself. (Incidentally, this is not to say th
philosophy reduces to linguistics; to make things even more confusing, you might not be surprised
learn that there is also a philosophy of language.)

Of course, if you asked one hundred philosophers what philosophy is, you would probably recei
the proverbial hundred (and one) different answers. And yet, thinking of philosophy as the disciplin
that deals with the rational use of language seems to me the easiest way to understand why philosoph
also is the broadest possible discipline: because it deals with our most basic tool for knowing a
communicating things, it in some sense encompasses all of human knowledge. There are plenty
other conceptions of philosophy, but my take on it is that ultimately philosophy is founded on th
construction (and deconstruction) of reasoned arguments. Typically, a philosopher will pose herself
set of questions, examine what is known about them, and explicitly reason her way to a particul
conclusion. Other philosophers will then examine and pick apart her reasoning and see how
withstands critical scrutiny, probably presenting arguments of their own in favor of a differe
conclusion. And so on. There are traditions that are commonly counted as philosophy that do n
follow this modus operandi—for instance, the so-called Eastern philosophies, and also part of what
today referred to as “continental” philosophy (because it originated with the work of some eighteent
and nineteenth-century philosophers from continental Europe, such as Immanuel Kant and Friedri
Nietzsche [1844–1900]). What I consider philosophy in this book is the sort of intellectual activi
that started out in ancient Greece before Socrates (469–399 BCE) and whose Greek root charming
translates to “love of wisdom.”

Just as with science, there are several common misconceptions about philosophy, and o

definitely needs to be put to rest at the outset: philosophy, like science, does make progress, eve
though its progress has to be measured differently from scientific progress. Science, roughly speakin
can be said to make progress in proportion to how its understanding of the world matches the way th
world actually is. (This idea is a bit simplistic, as any good philosopher of science will tell you, but w
will take it as a good enough approximation for our purposes.) For instance, the Copernican theory
the solar system is better than the Ptolemaic one because, as a matter of fact, it really is the sun ar
not the earth that is at the center of the system. And the Keplerian theory that succeeded th
Copernican one is even better, because it comes even closer to reality: Kepler (1571–1630) realize
that the planets follow elliptical orbits, not circular ones, as Copernicus (1473–1543) thought, and th
the sun is not quite at the center of the whole thing but rather occupies one of the foci of tho
ellipses.

Analogously, philosophy also makes progress when it understands better and better the meanin
and implications of human concepts and how they relate to the world. For instance, philosophers hav
produced several theories of human morality, exploring a variety of logical possibilities (discussed
Chapter 5). As I have already hinted, Aristotle said that morality is about what makes human being
flourish (so-called *virtue* ethics); Jeremy Bentham (1748–1832) and John Stuart Mill (1806–1873)
the eighteenth and nineteenth centuries advanced the idea of *utilitarianism*, according to which what
ethical is whatever increases the happiness of the greatest number of people; and Immanuel Kant, als
in the eighteenth century, articulated a view of morality as a set of rules based on certain duties w
ought to have with regard to other human beings (a rule-based, or *deontological*, ethics).

Philosophers have worked out the implications of these and other systems, criticized them, an
proposed refinements and alternatives. No philosopher today would be so naive as to espouse any
these ideas in anything like their original form, because discussions in the field have led to mo
sophisticated versions of them, and indeed, the debate is still moving forward from this new level
understanding.

Regardless of how we think about philosophy as a discipline, its relationship with science will tak
some interesting turns in this book. As I mentioned earlier, science started out as a branch
philosophy known as natural philosophy, and it stayed that way until the seventeenth century
thereabouts. With the advent of modern academic specialization, however, not to mention th
explosion of discoveries in science, the two fields have become largely separated. There are som
interesting fields that are still at the borderline today and that show us how areas of philosophy ca
turn into corresponding areas of science. One of them is philosophy of mind, which concerns th
nature of consciousness. Until very recently, this was an exclusively philosophical enterprise, b
more and more neuroscientists have tackled the question because of the availability of ne
experimental techniques; functional magnetic resonance imaging (fMRI), for instance, now permits
researcher to note which parts of the brain are active when a subject is immersed in particular ment
tasks, such as reading, or thinking about ice cream.

Nowadays academic conferences and journals dedicated to the study of consciousness a
populated by both philosophers and scientists, and my guess is that the field will gradually come to b
dominated by scientists, as has already happened in, say, psychology (which, before William Jame
[1842–1910], was also a branch of philosophy). Such an evolution does not reflect the relative value
philosophy and science, but rather results from the fact that the two approaches are complementar
when a problem is vaguely defined and empirically unassailable, it is the task of philosophers
clarify matters and prepare the conceptual ground for the time when science has developed th
appropriate experimental tools to investigate it.

But this sort of transition is not the only possible path. There will probably always be questions f which Hume's naturalistic fallacy precludes a transition between fields. Indeed, these are the cas that interest us the most in this book. Morality will figure in much of what we discuss here, for t very good reason that the moral sphere makes up a lot of what goes into making our existen meaningful. The naturalistic fallacy prevents us from simply accepting scientific answers (is/is not) moral questions (ought/ought not), though our philosophical discussions of meaning and values shou most certainly be informed by the best available scientific understanding of the relevant issues.

As we will see, there are plenty of other areas where the combined insights of the best science a the best philosophy make it easier for us to consider our problems from a more informed, mo rational position. A conceptual map of the territory ahead in this book would range from how to te right from wrong to what counts as knowledge and why; from considerations of who we are discussions of love and friendship; from an analysis of justice and politics to the ever-present issue gods and what they might contribute—if anything—to the meaningfulness of our existence. In all this, the practice of what I call sci-phi makes one crucial assumption: that you are interested in usi reason and evidence to guide your life and make it better. If you'd rather be led by mysticis superstition, or "other ways of knowledge"—whatever they may be and however they may work—th is not the book for you. But if you agree that the most precious organ a human being possesses is h brain and that we owe it to ourselves to make the best use of it that we can, then by all means turn t page and let's get started.

# HOW DO WE TELL RIGHT FROM WRONG?

CHAPTER 2

# TROLLEY DILEMMAS AND HOW WE MAKE MORAL DECISIONS

> Moral excellence comes about as a result of habit. We become just by doing just acts, temperate by doing temperate acts, brave by doing brave acts.
>
> —ARISTOTLE

IMAGINE THAT YOU ARE AT THE HELM OF A TROLLEY, GINGERLY carrying passengers from one stop another along the city's streets. Suddenly you see five people standing close, right in front of yo about to be hit by the trolley! You slam on the brakes, and they don't work! You shout to them t get the hell out of your way, but they don't see or hear you! In desperation, you realize that there only one option available to you: the trolley tracks are about to split, and if you pull a lever you wi change course and save the five people. In so doing, however, you will inevitably end up hitting, an probably killing, an innocent bystander. Would you pull the lever?

Most people who are surveyed answer affirmatively, if reluctantly, across cultures. This is on version of one of ethical philosophers' favorite thought experiments, the trolley dilemma. The idea course is to see what people's moral intuitions are when faced with difficult ethical quandaries. Th results would suggest that most people adopt what philosophers call a utilitarian, or *consequentialis* form of moral decision-making: saving five people is the right thing to do, even though another perso will be killed in the process. It's an example of what Jeremy Bentham—the originator utilitarianism—would call "moral calculus."

Almost every time I explain the trolley dilemma someone inevitably begins to rattle out th obvious objections: But what if the five people are all Nazis and the one you kill is your mothe Could you not alert the people to move? Is there no other option available? Or some variant thereo But the point of the experiment is precisely that there are no other options, and that we do not kno anything about the people involved. This kind of experiment allows us to examine people's mor intuitions, other things being equal. Incidentally, the scenario may appear far-fetched, but it isn' There are plenty of situations in real life, from medical emergency rooms to police or military action where people are suddenly confronted with the need to exercise some sort of moral calculus quickl with few available options, and on the basis of very little information. Philosophy sometimes is question of life and death.

The trolley exercise does not stop there. A variant of the trolley situation reveals something eve more interesting about how we think about morality. Imagine now that instead of driving the trolle you are walking on a bridge, below which you see the trolley, on its tracks, about to hit the fiv bystanders. Now your only course of action, the only way to save the five people, is to quickly grab large person standing near you and throw him off the bridge, thereby blocking the advancing trolle Would you do it? (Again, no other options are available; you cannot sacrifice yourself, perhap because your body mass is too small to stop the advancing car.) It turns out, somewhat surprisingly philosophers, that in this version of the dilemma most people recoil from sacrificing the one for th many. This is unexpected because clearly the new course of action is not consequentialist at al

Rather, it seems to fit with some other general way of thinking about morality, perhaps a type o *deontology*, or rule-based ethics, similar to the ones adopted by many religions. (The Te Commandments are the obvious example.) Maybe the rule here is "Thou shall not kill an innoce person," or the Kantian imperative not to use other people as means to ends. Yet that can't be th whole story, because people who adopt a deontological morality in the bridge version of the dilemm are directly contradicting their obviously consequentialist approach in the lever version. We return t the problem created by contradictory ethical doctrines in Chapter 5.

At any rate, here is where cognitive scientists enter the picture. A group of researchers led b Michael Koenigs of the University of Iowa and Antonio Damasio of the University of Southe California in Los Angeles performed an interesting neurobiological experiment using the trolle problem. They compared normal subjects with people who had suffered a specific kind of neurologic damage in the ventromedial prefrontal cortex of the brain, an area known to affect emotion reactions. After presenting both sets of subjects with both versions of the trolley dilemma, Koenig and his colleagues discovered something very interesting about how the brain works when it engaged in moral decision-making. There was no difference between normal subjects an neurologically damaged patients in their responses to the lever version of the dilemma: most subjec in both groups agreed that it was acceptable to pull the lever, thereby trading five lives for on However, when faced with the bridge version of the problem, twice as many brain-damaged patien said that the utilitarian trade-off was still acceptable (that is, that it was okay to throw the big guy o the bridge) compared to the controls. What gives?

Joshua Greene, a cognitive scientist at Harvard, thinks he knows what's going on. His group ha shown that different areas of the brain are activated when someone is considering a personal versus a impersonal ethical problem—just like the difference between the bridge and lever versions of th trolley dilemma. Predictably, the lever situation elicits a strong response from areas like the medi frontal gyrus, which is known to be associated with emotions, while the bridge situation stimulat those sections of the brain known to be involved in problem-solving and abstract reasoning. Th difference between the brain-damaged and normal subjects in the Koenigs study, then, is explained b the fact that their emotional circuits were impaired, so to speak.

So, does the available science favor consequentialism or deontological ethics? A philosoph would say that this is a strange question, since neurobiology can tell us how people think, but not ho they *should* think. Indeed, a naive scientist could make the claim that the neurobiological eviden favors a consequentialist ethical philosophy over a deontological one based on the observation th when people use their reasoning faculties—and isn't that the logical thing to do?—they "g consequentialist." Then again, a neuroscientist with Kantian inclinations could equally reasonab point out that it is the people with incapacitated emotions—people whose brain isn't working the wa it is supposed to—who favor the consequentialist solution in the bridge version of the dilemma. Yo can see how simple facts, however interesting they may be, are just not enough to decide what's th right thing to do.

Jonathan Haidt is a social psychologist who has made some intriguing observations about th question of human moral judgment. He has proposed the "mere rationalization hypothesis," whic essentially states that a lot of our moral decisions arise from evolutionarily ingrained instincts emotions and are not ethical at all. Haidt refers to a study he conducted in which he exposed subjec to actions that caused no harm and yet were likely to provoke a strong emotional reaction. F instance, he looked at how people responded to the idea of cleaning the toilet with one's national fla Predictably, most people recoiled from the action, and when asked to elaborate they produce

explanations that used moral terms to condemn such a use of the flag. But, Haidt argues, since the actions do not actually harm anyone, in what philosophically coherent sense can they be considered immoral? Instead, he suggests, this is one example of people *rationalizing* their evolutionarily and culturally engrained emotions and dressing them up as moral when in fact they are arbitrary. According to Haidt, we should learn to distinguish valid moral judgments from those caused by our evolutionary or cultural background and make an effort to discard the latter in favor of the former.

But then the obvious question becomes: How do we tell the difference between spurious and valid moral explanations? Why doesn't the mere rationalization hypothesis hold all the way down, so to speak, providing scientific backing for the "anything goes" idea of moral relativism? Philosopher William Fitzpatrick points out that in some cases we can clearly distinguish between evolutionary and ethical considerations, as when people make decisions that seem to be guided by moral reasoning that flies straight in the face of their evolutionary instincts. For instance, we may decide not to have more than two children because we are concerned about world population (thus violating the Darwinian imperative to reproduce as much as possible); or we may give up part of our time to volunteer for a humanitarian organization; or we may send a check to a charitable organization so that a child on the other side of the world will have a chance at survival, health care, or education; or, at the extreme, we may even sacrifice our own life for a cause we deem worthy (which amounts to nothing less than evolutionary suicide). None of these decisions make sense from a purely biological standpoint, which would have us focus our efforts on two and only two things: survival and reproduction (and the first imperative is important, from the point of view of natural selection, only if it leads to the second one).

The widespread existence of human behaviors like the ones just mentioned (and many others, of course) is a real problem for any strong evolutionary theory of morality. Still, Fitzpatrick points out such behaviors do not mean that evolution has no bearing on why we are moral animals. He articulates what he calls a "modest evolutionary explanatory thesis," according to which our evolutionary history tells us something about why we have the tendency and capacity for moral thinking, as well as why our moral thinking is accompanied by certain emotions. We will examine what evolutionary biology has to say about morality in more depth in Chapter 4. For now, we are still left with a serious problem. Consider the following moral judgments (MJs) (again, from Fitzpatrick's work):

MJ1: Interracial marriage is wrong.

MJ2: Homosexuality is wrong.

Until recently, both MJ1 and MJ2 were considered true in Western societies, and both are still considered valid in many non-Western societies. However, most Westerners have moved away from MJ1, and an increasing number of them have also abandoned—or at least seriously questioned—MJ2. But the moral skeptic would obviously say: Doesn't this variety of opinions clearly show that moral judgments are culturally relative? That what is morally "true" in one place or time is not necessarily true in another cultural or temporal context? This is a crucial question. We saw in the last chapter that we cannot derive moral oughts from matters of fact (at least according to Hume). If it now turns out that we have no reason-based approach that leads us to say that something is moral or not, then the relativist might win the field after all, leading to a situation where we have no moral guidance other than our tastes and idiosyncrasies.

This is the territory of so-called *metaethics*—the discipline that examines the rational justifications for adopting any moral system at all (as opposed to ethics, the branch of philosophy that

debates the relative merits of different views of morality and how they apply to individual cases
Metaethical issues are notoriously hard to settle, for a reason very similar to why it has prove
doggedly difficult to provide rational foundations even for mathematics and logic, the quintessenti
areas of pure reasoning. Throughout the twentieth century the top logicians in the world embarked o
an epic quest to find a tight logical foundation for mathematics (a quest delightfully recounted in th
graphic novel *Logicomix* by Apostolos Doxiadis and Christos Papadimitriou). That search for the ho
grail of reason ended in defeat when Kurt Gödel (1906–1978) demonstrated (logically!) in 1931 that
just wasn't possible to find such a foundation. Then again, Gödel's so-called *incompleteness theore*
has not induced mathematicians to hang up their pencils and paper and go fishing, so maybe we to
can set metaethics aside for another day without having to give up the idea of moral reasoning.

That said, it turns out that philosophers think that neither MJ1 nor MJ2 are valid moral judgment
Moreover, they think that the following moral judgment is a valid one:

MJ3: The unmotivated killing of another human being is wrong.

Why? Fitzpatrick summarizes what a philosopher would say about MJ1 and MJ2 in this way: firs
both statements fail to withstand critical reflection; second, the reason some people think that MJ
and MJ2 are true (even though they are not) is nonmoral in nature.

Let's start with the second criterion: it is easy to attribute an endorsement of MJ1 to racism and a
endorsement of MJ2 to homophobia, both of which explanations can be tested independently (that i
we can tell via other means whether a person is racist or homophobic). In the case of MJ3, however,
is hard to think of a nonmoral motive for the judgment.

The first criterion is, of course, trickier, as the type of critical reflection one applies to the allege
moral judgments depends on what type of ethical system (consequentialism, deontology, and so on
one accepts more generally. Still, we could argue that both MJ1 and MJ2 are wrong for a variety o
reasons: they discriminate against an arbitrary group of people (members of another rac
homosexuals); we would not want to have these sorts of judgments applied to our own decisions
matters of marriage and sexual practices; or such prohibitions infringe on personal liberty
situations where no one is being harmed by individuals' choices. MJ3, by contrast, stands up to suc
critical evaluation because, if we did allow random killings, we would soon not have a society
speak of, since a society is a group of individuals who band together for reasons that include increase
personal safety. (Notice, of course, that the word *unmotivated* in MJ3 is a big caveat: it allows for th
moral acceptability of killing someone in, say, self-defense, or for other reasons that need to b
specified and analyzed. The point is that such reasons cannot be arbitrary and at the whim of cultur
trends.)

To take stock, it would seem that moral judgment is still an area where philosophy dominate
because it is hard to justify the equation of what is natural (as in the result of evolutionary processe
or the brains' way of connecting analytical thinking and emotional reactions) with what is right. Th
does not mean, of course, that philosophers have an easy time settling ethical disputes or eve
rationally justifying why we should be ethical to begin with. Still, science does tell us quite a bit abo
how our brains work when we do exercise ethical judgments, and even about how we acquired th
somewhat strange idea that there are "right" and "wrong" things out there. In the next two chapter
we turn to more neurobiology and evolutionary biology to help us make sense of what it means to be
moral animal.

CHAPTER 3

# YOUR BRAIN ON MORALITY

As for morality, well, that's all tied up with the question of consciousness.

—ROGER PENROSE

IN 1667 ONE THOMAS CORNELL WAS HANGED BECAUSE he had been found guilty of murdering h mother. A little more than two hundred years later, one of his descendants, Lizzy Borden, wa controversially acquitted of charges of having killed her father and stepmother. At the onset of th twenty-first century, yet another descendant of the same family, Jim Fallon, is a professor at th University of California at Irvine, where he studies the brains of serial killers. The interesting thing that until a few years ago Fallon was not aware of his family's, shall we say, interesting history or how pertinent that history was to his own academic interests. It apparently was after a casu conversation with his mother that he began to look into it, and the more he looked the more worried got.

To satisfy his own curiosity, he had several members of his family brain-scanned, includin himself. You see, Fallon's research shows that serial killers tend to have very little activity in the ar of the orbital cortex. This makes sense, because that area of the brain is known to interact with ar repress the activity of the amygdala, which—to simplify a bit—is the seat of our strong emotion particularly fear, but also the spring for our aggressive behavior. No activity in the orbital corte means that the normal brakes on the amygdala have been lifted, so to speak, making an individu more prone to violence. None of Fallon's close relatives turned out to have the brain signature of serial killer—but he did!

At this point the biologist began to feel a bit uneasy, but he pressed on with his quest nonetheles There was a second test he could run that would be pertinent, one that didn't deal directly with th structure of the brain, but rather with the genetic bases of aggression. The monoamine oxidase- (MAO-A) gene is found in different variants in the human population, just like most genes. It happen however, that one of these variants is associated with particularly violent behavior and, again, frequently found among serial killers. That variant, nicknamed "the warrior gene," was absent fro the DNA of Fallon's relatives, but as I'm sure you'll be less than surprised to discover, he had it. An yet, Jim Fallon is not a serial killer—he just has an academic interest in the phenomenon. What going on?

Welcome to the increasingly fascinating field of *neuroethics*, where philosophers and scientis come together to better understand (and perhaps improve) the way human beings reason and act fro a moral perspective. This book is about what philosophy and science together can tell us concernin the big questions in life, and if we want to understand these questions in a new light we also need look under the hood, so to speak. We will employ not only the logical scalpel of philosophy to par what people mean by the different ideas that guide their lives but also the microscope of science to t to figure out how and why people behave in certain ways. In this chapter, then, we focus on the hov

of moral reasoning from a neurobiological perspective. We will turn to the whys—what we can te about the evolution of morality—in Chapter 4. And we will wrap up this topic by returning philosophy in Chapter 5, this time armed with a better understanding and ready for better guidance how to live an ethical life.

Jim Fallon does have an idea about why he is not a serial killer. Despite his family history, being carrier of the warrior gene, and having the characteristic deadness in his orbital cortex, anoth element is missing, he believes: the right (or rather, wrong) environment. Fallon had a nice childhoo with no traumas and plenty of affection from his family, but if it had been different—had he bee abused, for instance—then the perfect neuro-genetic-environmental storm would have been unleashe he thinks, and he might have been a subject for someone else's studies on serial killers. Perhaps, b we do not know—we can only speculate about such things. At the very least, the strange case of Ji Fallon highlights the fact that particular genetic or neurological signatures are not *sufficient* to trigg a given set of behaviors. They may, however, be sufficiently important factors to be admitted in court of law.

According to a National Public Radio investigative report in 2010, American courts have allowe evidence about the neurobiology or genetics of violent behavior in about 1,200 cases so far, and looks like this is just the beginning of a trend. For instance, in 2006 in Tennessee one Bradle Waldroup was accused of killing his wife and a female friend of his wife's during a violent outburst the end of an altercation. From a forensic point of view, Waldroup's culpability was obvious and th prosecutors asked for the death penalty. But the defense attorney argued that evidence should b admitted to the effect that Waldroup had the very same MAO-A variant, the "warrior gene," that Ji Fallon found himself carrying. The attorney argued that the defendant was prone to snap und pressure and engage in violent acts because of his genes, and in a stunning outcome the jury agree Waldroup was convicted of voluntary manslaughter and avoided the death penalty.

From a philosophical perspective, there are two reasonable ways of looking at this case, and the carry us to very different conclusions. On the one hand, it is a well-established principle of mode American law that people with extremely low intelligence should not be sentenced to death, even they have demonstrably committed a crime for which capital punishment might otherwise b considered. (Remember that the United States is the only Western country where the death penalty possible to begin with.) The reasoning behind this principle is that, because such people are incapab of the same degree of understanding and decision-making that most of us can muster, the ethical thin to do is to *restrain* them from doing additional harm, but not to punish them for something over whic they had little deliberative power. On the other hand, there clearly has to be a limit to how muc biological considerations can enter into our system of laws or the concept of justice will simply lo any coherence. If the defense is that "my brain made me do it," or "my genes made me do it," simp consider that pretty much anything we do is affected by our genetic makeup, and certainly our brai get involved in everything we do. You see the dilemma.

Moreover, our moral judgments can be skewed by factors that are not nearly as dramatic as havin a silent orbital cortex or a warrior gene. For instance, what if I told you that watching an episode *Saturday Night Live* affects not just your mood (if you appreciate that sort of comedy) but measurab alters your immediate moral judgment? (You become more of a utilitarian, or consequentialist, if yo watch comedy.) Or how about the fact that if I were to ask you about an ethical issue while you we sitting at a dirty desk or smelling an unpleasant odor, you would be more likely to render a seve judgment than if you were at a clean desk or your nostrils were not under assault? Clearly much mo than calm and rational deliberation goes into our moral decision-making, and indeed, much of wh

influences that decision-making flies quite easily below our conscious radar—unless we know it there and we keep our guard high.

We already encountered some of these additional factors in Chapter 2, when we considered sci-p research into the trolley dilemmas, and now it is time to return to the ideas of one of the scientists v have already met, Joshua Greene of Harvard. Greene has reviewed much of the literature on th neurobiology of moral decision-making and has come up with what he calls a "dual-process" theory moral judgment. According to Greene's theory, we change the type of moral judgment we employ– going, for instance, from being utilitarians in the lever version of the trolley dilemma to bein deontologists in the bridge version of the same problem—because we are literally of two minds whe it comes to ethical decision-making.

The basic idea is that our cognitive processes (broadly speaking, our ability to think rationally) a engaged in utilitarian ethical judgment, while our emotional responses (our "gut feelings," o intuitions) enable deontological judgment. This concept creates an interesting situation, considerin that philosophers think of the two types of ethical theory as logically distinct: thus, we may end u with irreconcilable and contradictory judgments depending on whether one form of judgment or th other takes over in our brains.

What is the evidence for Greene's dual-process theory? Perhaps the earliest clue came with th famous case of Phineas Gage, a nineteenth-century railroad construction foreman who survived th freak accident of a long metal rod passing through his head. Much of Gage's left frontal lobe wa destroyed, but this damage did not result in any obvious impairment in his cognitive reasonin compared to before the accident. What did change, however, was his social behavior: suddenly h found it difficult to control his impulsive and emotional reactions. This was the earliest suggestio that the areas of the brain affecting cognition are at least partially different from those controllin emotions, and that it is possible to disrupt (in this case, by accident) the balance between the two.

In the 1990s, research conducted by neurobiologist Antonio Damasio's group zeroed in on a mor specific area of the brain, the ventromedial prefrontal cortex (VMPFC), to show that patients wi damage there made bad decisions when it came to risk assessment, significantly underestimating th risk associated with certain simulated scenarios. The patients responded normally, however, to tes measuring their ability to engage in moral reasoning; the problem seemed to be caused by the inabili of their brains to generate the feelings that normally help guide most of us in analogous situation Interestingly, studies on the neurobiological underpinning of psychopathy also show a connection wi the VMPFC (among other areas of the brain): apparently, psychopathic behavior can be generated by reduced functioning of the amygdala (the same area that lost its cognitive "brakes" in Jim Fallon brain), which in turn may be caused by a malfunction in—you guessed it!—the VMPFC. One of th intriguing consequences of psychopathic breakdown of normal brain activity is that psychopaths don seem to be able to make the distinction that comes easily to most of us between moral rules an arbitrary rules of conduct (such as etiquette-related ones). For them, all rules are arbitrary convention and can therefore be ignored at will. In a sense, a psychopath is the ultimate moral relativist.

Of course, neurobiological studies focusing on exceptional situations—be they freak accidents socially deviant individuals—can tell us only so much. Is there evidence for Greene's dual-proce theory from more standard situations that affect all of us? Indeed there is. In a study carried out b Greene's group, subjects were presented with what the researchers referred to as a "high-confli personal dilemma"—something along the lines of the various versions of the trolley dilemma, f instance. The trick was that some of the subjects were simultaneously asked to engage their attentio with an unrelated (and morally neutral) cognitive task, such as detecting when the number 5 w

presented to them in the midst of a string of numbers. The idea was to cause a simple interferen with cognitive moral processing by diverting some cognitive resources to another problem. The dua process theory would predict that utilitarian moral judgment should be partially impaired by th interference, but not deontological judgment. And that's exactly what the researchers found! It is as one of the moral channels of the brain shares bandwidth (so to speak) with functions like calculatio and identification tasks and the more we are engaged with the latter the worse we do with the forme In addition, we have seen that the experiment can be done in reverse: researchers can interfere wi subjects' deontological judgment simply by altering their emotional state in an unrelated fashion—f instance, by exposing them to noxious odors. And of course, all of these findings have more than ju scientific import: imagine the endless possibilities for willful manipulation of juries by unscrupulo attorneys bent on shifting the balance of jurors' moral compass toward either a utilitarian or deontological extreme.

The dual-process theory is also consistent with what we do when faced with very different sorts moral judgments—those that have to do with the concept of justice (a subject to which we return Chapters 14 and 15). Consider the following, not too hypothetical, scenario: you have one hundr kilos of food available to be distributed to a population affected by famine. However, it takes som time to deliver the food, and this will cause about twenty kilos to spoil and become unusable. If yo choose instead to deliver the food to only half of the population, the spoiled amount will decrease five kilos. What do you do? If you choose to send more food to only half of the population, you a giving priority to the efficiency of your aid program, but if you still try to deliver to the enti population, despite the greater loss of food, then you are prioritizing fairness over efficiency.

This is precisely the sort of conundrum explored by Ming Hsu and collaborators, who presente subjects with a set of scenarios in which fairness and efficiency could be manipulated independent of each other, and who also obtained brain scans of the participants to figure out not only what the would decide to do under each scenario, but which parts of their brains were involved in the decisio making process. They found that three areas contribute to weighing issues of justice: the putamen the part that responds to issues of efficiency, the insula is involved with judgments of inequity, an the caudate-septal subgenual region essentially mediates between the two to come up with a unifi judgment once the person has considered the relative importance of equity and efficiency in the give situation. Looking at these results, it is hard to resist the conclusion that human beings come equipp with a sophisticated "moral calculator," in much the same way as we are endowed with bra machinery that enables us to learn the complex rules of just about any language during the first fe years of our existence.

What is particularly interesting about these results in light of Greene's dual-process theory is th the insula (the inequity-encoding region) is also known to be part of our emotional system; th putamen (the efficiency-encoding region) is involved with the brain's reward system (it is sensitive dopamine, a natural reward drug produced by our neurons), which in turn has been demonstrated to l linked with feeling good about both charitable giving and punishment of free-riders; and finally, an most revealingly, the area integrating these two functions, the subgenual, has been implicated in tru and social attachment. In other words, it looks like a socially well adjusted person has to constant weigh issues of fairness and efficiency and that three distinct but interconnected areas of the bra help us do just that. Hsu and his collaborators conclude:

> More broadly, our results support the Kantian and Rawlsian intuition that justice is rooted in a sense of fairness; yet contrary to Kant and Rawls, such a sense is not the product of applying a

rational deontological principle but rather results from emotional processing, providing suggestive evidence for moral sentimentalism.

We will get to both Kant and John Rawls (1921–2002) in due time, but if you read this careful you will find that it is an example of scientists attempting to override philosophy based o experimental results, a violation of Hume's separation between is and ought. As I argue at severa junctures in this book, however, this counterposition between science and philosophy is misguided an not particularly fruitful. A more interesting reading of these results is that humans have a built-i emotional sense of fairness analogous to the one advocated by philosophers like Kant and Rawls. B this doesn't mean that, just as with any other biological instinct, rational discourse and learnin cannot improve on what mother nature gave us.

Although Greene's dual-process theory is beginning to look like a good way to think about th relative roles of reason and emotion in moral judgment, it is not without its critics. Bryce Huebner Tufts University, Susan Dwyer of the University of Maryland, and Marc Hauser, formerly of Harvar have pointed out the obvious problems: from a correlation between emotions and ethical decisions doesn't follow that the first causes the second; it may just as easily be the case that certain decisio of moral import cause us to experience specific emotional reactions. Huebner and his collaborators d not, of course, deny that emotions are an integral part of the psychology of moral decisions. F instance, it is hard to ignore the fact that the emotions of guilt and shame not only are felt after certa actions but are powerful factors preventing the recurrence of such actions. Still, their paper presen not one but five different models of what they call "the moral mind." Interestingly, four of the fiv models are associated with the name of a philosopher because each of these four models reflects well-known type of moral philosophy. Let's take a quick look.

The first possibility considered by Huebner and his colleagues is what they call a "pure Kantian model: just as philosopher Immanuel Kant thought, in this model Reason influences Emotion, and th in turn generates moral Judgment (thus the causal chain looks like R > E > J). Alternatively, a "pur Humean" model is characterized by the fact that Emotion gets the process started, generatin Judgment, followed by our ability to come up with Reasons why we made that judgment (E > J > R The third possibility, not surprisingly, is a hybrid Kant-Hume model, where both Reason and Emotio interact to yield moral Judgment (E,R > J); this, of course, is essentially a restatement of Greene dual-process theory. A fourth model is termed by the authors "pure Rawlsian" because it is based o John Rawls's ideas about justice as fairness (to be discussed in Chapters 14 and 15); here mor Judgment comes first (the result of an Analysis of possible Actions), and both Reason and Emotio are deployed to justify it and to act on it (AA > J > E,R). Finally, a "hybrid Rawlsian" model enlis Emotion to carry out action analysis, which then leads to Judgment and finally to the articulation Reasons in its support. (This would look diagrammatically a lot like the pure Humean model, exce for the added interaction between Emotion and Action Analysis: AA/E > J > R).

The interesting point raised by Huebner and his colleagues is that the current empirical evidenc does not conclusively discriminate between the five models; indeed, the fifth had not even bee articulated in print until they published their paper. Things, therefore, are a bit more complicated tha what I have already outlined, though I remain convinced that some version of the Kant-Hume mod (that is, a dual-process model) is the one currently favored by the totality of the available evidence.

There is another fairly big set of caveats that an intelligent user of scientific investigations into th functioning of the brain has to keep in mind. As pointed out by Kristin Prehn and Hauke Heekeren studies like the ones we have examined so far (and to which we return in Chapter 16 when we look