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Good Thinking

This book is for anyone who wonders whether to trust the media, seeks creative solutions to problems, or grapples with ethical dilemmas. Cognitive scientist Denise Cummins clearly explains how experts in economics, philosophy, and science use seven powerful decision-making methods to tackle these challenges. These techniques include: logic, moral judgment, analogical reasoning, scientific reasoning, rational choice, game theory and creative problem solving. Updated and revised in a second edition, each chapter now features quizzes for course use or self-study.

Denise D. Cummins is a cognitive scientist, author, and elected fellow of the Association for Psychological Science in recognition for her research on thinking and decision-making. Her work has been featured in *Psychology Today*, *PBS Newshour*, *BBC*, and *Scientific American.*

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GOOD THINKING

Seven Powerful Ideas That Influence the Way We Think

Second Edition

DENISE D. CUMMINS

University of Colorado-Boulder

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Preface

Since the publication of the first edition of *Good Thinking* in 2012, we have become increasingly more tribal in our thinking: People have grown distrustful of reported facts that clash with their personal or political views, regardless of their veracity. We too often cavalierly dismiss such reports as "fake news" precisely because they don't jibe with our beliefs.

For example, on June 26, 2019, *Big League Politics*[1] posted an article claiming three migrants trying to enter the United States had been quarantined because they tested positive for Ebola. But government border officials had no record of this, and neither did the Centers for Disease Control and Prevention in Atlanta. Despite this, the false report went viral on social media and attempts to rein it in proved problematic.[2] This is not an isolated case: A 2016 Pew poll found that nearly a quarter of Americans admitted to sharing made-up news stories.[3]

In the twenty-first century, we define our tribes not through genetic kinship but through shared beliefs. Someone who shares our beliefs is one of "us," which immediately inspires our trust. Someone who doesn't share our beliefs is one of "them" – an outsider who immediately triggers our distrust. These ideological tribes are most prominent on social media. Matthew Syed, author of *Rebel Ideas: The Power of Diverse Thinking*, points out that, for all its promise of diversity and interconnection, the internet has become characterized by a new species of highly cohesive in-groups, linked not by kin or clan but by ideological fine sorting.

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He refers to this phenomenon as "echo chambers" or "filter bubbles."[4]

Why have we become so tribal in our thinking? According to experts who study this phenomenon, the answer is as perplexing as it is simple: *We feel threatened, and people become more tribal when they feel threatened.*

In the United States, one in five people report frequently experiencing moderate to severe anxiety.[5] Much of this anxiety is rooted in economic uncertainty. According to a 2019 Gallup poll, 40 percent of Americans said they were either running into debt or barely making ends meet, while only 29 percent consider themselves financially healthy. Millennials are hit particularly hard by these factors.[6] Even corporations are not immune: The word "uncertainty" came up in over 250 presentations and earnings calls among S&P 500 companies in the three-month period spanning June to September, 2019, according to data provided to POLITICO by S&P Global Market Intelligence.

Anxiety levels skyrocketed following the outbreak of the COVID-19 pandemic and the social isolation measures imposed to contain the spread of the virus. According to a poll published by the American Psychiatric Association in March 2020, nearly half of Americans reported feeling anxious about the possibility of getting COVID-19, nearly four in ten reported anxiety about becoming seriously ill or dying from coronavirus, and six in ten reported feeling anxious about the possibility of family and loved ones getting the virus.[7]

Throughout human history, people have sought safety and solace by banding together into tribes, a characteristic anthropologists and evolutionary biologists refer to as "sociality." So vital was this form of social bonding that belonging became a primary human need, encoded deeply in our neural pathways: A number of neuroimaging studies have reported that social rejection and isolation light up the same areas involved in feeling physical pain.[8] This should come as no surprise. Being a member of a tribe boosted one's chances of survival. Tribe members can be called upon to share food, distribute labor, and defend each other against external threats – whether these threats were predators or human enemies.

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The more intense the feeling of threat, the more tightly tribe members draw together for protection and succor. Exile from one's tribe can mean certain death from starvation or predation, and, as a result, the threat of exile carries immense coercive force. To avoid exile, tribe members must reaffirm their adherence to explicit and implicit social norms, norms that typically favor in-group members over out-groups.

The "evolutionary footprint" of tribalism is apparent in the profound in-group biases of very young infants, long before we have had time to learn these biases through interactions with the environment. Infants as young as 10 months of age have been shown to prefer toys or snacks endorsed by a native speaker of their language over those endorsed by a foreign speaker.[9] By as young as 14 months of age, infants are more likely to imitate a novel action modeled by a native as opposed to a foreign speaker.[10] In some studies, infants watch as an actor (such as a monkey puppet) distributes toys to members of their in-group (monkey puppets) and to members of an out-group (giraffe puppets). If there are enough toys for everyone, infants look longer at displays in which one group is given more than the other group, as if they are thinking "Hey, that's not fair!" But if there are fewer items to distribute than there are recipients, they look longer when the out-group receives more items than the distributor's in-group. In other words, when resources are scarce, they expect in-group support to trump fairness, which leads them to closely scrutinize situations where this in-group bias is violated.[11]

Neuroimaging research with adults shows how rapidly and efficiently these in-group biases are triggered and processed by the brain. We can recognize familiar faces in less than half a second (380 ms).[12] But long before that, we classify faces as "like me" or "not like me." For example, we are slower and less accurate to recognize faces of other races, but we are faster to classify the race of other-race faces than faces of people in our own race. In other words, long before we decide whether we've seen someone previously, we've already classified them as "same race as me" or "different race."[13]

In one particularly striking example, Caucasian participants watched black and white faces flash on a screen for a mere 30

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milliseconds (3/100ths of a second).[14] Researchers found that the "threat detection" areas of their brains (amygdala) lit up more strongly in response to black faces than to white faces. However, this effect was diminished when the pictures were presented for a longer time so that they were clearly visible (525 ms, or about half a second). During this very brief interval, the "executive" area of the brain (prefrontal cortex) became very active. The researchers concluded that the additional time allowed participants' executive brain areas to downregulate (quieten down) their automatic implicit out-group threat bias.

Other neuroscience studies have reported profound differences in the way the brain processes in-group and out-group information.[15] The pleasure areas of our brains (e.g., striatum) become active when we see rewards given to in-group members, but not when we see rewards given to out-group members. These areas also light up when we are asked to trust in-group members, but not when we are asked to trust out-group members. When we interact with in-group members, areas of our brains involved in understanding what others are thinking or feeling (theory of mind) become active. But these areas are not strongly activated when we interact with out-group members.[16] Even worse, when there is strong competition between two groups, seeing out-group members experience pain or misfortune activates brain areas associated with processing pleasure (e.g., the striatum) rather than pain.[17]

Rapidly triggered neural biases like these that emerge early in infancy often typically are ones that conferred survival or reproductive advantages during our evolutionary past. But the important thing to keep in mind is this: *Showing that a bias or preference has deep evolutionary roots doesn't imply that it is immutable or justified.* As a simple example, consider that we are born with a strong preference for sweet taste, in large part because sweet taste signals high caloric content that can be quickly converted to glucose in the blood stream – just what you need if you spend most of your days burning calories as you forage for food. But we now live in environments that exploit this innate bias by inundating us with sweet tasty foods, which we find enormously tempting, satisfying, and difficult to resist. The result is an epidemic of obesity and diabetes. It is just as ridiculous to say "Of course I should

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favor those who are like me over those who aren't because it's natural to do that" as it is to say "Of course I should indulge in sweets because it's natural to do that."

We are experiencing an unchecked rise of in-group bias (aka tribalism) today, or to put it another way, we are reverting back to a very primitive way of thinking about our social world. But as we've found out, our tribes no longer seem to consist of friends and family. Shockingly, 22 percent of millennials in a recent poll said they have no friends at all.[18] Despite (or perhaps because of) our addiction to social media, three out of four Americans report experiencing levels of loneliness from moderate to severe.[19]

To fill the void of social connection, we increasingly turn to *identity politics*: We divide the world into "us" and "them" based on gender, race, ethnicity, religion, political orientation, and socioeconomic class. Nowhere is this more apparent than on college campuses, which have become balkanized into identity groups. In 2017,[20] *New York Times* journalist Bret Stephens observed that on college campuses "the primary test of an argument isn't the quality of the thinking but the cultural, racial, or sexual standing of the person making it." To say, "*as a woman of color, I think X*," Stephens noted, "is the baroque way Americans often speak these days." It is not unusual for Americans to first identify themselves as members of a particular tribe before stating a view or opinion, relying on that tribal membership to imbue their view or opinion with special epistemic status. This ubiquitous yet curious state of affairs is referred to by philosophers as *standpoint epistemology* – the theory that knowledge is a function of social position. The purpose (as well as outcome) of standpoint epistemology is replacing individual thought with social identification. The irony of standpoint epistemology is that it often doesn't encourage acceptance of diversity; instead, it encourages viewing members of a particular identity group as carbon copies of each other who all think alike and hence are interchangeable.

The hope of liberal arts education was the broadening of young minds through exposure to differing points of views and to different methods that can be used to discover truths about the world and about ourselves. Yet, paradoxically, recent research has discovered just how

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much education has failed to achieve that lofty goal: Republicans' misperceptions of Democrats do not improve with higher levels of education, and Democrats' understanding of Republicans actually gets *worse* with every additional degree they earn. This dismal state of affairs emerges despite the fact that the difference between views by the majority on either side of the aisle is far less than people perceive it to be, a phenomenon that social scientists refer to as a political "perception gap" (https://perceptiongap.us/).

The clear and present danger of rising identity politics and concomitant standpoint epistemology is that they can be used to manipulate us. We lose sight of assessing statements based on evidence and truth, replacing it with a simpler question: Does this benefit my tribe or not? The next step is to see other "tribes" as harming "us" or "our" way of life, usually by finagling unfair access to "our" resources. Members of other tribes then are usually characterized as abstract threats that must be neutralized, anonymous masses that are surely not worthy of our empathy or compassion. This is also chillingly apparent on college campuses: One study of American students published in *Personality and Social Psychology Review* revealed that levels of empathy in this demographic fell by 48 percent between 1979 and 2009, an inevitable outcome of living within digital echo chambers, in which people anchor themselves in close-knit groups of like-minded people.[21] And here is why:

As I pointed out in the first edition of *Good Thinking*, after two decades of teaching bright and curious university students, I came to a disturbing conclusion: *Despite our best efforts to expose students to methods of inquiry that can profoundly improve the way we think and live, most students are still well insulated within their particular disciplines.*

Science majors know all about hypothesis testing but don't know the first thing about moral theory or ethics. Philosophy and prelaw majors know all about argumentation and ethics, but don't know the first thing about scientific investigation. Outside of business schools, precious few students know anything about decision theories that drive the equity market and underlie economic policies that impact their lives – right down to whether or not they can get student loans. And

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outside of psychology majors, virtually none fully grasps how much the way we think, act, and feel depends on how the brain is wired at birth and changed by experience. These bright and well-educated people then take jobs as policy makers, writers, scientists, lawyers, and teachers – bumping about in life with holes where crucial knowledge ought to be. Because they now have incorporated a good deal of tribal thinking into their cognitive tool kit, they easily fall prey to manipulations aimed at triggering tribal instincts and survival fears.

For example, in *The Suicide of Reason: Radical Islam's Threat to the West* (2007), Lee Harris argues:

> *[T]he West has cultivated an ethos of individualism, reason and tolerance, and an elaborate system in which every actor, from the individual to the nation-state, seeks to resolve conflict through words. The entire system is built on the idea of self-interest . . . . Our worship of reason is making us easy prey for a ruthless, unscrupulous and extremely aggressive predator and may be contributing to a slow cultural "suicide."*

To thinkers like Harris, reason is what makes us weak, indecisive, and vulnerable. Reason is what ensnarls us in words and makes us slow to act. Yet the fallibility of human reasoning was not lost on our founding fathers, nor is it lost on scientists and policy makers who still depend upon it to make decisions that impact millions of lives. Reasoning is fallible, which is why we need training in solid methods known to improve it. As Ayaan Hirsi Ali puts it:

> *Enlightenment thinkers, preoccupied with both individual freedom and secular and limited government, argued that human reason is fallible. They understood that reason is more than just rational thought; it is also a process of trial and error, the ability to learn from past mistakes. The Enlightenment cannot be fully appreciated without a strong awareness of just how frail human reason is. That is why concepts like doubt and reflection are central to any form of decision-making based on reason. ("Blind Faiths,"* New York Times, *January 6, 2008)*

But here is the crux of the problem: It is not that we rely too much on reason. It is that we don't know how to reason well.

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This is in large part because the type of reasoning needed to understand an issue or solve a problem depends on the nature of the issue or problem. Different disciplines have developed specific tools to address specific issues and problems, which only adds to insulating students within their own disciplinary tribes. Textbooks on critical thinking in the humanities focus entirely on analyzing the validity and soundness of arguments. Rarely do these textbooks discuss the large body of research on human reasoning conducted by cognitive scientists over the course of half a century, and rarely do they discuss methods such as Bayesian inference that dominate fields such as economics.

I am not alone in believing that focusing solely on critical thinking from a humanities tradition is outdated. In his *Brains Blog*, Yale philosopher Joshua Knobe points out that it simply is no longer the case that logic eclipses all other formal methods. In response, numerous philosophy programs have made important changes in their requirements governing philosophical education:

- Yale University replaced its traditional logic requirement with a broader formal methods requirement. Students can fulfill this new requirement by taking a course in logic, but they can also fulfill it by taking a course in any other formal method that plays a role in their philosophical research (probability, game theory, statistics, etc.).
- The University of Michigan now allows students to fulfill the logic requirement by taking a broad survey course in formal methods (logic, probability, decision theory).
- The University of Arizona has a "formal requirement" that can be fulfilled not only by taking a logic course but also by taking a course in statistics (in the psychology department) or machine learning (in the computer science department).
- Stanford University recently introduced at the undergraduate level a broad course on formal methods, which includes logic, probability, decision period, and statistics.

This is precisely the aim of *Good Thinking* – to lay out each of the seven tried and true methods of inquiry in plain English so that readers can

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decide for themselves just how much or how little confidence we should have in what we are being told by the media and by authorities. These methods are:

1. *The game of logic* – what follows from what
2. *Moral judgment* – how we tell right from wrong
3. *Analogical reasoning* – the heart and soul of insight, discovery, and genius
4. *Scientific reasoning* – figuring out what causes what, and what to do about it
5. *Rational choice* – choose what is most likely to give you what you most want
6. *Game theory* – what to do when you're not the only one making choices
7. *Creative problem-solving* – the search for solutions to unwanted situations

These are the main methods of inquiry that underlie the decisions we make in our everyday lives, in jurisprudence, in politics, in economics, and in science. *The major goal of this book is to counteract our inborn reasoning biases by empowering people to think more clearly and rationally.*

This is particularly urgent with respect to our inborn bias toward tribalism. As Allen Buchanan, author of *Our Moral Fate*,[22] points out, tribalism is not an inevitable, inherent part of our basic moral psychology. On the contrary, Buchanan argues that the moral mind is highly flexible, capable of both tribalism and deeply inclusive moralities, depending on the social environment in which the moral mind operates. We can take charge of our moral fate by deliberately shaping our social environment to better reflect what sort of morality is predominant in our societies and what kinds of moral agents we are.

One last thought must be kept in mind: However rational and flawless these methods may seem, they are not implemented on infallible hardware. Instead, these models are implemented by flesh-and-blood human reasoners or, more specifically, by their neural circuitry. To fully appreciate the whole package of reason, we must be conversant with the way such circuits operate in different circumstances to yield

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decisions. For this reason, this book details important findings from the new fields of decision neuroscience that are pertinent to each of these models of thought.

Finally, since the publication of the first edition of *Good Thinking* in 2012, a wealth of exciting and surprising discoveries about human decision-making have been reported, and these intriguing discoveries are summarized in each chapter of this second edition. For example:

- While Paul Bloom's book *Against Empathy*[23] persuasively argued that empathy is "*narrow-minded, parochial, and innumerate,*" the bulk of recent research in game theory shows quite the opposite. Using biology-inspired evolutionary models of social interactions, researchers discovered that, without empathy, cooperation almost vanishes under most social norms. With empathy, cooperation rates skyrocket. The researchers concluded that empathy is the secret ingredient that made civilization possible.
- The powerful impact of emotion on decision-making has become a key area of research, with the potential to create a paradigm shift in decision theories. Individuals with high emotional intelligence are more likely to correctly identify which events caused their emotions and, therefore, are also more likely to screen out the impact of their emotions on subsequent decision-making.
- Of the many explanations that have been offered for skyrocketing rates of obesity and diabetes worldwide, one explanation stands out above the rest: *plausibility bias* among medical researchers. The ideas that "eating fat makes you fat" and that "obesity leads to diabetes" are so intuitively appealing and plausible that they took root among medical researchers during the 1970s. The alternative view – that overindulging in carbohydrates (even "healthy" ones like grains) could trigger Type 2 diabetes and obesity, raise cholesterol levels, and lead to non-alcoholic fatty liver disease – seemed highly implausible by comparison. Today, the body of evidence supporting this counter-intuitive hypothesis is too large to ignore.

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Finally, this book is divided into two parts. Part I provides the following:

- An informal overview of a method of inquiry
- Examples drawn from current events to which the method is relevant
- Results of studies in cognitive science and neuroscience showing how people actually perform compared to how they are supposed to perform when using the method
- How to improve your thinking using the method.

Part II takes us "Into the Weeds":

- An in-depth tutorial on each method of inquiry that drills down into the history of the method and the details of how it is supposed to be applied
- Quizzes and exercises that readers can use to try their hand at using the methods like experts do.

After reading this book, readers should be empowered to decide for themselves whether human reasoning is as frail or as strong, as dangerous or as benign, or as superfluous or as crucial as it has been made out to be.

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