HOWARD GARDNER

THE BEST-SELLING AUTHOR OF
FRAMES OF MIND AND *LEADING MINDS*

EXTRAORDINARY MINDS

PORTRAITS OF
4 EXCEPTIONAL
INDIVIDUALS AND
AN EXAMINATION
OF OUR OWN
EXTRAORDINARINESS

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The Master Minds Series is a global publishing venture consisting of original books written by leading thinkers and published by a worldwide team of publishers assembled by John Brockman. The series was conceived by Anthony Cheetham of Orion Publishing and John Brockman of Brockman Inc., a New York literary agency, and developed in coordination with Basic Books.

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Published by Basic Books,
A Member of the Perseus Books Group

Designed by Elliott Beard

Library of Congress Cataloging-in-Publication Data

Gardner, Howard.
Extraordinary minds / by Howard Gardner. — 1st ed.
p. cm.
ISBN 0-465-04515-4 (cloth)
ISBN-10: 0-465-02125-5 ISBN-13: 978-0-465-02125-3 (paper)
1. Gifted persons. 2. Gifted persons—Case studies.
3. Mozart, Wolfgang Amadeus, 1756–1791. 4. Freud, Sigmund, 1856–1939. 5. Woolf, Virginia, 1882–1941.
6. Gandhi, Mahatma, 1869–1948. I. Title.
BF412.G27 1997
153.9'8—dc21 96-45069

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PREFACE

I have spent much of the last ten years deeply immersed in the lives of extraordinary individuals—usually, though not invariably, persons I admire. I have read about their lives, studied their works, interviewed persons who knew them and, insofar as possible, sought to infiltrate their magnificent, often mysterious minds in an effort to figure out just how those minds worked.

In this pursuit of extraordinary minds, some of the lessons I have learned are specific: there is no substitute for familiarity with the notebooks of Martha Graham or the sketchbooks of Pablo Picasso. Some lessons are general: a surprisingly large number of features recur across time (Wolfgang Mozart and Igor Stravinsky), across space (Mao Zedong and Franklin Roosevelt), and across domains (Virginia Woolf and Margaret Mead). This book gives me an opportunity to reflect on what I have learned about creativity, intelligence, leadership, and other species of the genus *mind extraordinaire.*

Tempting as it is to synthesize one's earlier thoughts—and make judicious emendations in the process—I undertook this project primarily for two reasons. First, I have concluded that there are four distinct varieties of extraordinary minds. In this book, I seek to explicate the developmental origins and the mature practices of the Master, the Maker, the Introspector, and

the Influencer. Second, I am convinced that each of us harbors within ourselves the essential ingredients of these four kinds of minds. Through understanding better the minds of Mozart, Freud, Woolf, and Gandhi, we can not only accomplish more as human beings: we are also more likely to make a meaningful contribution to our society.

Given the nature of this volume, I have kept citations in the text to a minimum. Readers who wish to probe more deeply into the various topics will find ample suggestions in the References section.

For the original invitation to tackle this subject, I thank John Brockman. For editorial stewardship, I thank Susan Rabiner, Linda Carbone, and Brian Desmond. For useful advice and feedback during the research and writing, I thank Mihaly Csikszentmihalyi, William Damon, Robert Kiely, Tanya Luhrmann, and my wife, Ellen Winner. For support of my recent work on creativity, I thank the Hewlett Foundation, the Ross Family Charitable Foundation, and the Louise and Claude Rosenberg Jr. Family Foundation. And for inspiration throughout my writing, I thank a friend and scholar with a truly extraordinary mind, Daniel Carleton Gajdusek.

ONE

Introduction: Toward a Science of Extraordinariness

Phenomena of Extraordinary Minds

Of the billions of human beings who have walked our planet in the last few thousand years, comparatively few have left traces beyond their immediate circle. Among those who are remembered, some are known for unusual courage (Joan of Arc), some for longevity (Rose Kennedy), some for generosity (Andrew Carnegie), some for cruelty (Genghis Khan).

In every age a tiny percentage of individuals stand out by virtue of creative achievements. A few are distinguished because of the prodigiousness and quality of their output: although he died young, Wolfgang Amadeus Mozart created dozens of masterpieces in virtually every existing musical genre. Sometimes they stand out in terms of innovativeness: unknown at age forty, Sigmund Freud succeeded thereafter in creating an influential

new domain called psychoanalysis. Sometimes they stand out in terms of insights into their own minds: Virginia Woolf penetrated deeply into her psyche, the experiences of women, and the nature of conscious mental processes. And sometimes they stand out in terms of their abilities to affect others: Mahatma Gandhi, a lawyer from an obscure province in colonial India, crafted and practiced a form of civil disbedience that continues to inspire millions around the world.

Mozart, Freud, Woolf, and Gandhi are very special—so special, indeed, that they here constitute the principal exemplars of Extraordinary Minds. But they are by no means the only exemplars of extraordinariness. Contemporary observers who have looked at the drawings of monkeys wrought by the Chinese girl Wang Yani, the sketches of horses by the autistic girl Nadia, and the architectural drawings by the autistic boy Stephen Wiltshire, for example, are haunted by these evocative creations. We are astounded to learn that Lorenzo di Medici was carrying out a diplomatic mission at age fourteen, that Thomas Jefferson wrote the Declaration of Independence at age twenty-six, and that Alexander the Great had conquered most of the civilized world by the time of his death at age thirty-three. We marvel at the success, against enormous odds, of the Polish-French scientist Marie Curie, the American pioneer of modern dance Martha Graham, the South African political leader Nelson Mandela. And we are incredulous that Goethe finished writing *Faust* at age eighty-two, and that Verdi, Yeats, and Michelangelo were producing some of their greatest works in their old age.

Throughout history most of us have had a love-hate relationship with the extraordinary individuals within our ranks. On the one hand, we have cherished and benefited from their contributions; we name buildings and even whole communities after them, we read (and sometimes write) books about them, we construct our courses and our disciplines around their words and their works.

Yet, at the same time, we entertain considerable misgivings about those who have been endowed with great gifts and those who exert a profound influence on our lives. At first, we are re-

luctant to recognize their accomplishments, sometimes leaving the creators in obscurity, sometimes rejecting their innovations. Then, after their achievements have been acknowledged, we often search for signs of weakness, feet of clay, reasons to demote them, as if in some sense evening the score. Even as we esteem our heroes, we mortals equally love to denigrate them.

A similar ambivalence surrounds social policy. Most societies have in one way or another recognized the talented in their midst and given them opportunities to realize their potential—setting up special programs either to nurture them or to allow the fittest to survive. In democratic societies, however, we are extremely uncomfortable with the concept of an elite, whether based on merit or on the concept of "to the manner born." In particular, we scorn those with intellectual talent—for example, expending incomparably more resources on those with learning problems than on those with unusual gifts. And we are (with some justification) suspicious of those "worshippers of the canon" who set themselves apart on the grounds that they alone are capable of understanding the great minds of the past.

Even within the ranks of scholars, one encounters contrasting perspectives. Particularly among humanistically oriented scholars—biographers, historians, literary and artistic critics—there is acceptance of certain individuals as extraordinary, and as thereby warranting sustained attention. In years past, studies of the extraordinary—Freud or Marx, Einstein or Darwin, Austen or Dickens—tended to glorify these individuals and to stress their inspirational qualities. More recently, in addition to discomfort with the notion of certain canonical individuals, there has been a correlative emphasis on discovering their frailties, a trend that sometimes culminates in frank "pathographies."

Among natural scientists and behavioral scientists, extraordinary individuals have not occupied comparable research interest. Differences among individuals are not prominent in other species; and most scientists who focus on human beings have been more interested in the patterns that obtain among all of us than in those regularities that might distinguish some individuals from others. Moreover, within cognitive science—the new

field of study that focuses particularly on the mind—there has been a strong bias toward assuming that all individuals make use of the same basic mental processes. Let the example be Abraham Lincoln, Marie Curie, or John Doe—all three presumably used the same processes of memory, learning, and behaving; if they exist, differences among them are thought to be at most distinctions of degree, not of kind.

Beyond Caricatured Views of Extraordinary Individuals

It is conceivable that extraordinary individuals lead lives that are so distinctive that no generalizations can emerge from intensive studies of their particular wrinkles. It is also conceivable that, in the end, scientists will find no striking differences betweeen the Charles Darwins and the James Smiths. But it would be presumptuous to reach either conclusion without at least attempting to discover whether there are revealing parallels in the lives of Martha Graham and Mahatma Gandhi, in the personalities of Alexander the Great and Lorenzo di Medici, in the early life circumstances of musical and painting prodigies. Put succinctly, the question of whether there can be a science of extraordinariness remains empirical.

There can be—indeed, there is beginning to be—a science of the extraordinary. Such a science must avoid two equally unpalatable extremes. It cannot pursue the Scylla of "apartness"—the conviction that extraordinary individuals are a species apart, inexplicable by the normal laws of behavior, thought, and action. At the same time, it cannot embrace the Charybdis of "nondistinctiveness"—the belief that extraordinary individuals are indistinguishable in all relevant respects from the rest of us. If there is to be a science of extraordinariness, it must somehow meld these two positions. Extraordinary persons must indeed be constructed out of the same building blocks as the rest of us; but by the time they are formed, they are no longer indistinguishable from the proverbial man (or woman) on the street.

Steering this middle course is not easy. The feats of out-

standing individuals can blind us to the accomplishments of individuals who are not widely known. In all probability, for every William Butler Yeats or Marie Curie who makes his or her way into the encyclopedias, there are individuals of equal potential—and perhaps even of significant achievement—who for one reason or another remain obscure. Equally important, all normal human beings can also accomplish feats that, from a Martian perspective, are impressive and difficult to account for: learn one or more languages, recognize hundreds of individuals by face, recall an apparently countless set of events from the past. And with practice, most of us can learn to do things that would once have amazed observers on our own planet: remember long strings of digits; play several musical instruments proficiently; and read a text like this at a speed greater than speech without having to move our lips.

Alas, we have no problem thinking of individuals who have blackened the pages of history—from this century alone, the names Hitler, Stalin, and Mao Zedong leap to mind. These individuals exercise enduring fascination, and they have scarcely been ignored by scholars and journalists. I believe that it is equally—perhaps more—important to understand individuals who have made enduring *positive* contributions to the human condition. These individuals remind us of what humans can achieve and may inspire others to comparable heights in the future. Moreover, I believe that no absolute divide separates the Ordinary from the Extraordinary—we are all human and can be explained by the human sciences. Whatever their genetic endowments, Pablo Picasso and Jane Austen and Nelson Mandela were not born fully formed; they had to develop, minute by minute, day by day, into the remarkable personages that they ultimately became. And so they harbor lessons for us all.

In this book, I undertake three tasks. First and foremost, I seek to explain individuals who are truly exceptional—to discern the patterns that underlie a Newton, a Leonardo, a Jefferson. Second, I search for factors that relate the ordinary to the extraordinary. Such a search entails the recognition of features common to all development, as well as features of extraordinariness that find resonance in the lives of the rest of us. Finally, I

look to the lives of extraordinary individuals for specific insights about how others—put bluntly, the rest of us mere mortals—might lead more productive and more satisfying lives.

Before this investigation can be launched, it is important to undertake a few preliminaries. Thus, in the remainder of this introduction, I present some considerations relevant to a "science of the extraordinary," introduce the key building blocks of my analysis, and outline the plan for the rest of the book.

Lines of Investigation

A science of the extraordinary rests on two bases. One is the careful study of extraordinary individuals—at first on a case-by-case basis. We cannot begin to understand extraordinariness unless we know a great deal about the lives and the minds of those individuals who are generally agreed to be special. Such a science must look at individuals within given domains—for example, scientists like Charles Darwin, Albert Einstein, and Marie Curie—to see whether patterns emerge; it must compare these individuals to exemplars from different domains—for example, writers like Virginia Woolf, James Joyce, and Leo Tolstoy—to see whether similar kinds of patterns obtain in quite different domains. In the end, the "scientist of the extraordinary" aims to identify the ways in which all extraordinary individuals are similar (say, in the amount of energy they expend on their work); the ways in which certain extraordinary individuals resemble one another (say, in the fact that writers are far more likely than other creators to have manic-depressive disease in their families); and the ways in which a specific extraordinary person is unique (say, in the solitude and mysticism that pervaded Newton's life).

Various scholars have pioneered this line of study. For example, Howard Gruber focuses on single extraordinary individuals, and Dean Keith Simonton searches for general laws about extraordinariness. I have been most influenced by Mihaly Csikszentmihalyi's "system view" of extraordinariness.

According to this line of analysis, some of it developed in collaboration with David Feldman and me, it is misleading to ask

whether specific individuals are creative or extraordinary—as if the answer lay in the brain/mind/personality of the individual herself. Rather, argues Csikszentmihalyi, we must always look to an interaction among three elements: the *individual* herself, with her talents and goals; the particular *domain* or discipline in which the individual has chosen to work; and the *field*—the set of persons and institutions that render judgments (at first tentative, and later more definitive) about the quality of work. We should ask not "Who is extraordinary?" but rather "Where is extraordinariness?" And the answer lies in the dynamic interplay among the three factors.

A few examples. For much of her brief life, Emily Dickinson wrote poetry. She was a person of talent working in a recognized literary domain. Yet, judgment of the quality of her work awaited the posthumous publication of her poems by Mabel Todd and Thomas Wentworth Higginson. Only after the informed "field" of poetry experts had the opportunity to examine Dickinson's work could it render its positive verdict. A similar story can be told about the painter Vincent Van Gogh and the biologist Gregor Mendel—both recognized only years after their deaths. In contrast, Sigmund Freud was an individual of wide gifts and unusual ambition. Yet, for the first half of his career, he moved from one specialized domain of science to another, without ever making much of a mark. Only when Freud moved toward the creation of a new domain—that of psychoanalysis—and eventually stimulated the development of a field that passed judgment on work in that domain did his work come to be recognized as meritorious.

Against this background, I have fashioned my approach to the study of extraordinariness. Following the tradition of Howard Gruber, I begin with careful case studies. Then, going beyond the focus on a single individual, I attempt to amass case studies within and across domains. In that way, I hope to be able to guide the study of the individual (the so-called *idiographic* approach) toward the establishment of laws in the Simonton tradition (the so-called *nomothetic* approach). In this line of investigation, I am strongly influenced by the model of Csikszentmihalyi; that model reminds us that extraordinariness is

never the property of a person or a work alone. Only when we consider the person in light of the domain of work, on the one hand, and the field of judges, on the other, are we able to make a reliable judgment of the extraordinariness (or nonextraordinariness) of that individual's contributions.

It is some distance from a method to a science. Students of extraordinariness lack strong models that can be crisply tested. From my vantage point, such work presupposes and builds upon the careful description of individual cases and the creation of taxonomies based on those cases. As scholars opening up a new area, we are engaged in the important Aristotelian or Linnaean task of classification; successful arraying of those data increases the likelihood of a Darwinian synthesis.

The Building Blocks of Extraordinariness

Now that I have introduced the traditions on which my study is built, I turn to a second preliminary: the identification of a set of units, or building blocks, on which one can base the analysis of extraordinariness. To start with, I'd like to posit three primary units or building blocks and one set of processes. Not at all mysterious, the initial units are persons, nonhuman physical objects, and symbolic entities; and the processes are those of human development. From this simple foundation, I aim to construct an edifice sufficient to explain ordinariness, extraordinariness, and the various way stations in between.

First, *persons*. We all are persons: entities that exist in the natural world, have certain appearances, and experience certain feelings, wants, and needs. Persons entertain all manner of relations with one another—they desire one another, fear one another, seek to communicate with one another—and are frustrated when such communication is not effective.

Second, nonhuman physical objects (hereafter, *objects*). We persons are surrounded by a myriad of entities: simple nursery objects like rattles and dolls; complex natural objects like elephants, bumblebees, and evergreen trees; and intricate artificial objects, like hobbyhorses and CD-ROMs. Despite their differ-

ing origins and appearances, all these objects operate according to the same physical laws. Technically, human beings are physical objects as well; but it proves useful—and scientifically justifiable—to distinguish between human objects and all other physical objects in the world.

Third, *symbolic entities*. Humans have the peculiar property of liking to create and to make sense of symbols: words, gestures, pictures, numbers, and many other marks that refer to physical and natural objects. (In this peculiarity, more than any other, we differ from nonhuman animals). Sometimes these symbols are material, as in the case of maps; at other times, they are more ethereal, as in the case of spoken language or mathematical operations carried on inside one's head. Sometimes, the symbols stand alone (as in a piece of sculpture by Henry Moore), while at other times they are part of an elaborate system (as in a natural or computer language).

Ultimately, symbols come to be associated with certain adult practices or "domains"—crafts or disciplines that are valued by the culture and that can be mastered through recognized apprenticeships. Thus the domain of law is dependent upon linguistic symbols; mathematics relies on numerical and other abstract symbols; musicians deal with scores that include instructions about expressiveness and dynamics.

Finally, *developmental processes*. It could be the case, as happens with many animals, that human beings are born more or less fully formed. It could also be the case that, while not fully formed, human beings unfold according to a fixed blueprint that remains unaffected by the vagaries of experience.

Neither turns out to be the case. From the moment of conception, the embryo is affected by the physiological conditions of the womb, and, forever after, the particular facts about the particular environment exert a profound effect on what the organism becomes. By the same token, however, the organism (or person) is not simply a blank slate; humans come equipped not only with keen sensory systems and sense-making capacities, but also with strong proclivities to focus on certain experiences, to draw certain inferences, and to pass through certain cognitive, affective, and physiological stages.

In using the term *developmental*, I stress that all individual growth reflects constant and dynamic interaction between an organism, with its internal programs, and the environment, whose constituent properties are never wholly predictable. I stress, further, that these dynamic interactions continue throughout active life, giving shape and meaning to an individual's existence and ultimate accomplishments.

In the following chapters, I trace the development of this person-object-symbol ensemble, in both the ordinary person and the extraordinary person.

Infant

Direct relations to persons | Direct relations to objects

Child

Direct relations to person | Direct relations to objects

Initial decoding/encoding of symbol systems (for example, language, pictorial representations, and so on) that refer to persons and objects

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Adult

Direct relations to persons | Direct relations to objects

Indirect relations to persons via symbolic entities | Creation of objects in existing symbol systems or newly created ones

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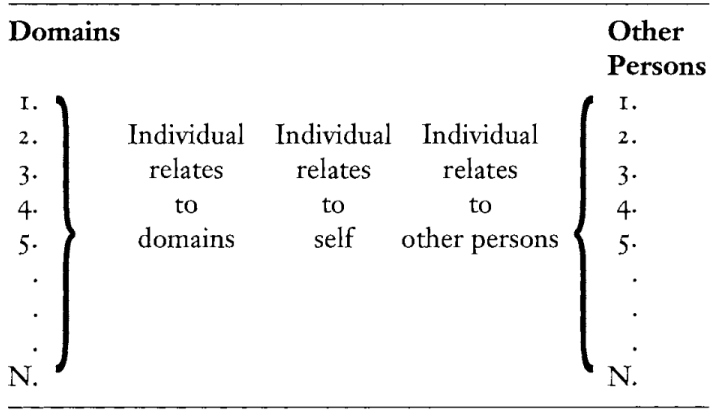
Four Forms of Extraordinariness

As individuals develop, they acquire much direct knowledge about the world of persons—others as well as themselves. As they approach the world of work, they gain comparable expertise with objects and symbols. These skills are brought to bear in various domains, ranging from the disciplines encountered in school, to the requirements of the job or profession that they pursue, to various avocations with which they enrich their lives.

Placing the individual in the center, we can think of the range of skills in terms of this diagram:



As depicted, every individual will develop relations to other persons, to domains of accomplishment, and to his or her self. That commonality, indeed, unites all human beings, independent of the milieu in which they happen to live. However, individuals differ from one another in the extent to which they emphasize one or more of these relationships; and extraordinary individuals differ dramatically from one another, and from ordinary individuals, in the extent to which they highlight a specific relation.

Armed with this conceptual framework, we can approach the four individuals I've elected to feature in this book. Each epitomizes one of four possible relationships of which all of us are capable.

Mozart exemplifies the *Master*. A Master is an individual who gains complete mastery over one or more domains of accomplishment; his or her innovation occurs within established practice. In Mozart's case, his mastery of the musical composition of his time was as complete as can be imagined; one could cite Bach from a somewhat earlier era, or Brahms from a somewhat later era, as other Masters of music. Each domain of accomplishment has its exemplary Masters: we think of George Eliot (Mary Ann Evans) as a master of the nineteenth-century English novel, Rembrandt as a master of seventeenth-century Dutch portraiture.

Freud exemplifies the *Maker*. A Maker may have mastered existing domains, but he or she devotes energies to the creation of a new domain. Freud created the domain of psychoanalysis. We may think of Jackson Pollock as an inventor of the domain of abstract "action painting" and Charles Darwin as the creator of the domain of evolutionary study in biology. From popular culture, individuals such as Charlie Chaplin and John Lennon emerge as Makers (while Ella Fitzgerald is better viewed as a Master).

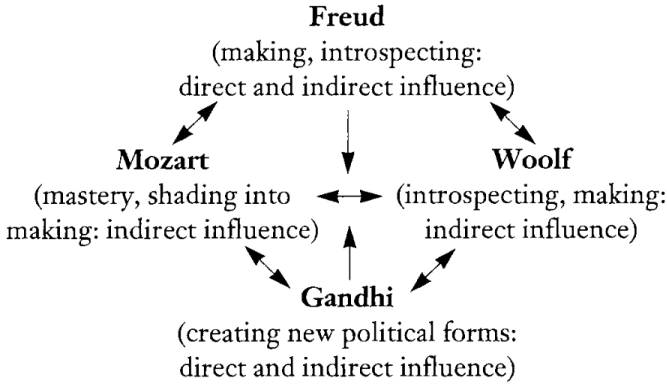
Woolf exemplifies the *Introspector*. Of primary concern to this individual is an exploration of his or her inner life: daily experiences, potent needs and fears, the operation of consciousness (both that of the particular individual and that of individuals more generally). Woolf left copious traces of her introspections—in her novels, her essays, her diaries, and her letters. Other notable Introspectors of recent times are the novelists Marcel Proust and James Joyce, and diarists such as Anaïs Nin and Witold Gombrowicz.

Gandhi exemplifies the *Influencer*. Such a person has as a primary goal the influencing of other individuals. Gandhi exerted influence through his leadership of various political and social movements, through his powerful personal example, and, less directly, through his evocative autobiographical and exhortatory writings. Political and military leaders influence directly; others influence indirectly, through their writings (Karl Marx) or by convincing leaders to pursue a certain course of action (Machiavelli).

For this study, these four roles constitute the major forms of extraordinariness. It is therefore important to make a number of additional points. To begin with, there are other forms of extraordinariness (for example, the spiritual guru or the moral exemplar); I will consider some of these variants in chapter 8. Second, individuals themselves may constitute examples of more than one form. Indeed, an occasional person like Freud can be cited as an instance of all four forms—for Freud mastered the domain of neurology, "made" the domain of psychoanalysis, introspected with finesse about his own life experiences, and exerted influence over dozens of direct follow-

ers and, ultimately, over millions of patients and readers. Third, this way of classifying individuals does not supersede others: in later chapters, for example, I will discuss how the four roles cut across various kinds of creative behavior and various human talents (or intelligences).

Finally, no sharp line divides the forms of extraordinariness. Since every action is to some extent original, no person is exclusively a Master; nor can any Maker proceed without some degree of mastery of existing domains. As further instances of the links among forms: despite their preoccupations with the world of persons, both Introspectors and Influencers also work in domains. Woolf and Joyce are innovators in the domain of writing, just as Gandhi and Mao Zedong are innovators in the domain of politics. It may be useful to think of our four exemplars as arrayed in a circular configuration, with each having ties to the other possible stances:



The Subtitle and Plan of the Book

About that subtitle: while we are not all extraordinary (or the notion would be meaningless), I invoke the word *our* for two reasons. First, all of us possess in some form the potential to occupy each of the roles: we can all master a domain, vary that domain in a significant way, introspect about ourselves, and

influence other persons. In a genuine sense, all our minds consist of these four variants. Second, the extraordinary minds that have emerged in the millennium belong to us. They are "our" minds both in the sense that they have contributed to the life of the broad human community and in the sense that they have been "made" by the evaluations of earlier generations of their respective fields (which include fellow human beings like us).

In the next section of the book, I draw attention to the processes of development in children. In chapter 2, I look at ordinary children, examining the processes that modulate normal development from infancy through adulthood. Then in chapter 3, I direct attention to the phenomena of extraordinary development. I seek to identify those factors that may distinguish certain children from the first, as well as those factors that come to distinguish a child en route to a life of extraordinary accomplishment.

In the central section of the book (chapters 4–7), I review the findings from case studies of Mozart, Freud, Woolf, and Gandhi; throughout I compare these exemplars with other extraordinary individuals as a means of uncovering general patterns of extraordinariness. In chapter 8, I address specifically the question of other forms of extraordinariness in individuals and in the broader society.

In my conclusion, I focus on three issues of growing concern in our world: What lessons can we, as ordinary mortals, learn from the study of remarkable individuals? Which factors might promote a greater degree of creativity or excellence in our contemporary world? And how might we increase the likelihood that human excellence might be mobilized for the common good?

As a guidepost for readers, let me mention three major lessons that emerge from the study:

1: Extraordinary individuals stand out in the extent to which they reflect—often explicitly—on the events of their lives, large as well as small.

2: Extraordinary individuals are distinguished less by their impressive "raw powers" than by their ability to identify their strengths and then to exploit them.

3: Extraordinary individuals fail often and sometimes dramatically. Rather than giving up, however, they are challenged to learn from their setbacks and to convert defeats into opportunities.

I am often asked, "Why this focus on excellence, creativity, extraordinariness?" Sometimes the question is raised for sheer curiosity, while at other times it carries a veiled (or not-so-veiled) indictment of a scholarly preoccupation with the privileged end of the bell curve.

My interest reflects an amalgam of motives. First of all, I believe such individuals—and groups of individuals—are fascinating in their own right and pose problems for frameworks in the human sciences that fail to take them into account. As just one instance, Jean Piaget's justly renowned theory of human cognitive development does not take into account the existence of "single-domain" prodigies, and this single omission calls into question his generalizations about the structure and "stages" of human intellect. Unless we can understand the unusual—be it eccentric, autistic, prodigous, or schizophrenic—our general theories will not be genuinely comprehensive.

Second, I believe that much of the good, and much of the bad, in the world is a result of the thoughts and actions of a few extraordinary individuals. Think of science without Darwin or Einstein, music without Mozart or the Beatles, political life without Napoleon or Mahatma Gandhi. One can recognize the important roles of chance, historical forces, the moment, the social needs of an era, and so on without taking the unnecessary (and, I maintain, fundamentally wrongheaded) step of denying the importance of individuals. Indeed, the very persons who themselves denied the importance of the individual—such as Leo Tolstoy or Karl Marx—have often belied this claim by the tremendous influence of their own work.

Finally, there is a moral undertone to my undertaking. I fully recognize that extraordinariness does not of itself translate into working for the societal good, or even caring about what the good might be. Still, if we are to have a world civilization—and, more particularly, one that strives toward fairness and peacefulness—we must understand as much as we can about individuals of unusual promise and achievement. From this understanding may come insight into how better to unite talent and a sense of responsibility.

TWO

Ordinary Development

The Two Great Child Watchers

It may be no accident that the two most famous students of human development, Sigmund Freud and Jean Piaget, focused on complementary aspects of the child. For Freud (1856–1939), a student of personality and emotional development, the central images of life concerned the child's relationship to other human beings: the infant's relationship to his mother; siblings' relationships with one another; and, above all, the dramatic tension between the child and his parents at the time of the Oedipal conflict, when the young boy seeks to possess his mother and to rid himself of the threatening father. (Despite flirtations with an Electra complex, Freud never quite determined how young girls mediate their relationship with their parents.) In treating troubled adults, one looked to triggering events in earlier years. Virginia Woolf's extreme difficulties in relating sexually to men would be traced, in a Freudian analysis, to the early death of her mother, her father's rigidity, and her probable molestation by both of her half-brothers.

Jean Piaget (1896–1980) devoted his research career to the child's cognitive development: the growth of her intellectual powers. Like Freud, Piaget was interested in the universal features of development—the milestones that characterize every child. And for Piaget, the central activity in the development of the young child is her relationship to the world of objects. At first, those objects are completely tangible: the infant playing with her father's beret, the toddler searching for a ball that has been hidden, the young schoolchild shooting marbles. But objects take on more abstract dimensions as a youth deals with nontangible entities like numbers, imagines the trajectory of marbles in her mind, and focuses on the *relations* among actions—for example, the connection between spreading apart (or amassing) a set of marbles and the actual tally of marbles in the new set, as compared to the earlier configuration.

Given the building blocks of our study, interesting resonances occur between the missions of the two great child watchers. Freud was interested in the individuals' relationship to other persons. When it came to physical objects, Freud emphasized the extent to which those objects either symbolized human concerns (for example, the cigar as phallus) or carried traces of the individuals who had created or used them (stuffed teddy bears). "Pure objects" were a rarity, though Freud is supposed to have quipped, "Sometimes a cigar is just a cigar." Piaget was interested explicitly in the individual's relationship to objects, and to the actions that one performs upon objects. He directed little attention to human relationships. When asked about them, he tended either to locate them outside his expertise or to treat the human person as just another "object-to-be-known."

Complementarity is also demonstrated in Piaget and Freud's stances to the world of symbols. Freud regarded the world of symbols—dreams, pictures, narratives—as magnificient vehicles for working out the dramas of the bedroom. Piaget treated symbols as a sophisticated means of portraying actions and the relationships among actions: thus the adolescent could express in logical propositions what the young child had to act out in the physical world. Piaget did concede that certain symbols

were "affectively loaded" for the child—for example, those referring to bodily functions—but he felt that this interest was a regressive element and seemed relieved when such forms of symbolization went "underground."

Both scholars focused on a general portrait of human development. This makes their work useful for illuminating the "center" of the bell curve, less germane for the understanding of individuals who are extraordinary in the cognitive sphere. Indeed, both men realized this: Piaget called the creative sphere "a magnificent subject which remains to be explored" (in Gardner, 1993b, p. 6) and Freud said "before creativity, the psychoanalyst must lay down his arms" (1961, p. 117).

While many of their specific claims have been challenged, current analyses of child development still build on the approaches devised by Freud and Piaget. In the remainder of this chapter, taking off from their pioneering work, I present a set of snapshots of the principal milestones in the development of children. In each case, I focus on those aspects of persons, objects, and symbols that characterize *all* children at that point in their growth. Only at the end of the chapter do I turn to features that reliably distinguish young children from one another.

The Mind of the Infant

Neither a blank slate nor William James's "blooming, buzzing confusion," the mind of the infant is already a quite detailed and articulated mental apparatus. Even the three- or four-month-old child has a strong sense of what a physical object is. She expects objects to remain solid, to retain their shape, and to move as single bounded entities; she registers surprise when an object appears to disintegrate or to defy the rules of smooth movement. The infant also has an incipient sense of number: she will treat a display of two elements as having the same number, even when those elements have been rearranged spatially; and she will notice when an element has been added to or taken away from the display.

Infants orient preferentially toward human faces and voices

almost from birth. They are able to recognize their own mothers by sight and sound within a few months of birth. They become upset when the images or sounds of these valued individuals are distorted in some way by a diabolical experimenter. By the end of the first year of life, most infants have established strong bonds of attachment to the important persons in their lives; when separated from these beloved individuals, the infants become upset.

Infants are primed to distinguish the world of persons from that of objects. During the opening months of childhood, infants engage in amazingly nuanced exchanges with their caretakers—smiling, cooing, rocking back and forth in rhythm, all in an effort to maintain close communication. These intimate dialogues have no direct analog in reactions to toys or household objects. To be sure, the infant can develop a strong tie to a cuddly toy animal or a favorite pillow; such intense relations represent an effort to infuse lifelike properties into hitherto nonresponsive entities. By age one, youngsters readily create categories that echo important adult distinctions: they know of prototypical plants, animals, persons, toys, and furniture, and they do not confuse members of different categories with one another.

Finally, infants make many of the same distinctions as do adults. Rather than hearing the spectrum of language as an unbroken stream of sound, they appreciate the same crucial distinctions as do adult speakers of a language—for example, honoring the difference between /buh/ and /puh/, or /duh/ and /tuh/. They also parse the spectrum of colors as do adults—acknowledging the same prototypical instances of colors and drawing the line between red and orange, or blue and green, at about the point that adult viewers do. Infants can remember tonal sequences, recognize when these have been altered in pitch or tempo, distinguish harmonic from dissonant chords, and appreciate the structure of the scale that governs the musics of their environs. And by the end of the first year of life, most children are already capable of "mundane symbolization": they recognize quite a few words in their language, can orient properly when they hear "ma" or "telephone," and utter recognizable words of their own.

PSYCHOLOGY/EDUCATION

In his landmark book *Frames of Mind*, Howard Gardner introduced the idea of multiple intelligences, arguing for a broad understanding of intelligence, one that embraces creation in arts and music, spatial reasoning, and the ability to understand ourselves and others. Gardner's ideas have changed how we think about intelligence, genius, and creativity. Now, in *Extraordinary Minds*, Gardner moves on to the mystery of extraordinariness. Are there parallels in the lives of extraordinary individuals as different as Woolf, Gandhi, Mozart, and Freud? In an exciting new synthesis revealing capacities we all possess, he suggests that "raw powers" are not what distinguish the extraordinary. Rather, three characteristics recur: an ability to analyze the events of their own lives; a knack for identifying and exploiting their own strengths; and the wherewithal to turn the inevitable setbacks of life into future successes.

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US $14.95 / $18.00 CAN

ISBN-13: 978-0-465-02125-3
ISBN-10: 0-465-02125-5

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