

# HARDWIRED BEHAVIOR

**WHAT NEUROSCIENCE  
REVEALS ABOUT  
MORALITY**

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## Neuroscience and Morality

Neuroscience advances during the past few decades have been nothing short of astounding. Our notions about how the brain works and the relationship between mind and brain have been radically changed as we have come to understand how parts of the brain function to provide a wide range of human functions – from short- and long-term memory to the production of fear when certain areas of the brain (most particularly, the amygdala) are activated, and to how the brain’s cognitive centers influence and are influenced by regions of the brain that produce emotions.

Many traditional notions of the “mind” as it reflects a dichotomy between mind and body are being revised. Evidence that the brain “makes” the mind is strengthening with indications that brain and mind are not two entirely different realms, but rather that the physical brain has the major role in creating and shaping our emotions and thinking.

With these ideas in mind, I began wondering about the impact of the brain on moral thinking. Because the brain is basic to decision making, it must play a powerful role in our thinking regarding moral issues, and consequently in the way we treat each other in our society to maintain order and uphold fairness, individual rights, and equity. Through my research on these issues as they involve a wide range of behavior, I learned that much thinking and some research have already gone into the impact of neuroscience on morality. Our view of morality has already been altered by new understanding

of brain biology, and at the rate that new discoveries are being made, that view will change even more in the future. With these changes will come the understanding that we can intervene at the most fundamental biological levels to affect moral development. Herein lies the primary dilemma posed by these new advances: The modifications in morality empowered by neuroscience will lead to hard choices on how we as a society want to handle these changes, how we want to deal with each other, and the untoward potential consequences of a biologically engineered morality.

### **Moral Precepts**

When I started to think about the biology of morality, I cast around for a frame of reference, one that would help me convey how our culture identifies and classifies right and wrong. My first instinct was to look to religion; all religions have well-defined notions as to what is “good” and what is “evil,” and with minor variations religions are in agreement about serious immoral acts. Murder, stealing another’s property, and infidelity are forbidden by nearly all the world’s religions. These notions of right and wrong have provided a set of rules for human conduct, particularly involving personal relationships, and form the infrastructure of a socially constructed system that exerts, at the very least, informal controls over individual behavior.

According to the Judeo-Christian tradition – which has been the foundation of social morality and laws in Western cultures – from as far back as Genesis humanity has been forced to confront evil. When Adam and Eve disobeyed God and fell from grace, this tradition holds, they changed the nature of Man. The Old and New Testaments caution us each to work every minute of our lives to be faithful to the integrity of our soul, which reflects God’s wishes for goodness.

An important dimension of our grappling with our potential for “evil” is self-awareness. Of the ancient philosophers Socrates was reputed to be the first to espouse the value of “Know thyself” as a guiding principle, and over the centuries this “self-knowledge”

has not been limited to recognizing our desires and unique abilities. It has required searching within ourselves for knowledge of our “dark” side, our predisposition for evil. Worldly considerations and our emotions may lead us to the ways of “evil” but – theoretically at least, in the Socratic view – we can gain control over these tendencies by understanding our deepest feelings, passions, and needs.

To heed Socrates’ advice in our day and age in culturally diverse societies is daunting, to say the least. I suggest that we examine instead the moral precepts developed as guides by humankind in the postclassical world. These precepts may have once been religion-specific, but today they apply generally to civilized societies and, despite their once religious pedigree, have a modern ring to them. They are in fact the moral values that we generally embrace – secular descriptions of our modern moral consensus.

The “moral” proscriptions on behavior appear in one section or another of the Old and New Testaments. In the Jewish faith, the Sixth through the Tenth Commandments, and in later Christianity’s Seven Deadly Sins, certain behavior that we might term immoral for all human society is proscribed. The Deadly Sins is a listing believed to be the work of Saint John Cassian, a monk who lived in Egypt and France during the latter part of the fourth and early fifth centuries.<sup>1</sup> Cassian wrote two principal works of rules for governing the monastic life,<sup>2</sup> which included eight books devoted to what he called obstacles to perfection – impurity, covetousness, gluttony, anger, ennui, vainglory, pride, and dejection. Pope Saint Gregory (the Great), who lived from the middle of the sixth to the early part of the seventh century, has been credited with refining the list to the Seven Deadly Sins (or “capital vices”).<sup>3</sup> His list was closer to the modern one and did not include some of the terms, like “ennui” or “dejection” (though “ennui” might be interpreted as distantly related to “sloth”).

These moral precepts fundamental to Judaism and Christianity have permeated Western culture, serving as the basis of countless literary works over the centuries. Dante in his *Divine Comedy* conceived of moral infractions as transgressions against “love,” and grouped them according to three broad classes: wrath and pride;

infractions that created “insufficient” love, such as sloth; and finally lust and greed, inducing “excessive” love or undue desire for material goods.

Geoffrey Chaucer in *Canterbury Tales* and Edmund Spenser in *The Faerie Queene* explicitly addressed these moral infractions. Spenser created visual images of individual immoral acts like gluttony and lust. In the early nineteenth century, the novelist Jane Austen devoted much of *Pride and Prejudice* to the impact of her leading male character’s pride on the society around him and to the biased reactions of the woman (Elizabeth Bennet) he had grown to love. More recently Stephen Sondheim and George Furth, in their play *Getting Away with Murder*, constructed characters to represent the Seven Deadly Sins. An entire series of murder mysteries by Lawrence Sanders takes its titles from these sins.

In relation to contemporary secular society, each moral transgression anchors an evil. Within this framework we go from mild or seemingly insignificant nuances of infractions to the most profound offenses, such as those described in the Ten Commandments. Nearly every act that we may deem immoral relates to one or another of these breaches. Wrath or anger, for instance, can be petty, manifesting itself in social slights against another person, such as not inviting someone to an important social event because of unresolved past grievances. It can also be the basis of harmful psychological and physical acts. At the very extreme, homicide and even suicide find their sources in anger. Lust can also fall along a spectrum from a private interest in pornographic magazines and salacious movies to the imposition of one’s sexual desires on another person, such as taking advantage of one’s superior position to demand favors. When combined with anger, lust can lead to serious criminal behavior and sexual psychopathy – rape, assault to exact sexual pleasure, and even homicide.

Behavior that might easily classify as “greed” or avarice also falls along a spectrum from mild to serious. Mild greed might be an unwillingness to donate one’s money to assist a socially important cause. On the more extreme level of greed are the many white-collar crimes of corporate executives skimming off millions for themselves at the expense of employees who suffer devastating reductions in

their retirement savings and the prospect of serious financial problems as they get older. In many cases this is done with the contrived appearance of legitimacy; in others, money is confiscated or embezzled by those in a position of trust. Perhaps even more reprehensible is when greed goes beyond acquiring money and goods to involve the physical destruction of innocent people, as when the clerk in a convenience store is shot for a few dollars in the till.

### **Do Moral Precepts Arise from Social Concerns?**

The Ten Commandments and the Seven Deadlies are handy and simple references whose fame has spread far from their original sources: Moses (if you will), a Catholic saint, and a pope. And that begs a question: If Moses, Saint John, and Saint Gregory hadn't articulated them, would someone else have? I think so. Morality deals with people and how they relate to one another. One can engage in immoral acts by oneself, like shooting up heroin or snorting cocaine, but one is not immoral alone. One's actions – even if essentially victimless – affect others in society.

Social scientists have theorized for years that morality has its roots in primitive societies, claiming that the ways people treated each other determined whether they would survive or fail in the natural world. Men had to learn to work together to obtain food and protect their families against predators and natural disasters. In the formation of the family unit and of societies that would focus on the common good, rules of conduct emerged to ensure that communities would work in harmony and that dissension would be minimized or completely averted.

Basic human emotions, such as the territorial imperative (the need to control land and other property, as well as defined and predictable relationships, particularly with mates),<sup>4</sup> and the desire for love, affection, and respect had to be recognized and carefully factored into the structure of community. A male who aggressively sought out another person's property and disrupted that family unit by seducing the other man's wife would create enormous tensions, not just between the two males, but within the community at large.

These tensions would be destabilizing and could lead to serious disorder and the weakening of the bonds in the community.

By the same token, it is important to recognize that these “sins” involve behaviors that created an evolutionary advantage during certain early phases of man’s development. They served the ends of individuals and to some extent groups. For example, greed and aggression (which activates the same reward pathways as drugs of abuse) led to ruthless leaders. The compulsion to eat, reflective of genes that lead to obsessive behavior, had the advantage of holding people over during periods of famine. Women having “extramarital” affairs resulted in children, which increased genetic diversity. Even homicide, during periods of limited resources, ensured the survival of some over others; perhaps, arguably, the stronger physically and emotionally would succeed.

The creation of “community” did not happen overnight; it developed over many millennia. People came to understand that emotions like shame, guilt, disgust, and fear of abandonment could be used to induce the individual to practice self-control for the common good.<sup>5</sup> Hence, according to many social scientists, agreed-upon morality came to serve as the device to use these emotions to control individual behavior. Over time, some system of rules for behavior had to prevail if a community was to prevent its own disintegration.

Today, research in evolution, genetics, and neuroscience is showing that what appeared to evolve from social need had in fact far more complex origins. It now seems more likely that human biology had to be of a certain type for society to be shaped in particular ways.

A new science, evolutionary psychology, emerged in the 1990s to focus on explaining human behavior against the backdrop of Darwinian theory.<sup>6</sup> This science considers how the biological forces of genetics and neurotransmissions in the brain influence unconscious strategies and conscious intentions, and proposes that these features of biology undergo subtle but continuous change through evolution.

Though it is indeed a social construct, morality gets its timelessness and universality from the human brain. The community’s de-



mands for cohesiveness and continued existence – its own ideas of what is appropriate human behavior – brought into play certain qualities that were already present in the human brain.

We have some evidence to support this view. We know that the limbic structures of the brain, often referred to as the “old” brain, are the physical circuitry for our emotional responses – fear, disgust, guilt – to the environment. These structures work in concert with the prefrontal lobe to attach emotions to specific behaviors. When we have done something that we feel was terribly wrong – like failing the final examination in mathematics in college because we stayed up the night before at a party – our prefrontal lobe considers the facts and checks them against a particular set of emotions. We feel shame because we have been trained from childhood to understand that our parents and friends will look disparagingly at our failure. Over time we internalize that emotional response and automatically feel shame whenever we are not successful.

Similarly, guilt can be induced by certain kinds of behavior that our family and society see as bad. When we cheat on a test because we are ill prepared, or simply can’t understand the complexity of the problems being presented, we naturally feel guilty about it.

We are not constructed to have consistent reactions of guilt or shame to specific types of behavior. Changes in attitudes and mores about human conduct will bring about adaptation in us to conform to what is going on in the environment. Certain thoughts and actions have always resulted in feelings of guilt, shame, and fear. Most significant of these are incest and homicide. Many kinds of behavior, however, are perceived differently by society now than they were even a hundred years ago. For example, attitudes toward premarital sex and infidelity have changed again and again and radically through the ages, depending upon a given society’s mores. What was totally unacceptable a mere hundred years ago in our society, for example, may today be treated with a “get over it” attitude or by divorce.

Support for the evolutionary and biological thesis of social morality comes from our understanding of natural selection and evolution from primates and other animals.<sup>7</sup> Darwin recognized that social instincts exist among animals and believed that the development

of a moral conscience was related to well-developed intellectual powers.<sup>8</sup>

Thomas Huxley,<sup>9</sup> one of the major proponents of Darwinian theory, and more recently Richard Dawkins,<sup>10</sup> felt strongly that morality had to be learned, as a person was born to be basically self-interested, or selfish. Huxley went so far as to claim that human nature was fundamentally evil, with morality essentially a human invention. He saw it as a system to control competition and selfishness.<sup>11</sup>

Recently conducted research by many evolutionary scholars – most particularly the cognitive ethologist Frans de Waal – has questioned the validity of Huxley’s and Dawkins’ views. Since the early 1900s biologists have been aware of how evolution favors mutual assistance among animals.<sup>12</sup> In *Good Natured: The Origins of Right and Wrong in Humans and Other Animals*,<sup>13</sup> de Waal writes about his discovery that primates engage in many acts, such as sharing food, that are antecedents or building blocks of morality.<sup>14</sup> Sharing (which is not limited to apes)<sup>15</sup> may take the form of “reciprocal altruism,” where even though giving is contingent on receiving, there may be a time lag before the favor is returned and the benefit to the recipient may require a significant cost and risk to the giver.<sup>16</sup>

De Waal and his colleagues have also shown that apes and even monkeys hold negative acts in mind as well and are capable of revenge.<sup>17</sup> Violations of the social code, such as when a chimpanzee cheats another chimpanzee by not returning a favor, can result in what has been called “moralistic” aggression. Furthermore he has found that nonhuman primates are capable of conflict resolution, consolation, and expressing empathy, sympathy, and even community concern.<sup>18</sup>

## Neuroscience and Moral Precepts

The fact that morality in humans evolved from other primates and depends on the brain for its universality and stability does not negate the importance of social forces in its creation, or the role of “free will” in its execution. The moral proscriptions in the Judeo-

Christian tradition are our articulation of responses etched in the biological structure of the brain. We have the ability to understand how these proscriptions developed and to recognize the importance of regulating them for an ordered society. Furthermore we can alter our behavior to square with our understanding of the wrongness of certain behavior, and we can thus exert control over our emotional responses to provocations.

Recent neuroscience discoveries are adding twists to this equation. We are getting a handle on brain biology as it relates to specific moral precepts, and in time all of them will be seen as originating, to some degree, in biology. This understanding might suggest that under certain conditions “immoral” behavior is not necessarily the product of willful acts. By controlling behavior, brain biology might be responsible for some of the extreme manifestations of these bad behaviors. In that case, some individual “sins” may not be “sins” at all.

Three of the Seven Deadlies, for example, have already been shown to be affected by biological factors in varying degrees, and in some cases the individual may have little power, or “free will,” to prevent them from happening. These three are gluttony, sloth, and lust.

*Gluttony* is a complex concept, but we have made some progress in understanding it. To a large extent, the “immoral” character of gluttony flows from the notion that this behavior consists of excessive consumption, waste, and a basic unwillingness to exert self-discipline. It is this tendency toward excessive self-indulgence that most likely resulted in gluttony’s inclusion as one of the Seven Deadly Sins.

With regard to the most conspicuous display of society’s notion of gluttony – obesity – the two conditions are not always compatible. Many causes of obesity have nothing to do with lack of control or excessive self-indulgence. Metabolism, which is genetically determined, can result in weight gain despite efforts toward control of excessive eating. Studies have shown that obesity may involve either of two brain systems: the system that sends hunger and satiation messages to the brain or the system associated with the reward circuits involved in drug (cocaine, heroin, marijuana) addiction.

Gluttony is on its way to being seen as part of the spectrum of addictive diseases. Research is already showing that gluttony and obesity may involve abnormalities in specific areas of the brain. With the use of positron emission tomography (PET scans), researchers have shown within the past few years that the human brain is highly sensitive to food and that the presence of food increases brain metabolism in specific areas.<sup>19</sup> Increased metabolism in the right orbitofrontal cortex correlates highly with self-reports of increased hunger and desire for food, just as it does for drugs in those who are addicted.

*Sloth*, or pathological laziness (another of the Seven Deadlies), is closely aligned to depression. A person experiencing serious depression has no desire to do anything. Some people suffer a “retarded” depression, which means that they think and move slowly, are unable to concentrate and focus on information, and may experience some memory loss. This is clearly a biological condition, as we know that in depression major neurotransmitters – in particular serotonin, dopamine, and norepinephrine – have been decreased in amounts in the synapses of neurons located particularly in limbic structures. Though an individual may appear willfully lazy, often he (or she) is suffering from an underlying depression and is biologically limited in his ability to become active and productive.

The third “sin,” which relates to the Sixth Commandment against adultery, is *lust*. The biology of testosterone and its impact on structures of the brain – such as the hypothalamus – of vulnerable individuals, mostly men, has been the focus of much research on sexual behavior. Again, extreme behavior seems to be aligned with addictive propensities in the brain. The power of “lust” varies among individuals. Some people have minimal sexual desires. This may be due to less testosterone, or to differences in the brain biology that responds to hormones. Others may have overactive libidos, whereby they become obsessed with sexual thoughts and indiscriminately engage in sexual behavior. The two extremes may reflect biological differences. The person consumed with lust may be powerless to exert free will and control his or her behavior. When lust is

combined with anger it can result in violent acts – rape, assault, and even murder.

With more research we are likely to find that other behaviors proscribed in the Ten Commandments or in the Deadly Sins are also influenced by biological factors. Such findings do not suggest that those afflicted with strong biological pressure are without responsibility for their behavior. But in some cases the biological influences may be so intense as to preclude restraints of behavior through free will. Neuroscience findings that are supporting the power of biology have been forcing a reexamination of the morality of much behavior, as well as the importance of handling abnormalities through medicine rather than guilt, shame, and criminal sanctions.

This is not to discount the relevance of “free will”; but under some circumstances its importance does diminish. In the same vein, I am not saying that there is no such thing as “immoral behavior” simply because we can demonstrate its specific biology. The idea of a moral transgression is a nontechnical compass pointing to behavior that can injure oneself or one’s society. Biology is unlikely to supply all the answers necessary to erase the uncomfortable notion of immorality, but evidence is building that brain biology will make major advances in that direction.

In this book I examine the history of our general ideas about morality and its development through childhood; show how modern neuroscience research is shifting the focus to the brain as a physical organ shaping moral responses; and illustrate the outcome of defective “brain wiring” in the development of undesirable moral traits. Finally, a view through the crystal ball into the future will explore how the shift to “physicalism” will lead to hard choices about how we deal with each other, and will discuss the potential for political control to create a homogenized moral society.

## 2

# Morality and the Mind

*Men ought to know that from the brain, and from the brain only arise our pleasures, joys, laughter and jests, as well as our sorrows, pains, griefs and tears. Through it, in particular, we think, see, hear and distinguish the ugly from the beautiful, the bad from the good the pleasant from the unpleasant. It . . . makes us mad or delirious, inspires us with fear, brings sleeplessness and aimless anxieties. . . . In these ways I hold that the brain is the most powerful organ in the human body.*

*Hippocrates (c. 460 BC–c. 377 BC), from “The Sacred Disease”*

One of the most astonishing things in the history of the brain is the seesawing between mentalism (focus on the mind as separate from the brain) and physicalism (emphasis on the primacy of the physical brain). As early as 400 BC, Hippocrates acknowledged the brain as the center of human emotions and thinking. During the ensuing centuries this viewpoint moved like a pendulum from that position to one espousing the dynamics of mental processes. Now, it appears, we are returning to a belief in the primacy of the brain.

When I began my practice in the late 1970s, psychiatry was in transition. A different model was replacing psychoanalytical explanations for mental and emotional illnesses, which had focused on the impact of infant and childhood development, particularly interactions with parents and siblings, for creating adult neuroses and psychoses. Research on behavioral genetics and brain neurotransmitters was bearing fruit, so that by the 1990s there was increasing

acceptance of the notion that serious mental illness had its origins in biological dysfunction.

Blaming abnormal genes and neurotransmitters for depression, anxiety, panic, and even schizophrenia had become more commonplace than blaming victims and their backgrounds. No longer were expressions like “snap out of it,” which created the impression that we control our mind and emotions, being offered to a seriously depressed or suicidal person. The zeitgeist had changed. With the publication in 1993 of *Listening to Prozac*, everyone became aware of the power of antidepressants and the general view that psychiatric illness involves brain biology.

As a psychiatrist I have seen many patients who suffer from a wide variety of mental and emotional problems, from serious depression, bipolar disorder, and panic, to marital disharmony and inability to function on the job. As with those who are mentally healthy, many of these patients presented moral quandaries. Several years ago I treated one such patient, a 35-year-old married lawyer, for depression. He presented an impeccable image. His shoes were so well shined that they looked like mirrors. It wasn't until after several visits that he confided in me that he abused cocaine while frequenting houses of prostitution. He admitted that his wife was completely unaware of this hidden side of his life. When I confronted him with the moral dilemmas his activities produced, most particularly the infidelity, lying, and betrayal, and exposing his wife to the possibilities of developing a serious illness, he seemed indifferent to these issues. His concern was only that she not find out about what he was doing because she would likely retaliate and cause serious problems for him. He seemed incapable of understanding or chose to ignore the morality of his behavior.

I had similar experiences with other patients, causing me to wonder if our understanding of morality at this time in history is similar to our knowledge about mental and emotional illnesses before the biological revolution in psychiatry. Could it be possible that we are assigning too much power to “free will” and blaming the perpetrator, who may instead be a “victim” of his or her own biology?

The accepted wisdom about morality is that we learn what is good and what is bad from parents, teachers, and religious leaders.

But we are also told that our ability to abide by these “moral” rules is seen as reflective of our character or personality: People of good character possess moral strength or integrity;<sup>1</sup> they would not cheat or take advantage of others; those who are immoral have bad character.

An individual confronted with a moral choice processes in his (or her) mind reasons for his decisions and actions. A person of strong character places his wants and desires in perspective by recognizing what others want; when he carefully balances competing factors he is most likely to make a moral decision. The mind of the individual, his intention, controls his character, which thereby determines how he will handle competing interests. By being self-indulgent and indifferent to the harm of others, the 35-year-old lawyer showed he had a weak character. He considered the options and impact of his decision and came out in a self-interested way. He had a choice and could have taken a different route.

This conventional way of looking at moral decisions focuses on the mind of the actor. Each of us operates to some extent under the influence of self-interest,<sup>2</sup> but we have the power to be sympathetic to others, and to choose against our own interests in keeping with social and moral standards. The accepted wisdom is that we have free will and control over our minds. Therefore, when we engage in an immoral act, we choose to do so.

With few exceptions, this belief has dominated much of Western European tradition for centuries. Exceptions have been made for mental illness as a condition that may influence a person’s capacity to make a moral choice,<sup>3</sup> but generally people are seen as intentional and responsible for their actions.

### **Moral Development in Children: Three Mentalists**

Three towering figures took up the question of how morality develops in children. These three – Sigmund Freud, Jean Piaget, and Lawrence Kohlberg – were “mentalists” in the sense that their focus and object of study was the mind, not the body or brain. Virtually by themselves they shaped our fundamental views of moral develop-



ment. Freud, the first of these, began spelling out his theories during the early twentieth century. Through his explication of the unconscious and early childhood experiences that shape adult behavior and thinking, he set the stage for Piaget, who constructed a framework for understanding the stages of development in the way children learn how to think and judge ideas and facts. Influenced by Piaget's staging of cognition, Kohlberg applied this dynamic to how children learn about morality.

Their theories still underlie contemporary cultural notions of child rearing, influencing experts like Drs. Benjamin Spock and T. Barry Brazelton. Each of these thinkers in psychomoral development contributed incrementally to the understanding of how the mind works; how intentions, desires, and intuitions as well as the power of socializing factors such as sympathy, empathy, sociability, and integrity guide us and shape our decisions.

Freud, Piaget, and Kohlberg tried to understand human thinking and behavior by assessing what was in the mind of the individual. They saw intellectual and moral development as requiring instruction. They explored what family and environmental factors affect the mind in early development, and set out ways to usher the young to higher levels of moral maturity.

The great theorists of the mind have given us ways of thinking about human behavior that serve as building blocks for a more scientifically accurate view of the species. All of them, especially Freud, saw in general terms the value of biology in human functioning.

Though he started out as a bench scientist in Vienna, Freud was denied academic opportunities for working in physiology (today, neurobiology) because he was Jewish. This forced him to shift his attention to another area that did not require resources such as a laboratory. He focused instead on the influences of early childhood development on forming the personality of the adult. He did not believe that humanity had an inherent moral sense, but instead saw the necessity of repression of sexual and aggressive instincts to create social-mindedness. How we learn to make choices, he felt, came from a balance of the forces of the unconscious, particularly instincts and desires (the "Id"), against those of the "Ego," which is the conscious part of us that relates to the environment

to bring about adaptation.<sup>4</sup> To Freud, understanding the mind by examining its contents and early social development was the key to understanding the power of unconscious and conscious factors in shaping character.<sup>5</sup>

Following many of Freud's ideas, Piaget also emphasized the child's mind, although the name of his theory, "genetic epistemology," suggests a prominent, if unknown, role for biology. His theory described the seemingly programmed way children grow and develop in their cognitive capacities, the faculties for recognizing and handling moral issues. This system of cognitive growth, he claimed, occurred in four major stages.<sup>6</sup> Each stage builds on the cognitive skills mastered in the preceding one, leading to the final stage, which he referred to as "formal operations." This occurs between eleven years of age and the end of adolescence, and is manifested by abstract thinking and deductive reasoning. Through adaptation, or the ability to interact with and adjust to the environment, the child learns how to take in new experiences from his or her environment and to shape knowledge to reality.<sup>7</sup>

Following the idea of stages laid down by Piaget, Lawrence Kohlberg further refined moral-development theory with detailed descriptions of the stages of evolution in moral judgment.<sup>8</sup> Kohlberg focused on moral reasoning and the developmental changes that occur through a sequence of stages that serve to change or reorganize an individual's way of thinking.<sup>9</sup> With each stage of reorganization – which, as in Piaget's system, integrates the insights from previous stages – the child achieves more understanding and the ability to handle a diversity of viewpoints regarding moral conflicts.

Kohlberg constructed three levels of moral development.<sup>10</sup> The first, the *preconventional* level manifested most frequently in children under ages 9 to 11, but also in adults, is where the "don'ts" are seen as responsible for punishment. To the individual at this level, social rules and expectations are not internalized: They are imposed on the child by others.

The second, the *conventional* level observed in adolescents and adults, involves understanding and upholding the rules and values of society. At this level the individual identifies with the rules and expectations of others in society. An illustration might be an ado-

lescent girl who knows it is wrong to smoke marijuana behind the school gym, and chooses as a result not to because of a desire to follow parental and societal rules.

The third and final level is the *postconventional* level, where social rules are critically examined against the backdrop of universal human rights, duties, and general moral principles. According to Kohlberg only a small number of adults reach this level of moral development, where a person's values are defined in terms of principles he or she has chosen.<sup>11</sup> Protesters during the Vietnam War illustrate this postconventional level, for they were clearly going against social and political "rules" to support their positions on what is a "just" war.

The staging concept was seen by Kohlberg as universal. He and his followers claim that anyone studying moral development in children through interviews and evaluations of the logic of a child's thinking will inevitably arrive at these three levels.<sup>12</sup> Furthermore they contend that, under normal circumstances, developmental change consistent with logical analysis will be upward in direction to increasingly sophisticated levels, with perhaps some differences in the content of thinking. For example, using Kohlberg's model in her examination of moral decision making in women, Carol Gilligan showed differences in the content and process of thinking between women and men. She saw men as more focused, directed, and deliberate, whereas women she saw as more encompassing and broader in the range of issues they consider in arriving at a moral decision. She also followed Kohlberg's pattern of shifting upward to higher levels of sophistication.<sup>13</sup>

### **Attachment: A Basic Element of Morality**

In keeping with "mentalism," theories about attachment support the idea that morality is a social construct, a set of rules that is intended to maintain order and cohesiveness among a group of people. Where the power of these rules and our desire to follow them comes from has long fascinated moral thinkers. Psychological research suggests our moral impulse is related to an infant's need for

attachment to parents. A child's craving for love, warmth, and human contact sets the stage for moral development. To ensure that a child continues to receive benefits from his or her mother, there is a powerful incentive in the child to imitate and please the adult.

John Bowlby, one of England's leading psychologists during the latter half of the twentieth century, showed in his pioneering work on attachment that an infant begins to demonstrate attachment behavior toward a caretaker within the first month of life.<sup>14</sup> This behavior intensifies with increasing proximity to the object of attachment, usually the mother. In return the mother becomes "bonded" to her child, and this ensures that the child will be secure and benefit from the mother's mentoring. Such behavior occurs in humans, primates, and many animals.

Bowlby believed that "attachment" behavior has a Darwinian (natural selection) evolutionary basis, ensuring that the young will be protected by adults.<sup>15</sup> Those incapable of attachment would fail to survive. It is particularly beneficial for humans and other species that have extended periods after birth of nurturing their young. In humans there is a long period when nurturance is necessary if the child is to develop the ability to form relationships and to have the cognitive capacity for complex intellectual thought.<sup>16</sup>

Attachment and bonding facilitate the passage of moral understanding and behavior from one generation to the next. According to Bowlby, attachment leads to sociability (although much developmental neuroscience now suggests sociability is hardwired), and sociability drives us to create and shape moral understanding. A child's desire and need for attachment, or for affiliation, and the mother's caring response and bonding provide the dynamics for the son or daughter's adherence to parental values. To maintain the attachment, the child will do whatever he or she thinks is necessary to please the parents.<sup>17</sup> Even though a child possesses a complex brain that is capable of constructing alternative beliefs and actions, the fear of loss or disengagement from a parent usually ensures that the latter's values will prevail.

This relationship between parent and child regarding core values is the bedrock for societal values and sociability. The transmission

of morality enabled by the dynamics of attachment from generation to generation ensures consistency of basic values in a culture.

Of course, this also encompasses vast diversity. We know that cultures differ to some extent on what they consider immoral, as they do in what they consider insane. In some cultures polygamy is allowed; in others it is strictly forbidden. The social acceptance of “deviant” sexuality, such as bisexuality or homosexuality, varies among cultures. Respect for dead members of a group also seems universal, and in nearly all cultures eating parts of a deceased’s body would be strictly forbidden. Yet, we know that in certain tribes in New Guinea the brains of dead relatives, ancestors, are eaten as a show of respect.<sup>18</sup>

Even such a taboo as incest is actually defined differently in different cultures. Sex between parent and child is forbidden in all cultures, as it is between brother and sister, but in ancient Egypt brother and sister relationships were allowed in the royal family. In contrast, the incest taboo in some cultures may extend as far as to second-order cousins.

### **Merging Nature and Nurture**

Though seen as a feature of “mentalism,” attachment is being understood increasingly as a dimension of “physicalism.” Attachment does not simply result from learning. We know from studies that the capacity for attachment must be present in the brain of the child or it will never occur. It is possible to determine one’s temperament at birth, which suggests that the newborn’s basic response to his or her environment is set in the brain.<sup>19</sup> Children born, for example, with severe autism are virtually incapable of forming bonds with adults or other children. Also, children who have been socially deprived from birth reach a certain point in their development when they lose the ability to attach and be bonded.

The theories of moral development with their escalating stages of maturation also involve more than just environmental or instructional exposure. Piaget, Kohlberg, and Freud helped us understand

the way children reason at various stages of their personal development, and the psychological process that allowed for this achievement. But they didn't address the physiological changes in children's brains that allowed for their movement through these stages.

Though geniuses in their theorizing about human thought and behavior, these three researchers were nonetheless limited by the biological knowledge of their time. Hence they lacked the sophisticated means for understanding how the brain functions. The tools for investigating the brain did not exist. During most of the first half of the twentieth century, genetics was primarily a descriptive science, meaning that information was obtained by observing in animals and plants how traits (predominantly physical characteristics) were transmitted through generations. DNA's structure was not discovered until the 1950s, and the correlation of specific genes with thinking and behavior have only recently begun to bring about interesting results.

These changes during child development, as we are now learning, had to involve basic biological changes in limbic structures and the frontal lobe, as well as instruction from the environment. As with attachment, the child must have the innate capacity to understand emotionally and cognitively at each of these stages.

This shift from "mentalism" to "physicalism" forces us to focus on the dynamics of nature versus nurture in trying to comprehend how the brain functions, particularly with regards to morality. Those who believe in the supremacy of nature over nurture see genetics and brain biology as the important factors in shaping an individual's personality and abilities. In contrast, the proponents of nurture see most of a person's abilities and behavior as due to cultural learning. Even though they may accept the presence of genes and brain biology, they see humanity as a product of learned culture, which is passed on from one generation to the other.

But this distinction between nature and nurture no longer seems relevant because of scientific discoveries. Basic human dynamics are being shown more and more to be based in biology. The biological capacity to react in specific ways may be transferred genetically or result from changes in the biology of the brain brought on by very early conditioning. What seems most likely is that there is usually

in operation a combination of *selection* factors, or the genetic capacity for transferring the trait, and *instruction*, which refers to an environmental event that may trigger the innate capacity present in the genes (see Chapter 6). This latter dynamic appears to operate for most behaviors, as it appears that the transmission of a genetic tendency is not in itself sufficient to ensure the presence of a trait. Rather, gene transmission must be followed by some “instruction” as the child ages.

### **From Mind to Brain: Completing the Circuit**

“Physicalism,” in the broad sense of characteristics that are innate to humankind, has a long and distinguished intellectual history, although the technology to bring it to the level of brain biology is only recent. Philosophers and thinkers from Aristotle<sup>20</sup> to Saint Thomas Aquinas<sup>21</sup> claimed that man’s nature was to be social. Aquinas argued that human sociability is an example of “natural law” or of man possessing an innate tendency to be rational and social. In keeping with this position, man would be disposed by nature to rely on his reasoning and social instinct to abide by the moral law. Natural law emerges from the awareness of ordering in nature, of laws that underlie the physical and mental dimensions of man. Moral law, therefore, is simply an expression of this tendency for social order and reason, qualities perceived of as inherent to man.

The concept of natural law dominated Western thought for centuries. Some philosophers added nuances to the basic principle. For example, Adam Smith believed that sympathy was another motivation behind behavior.<sup>22</sup> It was not just that people had the tendency to be self-interested, although that was an important element.

The modern world was influenced by the scientific revolution of the nineteenth century, in particular the scientific method, which promoted questioning given “truths” and organized the pursuit of knowledge into the formulation of a problem, the obtainment of data through observation and experiment, and the construction and testing of hypotheses. This scientific approach brought about major changes in our perception of morality. Natural law, or anything

resembling a naturally endowed moral sense, was discarded as fundamentally wrong.<sup>23</sup> The focus turned to what could be empirically tested and understood. Paradoxically, the way we are now looking at the brain and mental processes is a story of conflict and reconciliation. The new brain biology is likely to resurrect natural law, though perhaps in a different form than that of Aquinas and the Middle Ages.

The twentieth century was a period of intellectual ferment with thinkers such as Karl Marx, Sigmund Freud, Jean-Paul Sartre, John B. Watson, B. F. Skinner, and E. O. Wilson proposing very strong new views of humanity and its behavior. Marx saw morality as having no independent meaning, characterizing moral thoughts as “phantoms” created by the mind.<sup>24</sup> His philosophy essentially saw little benefit in allowing moral considerations to affect personal and political objectives.

Others influenced by the zeitgeist of diminishing the relevance of moral sensitivities took the position that values were not derivable from facts and, therefore, at best existed in the realm of personal preferences. Some went so far as to assert that since moral arguments and values cannot be scientifically verified, they are essentially expressions of feelings with no objective validity.<sup>25</sup> Jean-Paul Sartre claimed we have to choose our own values. However, he provided no guidelines or other methods to assist us in making moral choices.<sup>26</sup>

Freud did not believe that people inherently possessed a moral sense. His psychoanalytical approach to human behavior focused on unconscious desires, instincts, and bodily forces that he felt influenced the mind at the conscious level. He placed a strong emphasis on the presence of sexual and aggressive inborn forces, or instincts, that he felt drive people to decisions and actions. According to Freud, morality is imposed from outside of the individual. It is necessary for the survival of civilization that base instincts are controlled or repressed. It is through this repression, and not out of a natural tendency to be “good,” that morality is learned and that people develop a conscience, or as Freud called it, a “Superego.”<sup>27</sup>

The behaviorists, in contrast, rejected the relevance of a conscience. John B. Watson, the founder of behaviorism, claimed that



psychology should not concern itself with mental states, including the unconscious. He advocated strongly that introspection was of no use and should be given up. The primary center of concentration, he felt, was overt behavior, observing how people behave in different settings.<sup>28</sup> B. F. Skinner, his most famous follower, was even more insistent that understanding the mind is meaningless. He belittled the idea that we have “free will,” for he saw the mind as having no effect on action. To Watson and Skinner human behavior could be predicted without reference to mind by conditions that precede and follow actions. Furthermore, Skinner went so far as to maintain that a conscience did not exist in human beings.<sup>29</sup>

The idea that biology was basic to human behavior and the workings of social groups didn't reappear in a major way until E. O. Wilson published his book *Sociobiology* in the mid-1970s.<sup>30</sup> This work detailed the activities of social animals, investigating, among other things, insect colonies and wolf packs. Wilson, an expert on the ecology of ants, centered his attention on the complexity of instincts in the ant society. He was captivated by the fact that ants behave in a characteristic fashion with a degree of sophistication that should necessitate transmission from one generation to the next through learning. However, he found that learning does not occur; rather, ants function primarily from instinct. A striking example of this is that worker ants do not breed, but delegate the function of reproduction to a queen. This was confusing to Wilson, since it is a general principle in biology that animals strive to reproduce their own.

It was a British zoologist, W. D. Hamilton, who provided an acceptable answer to this dilemma. He found that the nature of genetic relatedness explained why ants, and other insects such as bees, were satisfied not reproducing and were social: They were more genetically similar to their sisters than they would be to any offspring they might otherwise have had.<sup>31</sup>

Influenced by this and similar work,<sup>32</sup> E. O. Wilson in his last chapter of *Sociobiology* suggested that social patterns in humans involve a collaboration between nature (genes) and nurture. He was putting forth the viewpoint that the biological understanding of social animals may have its correlation in human society. This nature argument created a furor among his colleagues who were

proponents of the perfectibility of humans through social action. They characterized him as a “right-wing extremist” and discredited his idea.<sup>33</sup> As a consequence the thrust of argument shifted in favor of nurture, with the belief that human behavior evolved as the result of learning and environmental exposure.

Recent discoveries of neuroscience, however, are once again supporting the thesis that genetics and biology are important for understanding human thought and behavior. In some respects we are coming full circle back to some of the principles of natural law, with perhaps one exception: The new biology recognizes the importance of environment in influencing even basic biological structures in the brain. The line between genetics and environment is blurred. The presence of a gene or a biological tendency, as we will see, may not be sufficient to direct brain development or behavior. Often this development depends on input or stimulation from human culture.

We are essentially entering an era of what two prominent neuroscientists, Steven Quartz and Terrence Sejnowski, refer to in their book, *Liars, Lovers, and Heroes: What the New Brain Science Reveals about How We Become Who We Are*, as “cultural biology”<sup>34</sup> – that is, that culture has a dynamic role early in life in shaping brain biology. In their work they have shown that the human brain continues to grow after birth rather prominently for at least two years until the fontanelles (the “soft spots”) on the skull are closed. During this period the input of culture through instruction and other environmental exposure acts directly to enhance brain growth and function.