The Antisocial Mind

"This book covers an amazing range of topics from the big bang theory to consciousness in its effort to argue against free will. I think it will be of great interest to non-specialists as it addresses in a comprehensive way issues that have confronted human society for thousands of years."
—Michael Elden Greenberg
Nathan Marsh Pusey Professor of Neurobiology, Harvard Medical School, USA

"Dr. Khodadad has been out front calling on scientists to study the biological underpinnings of excessively selfish and other kinds of antisocial behavior, given the extreme costs such behavior exacts on society. In this book, he explains why, focusing on the potential of such biological studies to uncover avenues for preventing or treating antisocial behavior. Hopefully, researchers and funders will heed his important call."
—Joseph W. Kable, PhD
Jean-Marie Kneeley President's Distinguished Professor of Psychology & Marketing, University of Pennsylvania, USA

The Antisocial Mind:

What Makes People Turn to Violence

By

Ghahreman Khodadad

Cambridge Scholars Publishing

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I dedicate this book to everyone.

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FOREWORD

MARTHA J. FARAH

The book you hold in your hand is an unusual piece of scholarship. It is a far-ranging, even audacious, attempt to synthesize contemporary research in the life sciences and social sciences, with the goal of offering insight into age-old problems of human behavior and morality. But do not be put off by the wide scope and ambition of this book! It is a delicious Dagwood sandwich of ideas from different intellectual traditions, made beautifully clear and accessible by Dr. Khodadad's eloquent writing. And, most important, Dr. Khodadad brings these diverse theories together to support a new, therapeutic rather than retributive, approach to antisocial behavior. The book is also distinctive in reflecting decades of self-education and independent thought by the author. Dr. Khodadad earned distinguished credentials as a neurosurgeon and professor at the University of Cincinnati Medical School. But these accomplishments were separate from the topics of this book, namely the biological roots of antisocial behavior and the ethical and legal implications of mechanistic explanations of such behavior. He was therefore obliged to learn about these topics on his own. This may explain the exceptional clarity of his exposition, as he could fully recall his own learning process to help readers with their own. Most important, his fresh eyes have been able to see the relations among traditionally siloed bodies of knowledge and their potential to address questions of ethical and legal blame. Most of the book is organized into standalone chapters with concise overviews of their subjects: for example, religion, psychiatry and the evolution of predatory behavior. I enjoyed reading these chapters as separate "nutshell" summaries. But the summaries are also essential groundwork for approaching the more philosophical questions of moral responsibility, free will and consciousness tackled in the closing chapters of the book. This is where the author makes his most original contribution, by relating these fields to each other and to the nature of behavior, consciousness and ethics. This is challenging stuff, but Dr. Khodadad is effective in guiding the reader through his argument. I got to know Dr. Khodadad in his retirement, when his focus had shifted from neurosurgery to the concerns of this book. At that point his ever-active mind was building

the argument that morally "bad" behavior can be understood without placing blame or calling for retribution. Instead, he argued, we should offer treatment. He encouraged several of my colleagues to undertake research on the genetic and neural bases of antisocial and excessively selfish behavior, to understand it and develop treatments for it. Ultimately, he supported them in carrying out this research, probing the origins of antisocial and extreme selfish behavior using functional magnetic imaging, transcranial magnetic stimulation and whole genome sequencing, and pioneering a validated psychometric instrument and animal model of selfishness. Some of these projects have already been published and more publications are forthcoming. In the meantime, this book provides a rationale and roadmap for more research in this area, and we celebrate its publication. I expect this book will provoke much thought and discussion on the important social problem of antisocial behavior.

PREFACE

As a young boy growing up in Tehran, Iran, I used to observe and follow ants around our house. One day, I saw two small ants standing on their hind limbs and each pushing against the other's head. I had not seen such behavior before, so I stood for a while and watched. The ants continued this action for some time. Eventually, one of the ants walked away with the head of the other.

Many years later, I correlated what I had observed in ants as a child with what I witnessed in the world, *such as violence and wars, existence/nature.*

When I grew up, I attended the University of Tehran medical school. I had no intention of practicing medicine but rather wished to learn about the human brain and behavior. I wrote my medical school thesis on the pathogenesis of schizophrenia.

After I graduated, I came to the United States as an intern, with the hope of eventually working as a researcher at the Rockefeller Institute (presently, Rockefeller University). In 1958, I applied to the Rockefeller Institute and was interviewed in different labs. One of the questions I was asked was whether I had published any papers or a book. As a recent medical school graduate, I replied that I had not. Before I left, I was told that they would let me know the outcome of my application.

I received a letter of acceptance while a neurosurgical resident at the University of Pennsylvania Graduate School of Medicine. My professor at Penn told me that I could do whatever I wanted, but that if I went to the Rockefeller Institute, then I might be told the following year, "Sorry, we have no further research funding," and then what would I do? I decided to stay at Penn.

Although my research interests remained, I became a practicing neurosurgeon, a job that I continued in until my retirement in 2002. It was then that I began to pursue my old interests again.

This book is the culmination of those research interests. It is a book about us, about the things that we do every day and the ways in which we live our lives. It is about peace, but also about the violence and wars in which our species engage.

Neuroscientists commonly use the word "prosocial" to refer to individuals who promote peace, and the word "antisocial" for those who cause violence and wars. It is also generally believed that the behavior of living organisms—whether a germ/bacterium or a human being—is based

on their genetic structures and their environments. Thus, some scientists use the principle of "structure to function" or "from structure to function" as the basis of all types of behaviors, whether of something living or non-living. We also know that factors such as socioeconomic conditions, for instance, can have a significant impact on human behavior.

The following offer some good examples of the relationship between structure and function:

- A car cannot fly because it does not have the requisite structures for flying. A plane can fly because it possesses those structures.
- An apple tree cannot produce oranges because it does not have the structures that are required to produce oranges.
- A pinch of salt (sodium chloride) tastes salty because of the structure of sodium chloride, whereas a pinch of sugar (carbohydrate) tastes sweet because of the structure of the carbohydrate.
- A man cannot get pregnant and deliver a baby unless he has the structures that a woman has.
- If a gene called "fos-B" is knocked out in a female mouse, she no longer nurtures her newborns.

Living creatures get their genetic structures from the living creatures that produce them and from their environment. For instance, any one of us is the product of the egg of our mother and the sperm of our father, as well as of the effects of our environment—both natural and human-made. Our environment includes the maternal–fetal intrauterine environment and, after we are born, the behavior of our parents or caregivers, as well as other household members, relatives, neighbors, teachers, friends, and so on.

The point I am making here is that we are produced. We have no role in determining the kinds of structures that we have nor the type of body that we possess. None of us chooses our parents or the structures of our environment; the successful sperm of our father interacts with the egg of our mother, and we are automatically produced in the uterine environment. Then, after we are born, our body, and particularly our brain, continues interacting automatically with the wider environment throughout our infancy, childhood, adolescence and adulthood. By "automatically" here, I mean without conscious awareness.

Since the words "consciousness" and "free will" were first attested in 1632 and 1535, respectively, both terms have been discussed extensively by philosophers and neuroscientists. Any discussion of these terms might benefit from bearing the following in mind.

First, one must be conscious to be able to choose or have free will. Second, consciousness cannot occur from nothingness. Some kind of existence or existences such as mass, forces, and fields, or some other

existences about which we know nothing, must produce consciousness and give us the feeling, sensation, or awareness of its presence. Consciousness cannot appear if the existences that produce it do not interact—and, obviously, we have no role in that production.

Our discussion seems to lead us to the conclusion that all of our behaviors, whether prosocial, antisocial, or otherwise, are based on our genetic structures interacting with the structures of our environment. Most significantly, our behaviors—regardless of the kind—are non-consciously produced for us, and only nanoseconds later do we become conscious of them.

If this becomes a scientifically accepted fact, then, astonishingly, no matter what we do or how badly we behave, that behavior is neither our fault nor our responsibility. The implications of this theory are profound. Were human beings to genuinely acknowledge such a social understanding, a very different social system might develop.

This is what *The Antisocial Mind: What Makes People Turn to Violence* is all about.

Ghahreman Khodadad
1 June, 2024

INTRODUCTION

Every culture includes people who promote peace, bringing comfort and tranquility, and people who cause violence and wars, creating pain and suffering. What is it that makes some individuals seek peace and others turn to violence? This book seeks answers to that essential question by focusing on research that only neuroscience could possibly provide.

The term "prosocial" is commonly used to describe individuals who advocate peace, whereas the term "antisocial" is used to describe those who are hostile or who disrupt the established social order. Here is a key idea for this book: a fundamental, universal truth is that the structures of things produce their functions or behaviors. This is true for entities of any kind or size, whether they are macroscopic or microscopic. For example, a fork cannot function as a knife because it is not as cutting or sharp as a knife is. Or a car cannot fly because it does not have the machinery that is necessary for flying. It is similar with a molecule of dopamine and serotonin, our brain chemicals that produce pleasure and displeasure for us respectively together with many other functions.

In this book, I use scientific methods that support the idea that antisocial people are antisocial because of the kinds of structures (e.g., of nerve cells, genes, neurotransmitters, other chemicals, ions and neural networks) that they have. But what is the source of the structures of prosocial and antisocial people? Like all living creatures, these are acquired from both nature (genetics) and nurture (the environment).

Scientific consensus based on many decades of research and various kinds of studies tells us that two things are true. First, we inherit our genetic makeup from our parents and these genes produce kinds of cells and molecules which, together with our environment, give rise to our behavioral functions. Second, we do not know what specific structures shape our behavior or how they work. That raises a second question: If our structures produce our functions and behaviors and we did not choose the structures we have, how can we be responsible for our behaviors?

Most people believe that we have free will. That is, they believe that people can control what they do through the decisions they make. The term "free will" appeared in English dictionaries in the early sixteenth century. The idea has thus been part of Western culture for about 500 years. Most Western legal systems are based on the concept of free will; people

who cause harm or destruction are punished for their actions. The idea is so entrenched in Western culture and philosophy that it is difficult to contemplate giving it up.

However, some neuroscientists think differently about the concept of free will. They believe that it is very likely that what we call free will is produced by our brains without any participation on our part and that "free will" is likely not caused by our conscious decisions. What we regard as free will ultimately results from the interaction between our brain structures (nerve cells, various genes, neurochemicals, and other molecules) and our environment, not by decisions we make. While we are the product of both our genes *and* our environment, the former play a greater role in what we are and how we behave. These ideas lead to an important premise, namely that antisocial individuals are not accountable for their antisocial behavior and that they should be treated respectfully instead of being punished or executed, for instance. The primary arguments discussed in this book support the belief that human beings are elements of nature and that their behavior follows the laws of biology.

If the research results are right, it is time to think about the concept of free will in a new way. This book lays out the scientific evidence that supports the idea that free will does not exist. That idea may seem controversial to many people. But I hope that readers will hear me out and consider the scientific evidence that has led me to that conclusion.

The book begins by discussing the concept of prosociality. In Chapter 1, I outline what this term means, how it emerged in Western culture, and how it is a core tenet of major world religions. I also describe the related topics of compassion, sympathy, altruism, and empathy, before moving on to a brief discussion of the human brain and prosociality. The chapter concludes with a brief tour of prosocial behaviors in nonhuman animals.

In Chapter 2, I make the argument that antisocial people are victims of their brain, body structures and of their environment. I describe the spectrum of antisociality and offer many examples of antisocial behavior and its consequences.

In Chapter 3, I argue that mental disorders are caused by abnormal brain and environmental structures. I discuss how biology follows the laws of physics and chemistry and how that fundamental principle plays out for people with mental disorders. The chapter offers examples of how emotions and behaviors are automatically produced for us. This evidence leads to the conclusion that dysfunctions that disturb peace and human well-being are not the products of a person's free will.

In Chapter 4, I look more closely at the relationship between mental disorders and antisocial behavior. I investigate two categories of mental disorders: those that are primarily antisocial, such as oppositional defiant disorder, conduct disorder, and antisocial personality disorder; and those that are not primarily antisocial but could be associated with antisociality, such as borderline personality disorder, paranoid personality disorder, attention deficit hyperactivity disorder, narcissistic personality disorder, post-traumatic stress disorder, and schizophrenia. The chapter relies on evidence from studies of the genetic basis of mental disorders and magnetic resonance imaging.

In Chapter 5, I describe antisocial behaviors that the American Psychiatric Association (APA) does not consider to be mental disorders. These include adult antisocial behavior, greed or excessive pathological selfishness, dominance, aggression, and domestic violence. The Association's *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) shapes the thinking of scientists and people in fields related to human behavior internationally.

In Chapter 6, I discuss predation, the most extreme form of antisociality. I will describe how this behavior was initiated about 3.5 billion years ago by prokaryotes. The eukaryotic cell then inherited the genes that produce predatory behavior from prokaryotes, invertebrates from eukaryotes, fish from invertebrates, amphibians from fish, reptiles from amphibians and both birds and mammals from reptiles. Predatory behavior is also shaped by neural networks and neurotransmitters.

In Chapter 7, I look at how humans have attempted to prevent antisocial behavior and how we might prevent it in the future. I use the example of international organizations that work for peace, such as the League of Nations and the United Nations. The chapter describes the role of education in preventing violence and wars. It also discusses how we can change environments in ways that will promote peace, by eliminating socioeconomic inequalities and the maltreatment of children. The chapter concludes with a look at the research findings of neuroscientists who study human sociality and the potential solutions that they are finding for antisocial behavior. When neuroscientists discover the DNA sequences of antisociality, neuropharmacologists may be able to manufacture compounds that could treat the illness.

My Chapter 8 proposes a working model for the behavior of the nonliving universe (which lacks cellular structures) and a working model for the universal pattern of life (which consists of cellular structures). The analysis in this chapter demonstrates a notable similarity in the patterns of behavior of nonliving and living beings. It concludes with a working model

for existence/nature and the behavior of both living and nonliving things. The word ‘existence’ is more descriptive than the word ‘nature’. It tells us what exists in contrast with nothingness. We may then think of matter, forces, and fields that make up existence. This kind of thinking directs us to the scientific understanding of existence and its structures. And one way to understand how structure shapes behavior is to ask, ‘if it is not the structure that shapes behavior, then what is it?’

In Chapter 9, I move on to the role of structure to function in our consciousness, our behaviors and life. We discuss three things. First, when scientists talk about Structure to Function or From Structure to Function, they simply mean that it is the structure of things that produce function or behavior, and this is a universal fact no matter what the act or function is. Second, we cannot do anything unless we are conscious, and consciousness is automatically produced for us as are all other functions including “free will”. Third, if we believe and accept the principle of structure to function, we will have more peace—and less violence and wars.

In Chapter 10, I continue the exploration of the concept of existence/nature. I begin with a definition of nature and a discussion of the complexities related to an understanding of microscopic structures and general behavior of nature. I then move to a central question: Is existence/nature conscious? I explore the roles that existence/nature play as both a super creator and a tinkerer, or victimizer. Existence/nature can also function to produce predation. This is its most nefarious form—the root of violence and wars. The chapter concludes with a discussion of the positive functions of existence/nature as a pleasure giver and even as a protector (e.g., in the form of immune systems and the process of evolution).

PART ONE

THE FACTS

CHAPTER 1

PROSOCIALITY

This book advocates for the compassion, care, and giving that we now call prosociality. Prosociality denotes behavior that benefits others irrespective (or even at the cost) of benefits to oneself.[1] The word "prosocial" was defined in the *Oxford English Dictionary* by Robert Richardson Sears in 1961 as "pertaining to the type of behavior that is automatically loyal, sometimes in a rigid and conventional manner, to the moral standard accepted by the established group; frequently contrasted with antisocial or asocial type of response."[2]

In ancient societies, morality was respected, practiced, and taught, frequently through the form of an organized religion. Morality is connected with religion in the basic premise that we can live together more peacefully. Indeed, according to recent social psychological studies conducted at the University of Illinois, "regardless of affiliation, religious people were more likely to act in a generous manner toward strangers when asked to think about their God. The level of giving increased equally regardless of whether the stranger was a member of the same religious group or not."[3] As George Newlands puts it in his Preface to the publication of his Henson Lectures, delivered at Oxford in 1995:

> In reflecting on the huge potential for future conflict in polarized cultures, cultures with religious differences and divisions between the religious and the non-religious, concepts of generosity commended themselves as having the potential to lead to constructive rather than destructive tensions.[4]

There are many world religions, but the following paragraphs list those that are considered the most influential in terms of morality and prosocial behavior.

Zoroastrianism: Zoroaster (ca. 1500 BCE–ca. 1000 BCE)[5] was an ancient Persian spiritual leader, ethical philosopher, and prophet who taught a spiritual philosophy of self-realization. Texts of Zoroastrianism are collected as the Avesta. Its basic maxims include:

- good thoughts, good words, good deeds;
- there is only one path and that is the path of truth;
- do the right thing because it is the right thing to do, and then all beneficial rewards will come to you also.[6]

Buddhism was founded in India by Siddhartha Gautama (the Buddha) more than 2,500 years ago. The faith originated as a Sramana (ascetic) tradition. Adherents, commonly known as monks, practice a nonmaterial lifestyle in pursuit of a spiritual existence. The teachings of Buddha are aimed at freeing sentient beings from suffering. The core teachings are the three characteristics of existence (Annica/Impermanence; Dukka/Suffering; Anatta/No Self),[7] the four noble truths (there is suffering; there is the origination of suffering; there is the cessation of suffering; there is a path to the cessation of suffering),[8] and the noble eightfold path (right understanding, right thought, right speech, right action, right livelihood, right effort, right mindfulness, right concentration).[9] As Damien Keown elucidates:

Morality (*sila*) is the first of the three divisions of the Eightfold Path and the foundation of the religious life […] In common with Indian moral tradition as a whole, Buddhism expresses its ethical requirements in the form of duties […] Rules must not just be followed, but followed for the right reasons with the correct motivation.[10]

Hinduism does not have a single founder or a common doctrine but is instead a fusion of various beliefs. Its rich tradition includes diverse texts and practices. It is thought to have started between 2300 and 1500 BCE in the Indus Valley, near modern-day Pakistan.[11] Hinduism emphasizes the doctrines of samsara—the continuous cycle of life, death, and reincarnation—and karma, the Hindu universal causal law according to which we are rewarded for our past beneficial actions and punished for our past harmful actions. Indeed, karma (which in Sanskrit means simply "action"), is best translated as "social action" or "social behavior." Indeed, Hindu moral duties are all prosocial, regardless of income.[12] Hindus accordingly strive to achieve honesty, to refrain from injuring living beings, and to attain patience, forbearance, self-restraint, and compassion. A key belief of Hinduism is that all living creatures have a soul. Thus, although food is an important part of Hindu life, most Hindus do not eat beef or pork and many are vegetarians.

Confucianism is often characterized as a system of social and ethical philosophy rather than a religion. This system of thought was founded by Confucius (551–479 BCE), a symbol of traditional Chinese culture who, at different times throughout Chinese history, has been portrayed as a "teacher, advisor, editor, philosopher, reformer, and prophet."[13] His

teachings focused on creating ethical models of family life and public interaction. Confucius emphasized education as self-improvement that prepared students for public service.[14] He espoused the principle, "what you do not wish for yourself, do not do to others." This maxim—versions of which appear across all of the major religions—is standardly referred to in English as the Golden Rule ("Do unto others as you would wish to be done unto.").[15] Following the death of Confucius, Confucianism became the official imperial philosophy of China and was extremely influential during the Song (960–1279 CE), Yuan (1279–1368 CE), and Ming (1368–1644 CE) dynasties.[16]

Judaism is the earliest of the three major monotheistic Abrahamic traditions; the other two being Christianity and Islam.[17] All three have in common a strong regard for Abraham as a patriarch and spiritual forebear and the belief that there is only one God, although aspects of the God differ among these religions. Although the Abraham story cannot be definitively related to any specific time, many scholars believe that it was initially written in the early Persian period (late sixth century BCE) as a sacred text based on oral teachings and histories.[18] The Torah is the foundational text of Judaism. Its tenets include individual and collective participation in an eternal dialogue with a transcendent God through tradition, rituals, prayers, and ethical actions. Giving and generosity are fundamental principles of Judaism.[19]

Christianity stems from the life, teachings, and death of Jesus of Nazareth, a preacher and religious leader in Judea and Galilee who lived in the early first century CE. Christianity is the world's largest and most widely diffused religion, with approximately 2.6 billion followers worldwide. The New Testament, which is considered the fundamental document of Christianity, records Jesus's life and ministry. According to Christians, Jesus—the Messiah, or savior of the world—is considered the incarnation of God and his teachings are followed as the model of a spiritual life. His discourses encapsulate teachings of love, humility, and compassion.[20] Among the main themes are loving your neighbor as much as yourself, forgiving those who have wronged you, loving your enemies, and asking God to forgive your sins.[21] Generosity is a key Christian tenet[22] and, according to theologians such as George Newlands, the development of a theology of generosity is a vital response to the challenges that the Christian faith faces in the twenty-first century.[23]

Islam dates to the seventh century CE, when its founder, the Prophet Muhammad, united most of the Arabian Peninsula with the Qur'an, the sacred text of Islam.[24] The core beliefs and practices, known as the Five Pillars, are:

- Shahada (The Declaration of Faith)—the declaration that "There is no god but God, and Muhammad is the Messenger of God";
- Salat (Prayers)—performed five times daily while facing Mecca, Islam's holiest city;
- Zakat (Almsgiving)—sharing wealth with those less fortunate than oneself;
- Sawm (Fasting in Ramadan)—fasting from dawn until dusk during the holy month of Ramadan (the ninth month of the Islamic calendar year);
- Hajj (The Pilgrimage)—undertaking pilgrimage to Mecca.[25]

The name "Islam" derives from the Arabic word 'salama' (سلم), meaning "surrender, submission, commitment, and peace." Thus, Islam can be defined as a path to attain complete peace through voluntary submission to the divine will and a *muslim* as any person who has "made this submission of their entire being to Allah and his demand that human beings behave to one another with justice, equity, and compassion."[26]

Ethics

Although the word "ethician" (since replaced with "ethicist")—referring to a specialist in ethics—did not appear in English dictionaries until the early seventeenth century, the concept of ethics dates back thousands of years. For instance, ancient Greek philosophers such as Socrates, Plato, and Aristotle (400–300 BCE) practiced and taught ethics. Socrates was a Greek philosopher from Athens who is credited as the founder of Western philosophy and is among the first moral philosophers. His student Plato conceived of platonic love as ascending from passion for the individual to the contemplation of higher, universal ideals. Plato's student Aristotle emphasized that virtue is practical and the purpose is to become good, not merely to know.[27]

Philanthropy

The word "philanthropy" is derived from the Greek "philanthropia," meaning "love of humanity." Although the meaning of the term has changed, and although we might agree with Jane H. Mavity and Paul N. Yivisaker that "philanthropy is a lot of different things" and that "the only standard definition is the one supplied by the Internal Revenue Service when determining the tax status of 'charitable' organisations"[28] (the IRS definition for "philanthropy" is "charity"), the concept continues to include the notion of giving by individuals or groups to promote the common good.

Philanthropy was built into many ancient social and belief systems. Modern philanthropy, which is considered to have begun in the nineteenth century, is part of a legacy of prosocial giving that has defined and improved the human experience for millennia.[29] Let us consider here a short list of past and present notable American philanthropists:

George Peabody (1795–1869). A wealthy Massachusetts merchant banker who founded many foundations and charities to benefit the poor, Peabody is considered the father of modern philanthropy. Peabody's philanthropic practices created the model followed by later titans of wealth in the United States.[30]

Andrew Carnegie (1835–1919). Scottish-born Carnegie was the founder of US Steel who gave away more than $350 million of his total wealth, which was worth over $480 million. He is best remembered in the United States for the public libraries he built in towns across the nation. His foundations and trusts funded a teachers' pension fund, scientific research, and research in peacebuilding and foreign affairs, among other issues.[31]

John D. Rockefeller (1839–1937). The founder of Standard Oil, Rockefeller is considered the wealthiest American of all time. He gave away $540 million, money that was used to found educational institutions, help lift the US South out of poverty, educate generations of African Americans, and improve health around the world.[32]

Warren Buffet (1930–). Buffet is a business magnate whose wealth is built on securities analysis, insurance, and investment. As of June 2023, he has given more than $54 billion to foundations that focus on reproductive health and family planning, alleviating hunger, and mitigating conflicts, among other issues.[33]

Michael Bloomberg (1942–). Bloomberg accrued wealth as a global provider of business news and information. As of 2023, he has given away more than $14.4 billion. In 2023, his giving has been focused on the environment, education, public health, the arts, and government innovation. Also in 2023, he announced that he plans to give his multibillion-dollar company, Bloomberg LP, to Bloomberg Philanthropies before he dies.[34]

Bill Gates (1955–). Gates is the co-founder of technology company Microsoft. In 2022, he announced his intention to give away all of his $133 billion fortune. The Bill & Melinda Gates Foundation has used its resources on the global scale to alleviate poverty, provide resources for education, and improve health, among other issues. As of December 2022, the foundation has distributed $65.6 billion.[35]

Melinda French Gates (1964–). French Gates is the co-founder of the Bill & Melinda Gates Foundation and founder of Pivotal Ventures,

which has invested $2 billion in companies that work to improve the lives of girls and women in the United States.[36]

MacKenzie Scott (1970–). Scott acquired what she describes as a "disproportionate amount of money" through her marriage to Amazon founder Jeff Bezos. Now divorced, she is determined to distribute all of her wealth from her 4 percent share in Amazon.[37]

A Vocabulary Concerning Well-Being

The evolution of terminology in English dictionaries over the past few centuries reflects how societies have felt about the well-being of others, as indicated by the incorporation over time of certain words with similar meanings.[38] These words include the following:

Compassion (first known use fourteenth century)—"The feeling or emotion when a person is moved by the suffering or distress of another, and by the desire to relieve it; pity that inclines one to spare or to succor."[39]

Sympathy (first known use mid-sixteenth century)—"A (real or supposed) affinity between certain things, by virtue of which they are similarly or correspondingly affected by the same influence, affect or influence one another (esp. in the same occult way), or attract or tend towards each other."[40]

Altruism (first known use mid-nineteenth century)—"Devotion to the welfare of others, regards for others as principle of action: opposed to egoism or selfishness."[41]

Empathy (first known use mid-nineteenth century)—"The power of projecting one's personality into (and so fully comprehending) the object of contemplation."[42]

For a better understanding of the vocabulary concerning well-being, some of these words have been redefined or elaborated by psychologists and psychiatrists. For instance, Clara Strauss and her co-authors have proposed that compassion consists of five elements: (1) recognizing suffering; (2) understanding the universality of human suffering; (3) feeling for the person suffering; (4) tolerating uncomfortable feelings; and (5) motivating to act to alleviate suffering.[43] Some neuroscientists believe that empathy is a multidimensional construct that includes the ability to perceive, understand, and feel the emotional states of others.[44]

In health care, practitioners typically define the term compassion as a sensitive and empathic response to another person's suffering, a rational process that pursues the patient's well-being through specific ethical actions that are directed at finding a solution to their suffering.[45]

The Evidence for Prosociality

Experiments with preverbal infants have shown that they are attracted to prosocial individuals.[46] Similarly, studies of early childhood have demonstrated that young children experience sympathy.[47] It has also been shown that altruism typically increases during the age range of 19 to 60 years and that at each age, women have higher scores in altruism than men.[48]

Studies of behavior genetics have shown that 30–50 percent of the variation in wanting to help others is inherited.[49] Studies of twins and families suggest that human characteristics such as compassion, sympathy, altruism, empathy, trust, love, and even musical talent, economic behavior, and political beliefs are partially hardwired. Genetic studies have primarily targeted the genes that encode neurotransmitters and enzymes in the systems that generate dopamine, serotonin, and other systems.[50] Although dopamine and serotonin have numerous complicated functions, dopamine is generally considered to be a pleasure chemical and serotonin a displeasure chemical.

The Human Brain, Neurotransmitters, and Sociality

Numerous areas of the brain and various neurotransmitters are involved in prosocial behavior, including the amygdala, the midbrain, the nucleus accumbent, the ventromedial prefrontal cortex, the anterior cingulate cortex (particularly the right hemisphere), the temporoparietal junction, and striatal regions. This makes it difficult to elucidate what is happening in the brain during prosocial behavior. But all of our behaviors, no matter what kind they are, occur at the cellular and molecular levels through physicochemical processes. And the structures that are involved in the physicochemical processes produce our behavioral functions.[51] The neurotransmitters known to be specifically engaged in altruistic, prosocial, and empathetic behaviors are dopamine, serotonin, and particularly oxytocin and vasopressin.[52]

As mentioned previously, neurotransmitters relate to prosocial behavior through the physicochemical processes that produce our behaviors. It is the characteristic of the transmitters to produce specific functions such as movements, sensations, or secretions, for instance. Some of these processes are associated with consciousness, although the majority of them are most likely not. Consider the following example: if you put a pinch of salt in your mouth you experience a salty sensation; with a pinch of sugar in your mouth you experience a sweet taste. Tasting salty is the characteristic of the salt and tasting sweet is the characteristic of sugar.

Prosociality in Nonhuman Animals

Scientists have identified prosocial behavior in nonhuman animals and even in unicellular organisms. Recently, prosocial behavior has been discovered in plant life by the biologist Suzanne Simard, and Peter Wohlleben has discussed prosocial behavior in trees in *The Hidden Life of Trees*.[53]

Nonhuman primates. Some investigators have observed prosocial behavior in nonhuman primates, while others have not.[54] For instance, individual chimpanzees do not spontaneously provide food to members of their group. However, other nonhuman primates exhibit well-developed prosocial and cooperative tendencies, as illustrated in the way they hunt together, support each other in fights, and console victims of aggression. Researchers have also found that common marmoset monkeys spontaneously provide food to nonreciprocating and genetically unrelated individuals.[55]

Dogs. The hypersociability of domestic dogs is well known and the underlying genetics have been investigated.[56] Research has shown that dogs can behave prosocially by donating food to a conspecific partner (i.e., one of the same species), but only if the partner is familiar. Dogs also provide emotional comfort to humans in a variety of ways. For instance, dogs approach humans more frequently if they are crying rather than humming. This evidence supports the claim that dogs empathetically respond to human stress. Likewise, dogs consistently approach a person who is crying even if they are a stranger, which suggests that their approach is motivated by empathy rather than by a desire to reduce their personal distress.[57]

Rats. Empathy and prosocial behavior have been reported in rats. Neuroscientists have found that a free rat in an arena in which a cage mate is trapped in a restrainer can learn to open the restrainer and free the cage mate. Rats have also helped trapped rats who are unknown to them by releasing them from a restrainer.[58]

Birds. Birds have been observed undertaking certain acts of helping and prosociality. For instance, jackdaws show prosocial behavior by providing food to both siblings and non-siblings, and jays spontaneously share food with others.[59]

Social insects. The most important feature of insect social behavior—in ants, wasps, bees, and termites—is the existence of the nonreproductive worker caste. The altruistic actions of this caste integrate the colony and enable advanced forms of labor specialization. The workers are specialized throughout their lives, with a large part of their repertory devoted to the welfare of the queen and to their siblings.[60]

Social amoebas. Social amoebas are exceptional in their ability to alternate between unicellular and multicellular forms. As single cells, they

inhabit forest soil, for instance, and consume bacteria and yeast, which they track by chemotaxis (the orientation or movement of cells in relation to chemical agents). Starvation prompts single cells to aggregate and develop as a true multicellular organism.[61]

Bacteria. Bacteria engage in a remarkable array of cooperative actions, for example by secreting shared proteins that are essential for foraging, providing shelter, engaging in microbial warfare, and virulence (overcoming the defenses of a host's body).[62]

Prosociality as a Trait of Some Individuals

The evidence that preverbal infants are attracted to prosocial individuals and that very young children experience empathy suggests that some people are born with a predisposition toward prosociality. In fact, genetic studies have shown that 30–50 percent of human beings can be considered prosocial.[63] In light of these findings, one might consider prosociality to be an inherent characteristic, which means that some individuals do not need to think about or make decisions about being prosocial; it just comes to them naturally.

Notes

[1] Marlene Sophie Altenmüller and Mario Gollwitzer, "Prosociality in Science," *Current Opinion in Psychology*, No. 43(2) (2022): 84–288. See also C. Daniel Batson, "A History of Prosocial Behavior Research." In *Handbook of the History of Social Psychology*, ed. A. W. Kruglanski and W. Stroebe (New York and London: Psychology Press, 2012), 243–264.

[2] *Oxford English Dictionary*, s.v. "prosocial" (Oxford: Oxford University Press, 2009). All definitions and citations from the *Oxford English Dictionary* that follow are from the 2009 published version.

[3] Michael H. Pasek, John Michael Kelly, Crystal Shackleford, Cindel J. M. White, et al., "Thinking About God Encourages Prosociality Toward Religious Outgroups: A Cross-Cultural Investigation," *Psychological Science*, No. 34(6) (2023): 657–669.

[4] George M. Newlands, *Generosity and the Christian Future* (Eugene, OR: WIPF & Stock, 1997), vi.

[5] See Franz Grenet, "Zarathustra's Time and Homeland Geographical Perspectives." In *The Wiley Companion to Zoroastrianism*, ed. Michael Stausberg, Yuhan Sohrab-Dinshaw Vevaina, and Anna Tessmann (Oxford: Wiley-Blackwell, 2023), 21–29.

[6] Peter Clark, *Zoroastrianism: An Introduction to an Ancient Faith* (Liverpool: Liverpool University Press, 1988), 88.

[7] David J. Kalupahana, *Buddhist Philosophy: A Historical Analysis* (Honolulu: University of Hawaii Press, 1984), Ch. 4, 36–43.