

IGNORANCE

WHAT WE DO NOT KNOW

A thick, horizontal red brushstroke with a textured, painterly appearance, positioned below the text 'WHAT WE DO NOT KNOW'.

CANNOT KNOW

A thick, horizontal red brushstroke with a textured, painterly appearance, positioned below the text 'CANNOT KNOW'.

MUST NOT KNOW

A thick, horizontal red brushstroke with a textured, painterly appearance, positioned below the text 'MUST NOT KNOW'.

AND REFUSE TO KNOW

A thick, horizontal red brushstroke with a textured, painterly appearance, positioned below the text 'AND REFUSE TO KNOW'.

GEORGE G. SZPIRO

IGNORANCE

BOOKS BY GEORGE G. SZPIRO

Kepler's Conjecture: How Some of the Greatest Minds in History Helped Solve One of the Oldest Math Problems in the World (Wiley, 2003)

The Secret Life of Numbers: 50 Easy Pieces on How Mathematicians Work and Think (Joseph Henry Press, National Academy of Sciences, 2006)

Poincaré's Prize: The Hundred-Year Quest to Solve One of Math's Greatest Puzzles (Penguin, 2007)

Numbers Rule: The Vexing Mathematics of Democracy, from Plato to the Present (Princeton University Press, 2010)

A Mathematical Medley: Fifty Easy Pieces on Mathematics (American Mathematical Society, 2010)

Pricing the Future: Finance, Physics, and the 300-Year Journey to the Black-Scholes Equation (Basic Books, 2011)

Risk, Choice, and Uncertainty: Three Centuries of Economic Decision-Making (Columbia University Press, 2020)

Perplexing Paradoxes: Unraveling Enigmas in the World Around Us (Columbia University Press, 2024)

Random Numbers Unveiled: The Secrets of Numbers That You Can't Predict but Can Rely On (Taylor & Francis, 2026)



The three wise monkeys: "Hear no evil, speak no evil, see no evil."
From Wikimedia commons: https://commons.wikimedia.org/wiki/File:Toshogu_Three_Monkeys_Restored_2024_Crop.jpg

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WHAT WE DO NOT KNOW,
CANNOT KNOW,
MUST NOT KNOW,
AND REFUSE TO KNOW

GEORGE G. SZPIRO



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Dedicated to the generation after the next:

Tamar, Rotem, Daniel, Ruben, Romy, Lavie, Maya, and Gali

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Knowledge is a big subject. Ignorance is bigger. And it is more interesting.

—Stuart Firestein, *Ignorance: How It Drives Science* (2012)

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IGNORANCE

INTRODUCTION

See No Evil, Hear No Evil, Speak No Evil

A seventeenth-century carving over a door of the Tōshō-gū shrine in Nikkō, Japan, depicts three monkeys: Mizaru, covering his eyes, Kikazaru, covering his ears, and Iwazaru, covering his mouth. The carving symbolizes the Japanese principle “see no evil, hear no evil, speak no evil.” The iconic image of the three monkeys has been reproduced many times and in many different contexts. Even Mahatma Gandhi, who eschewed most worldly possessions, owned a replica.

The carving was probably inspired by a maxim of the Chinese sage Confucius (551–479 BCE), whose sayings were collected by his followers and published many years after his death as the “Sayings of Confucius,” aka *The Analects*. In Book XII Confucius’s disciple Yen Yuang asked the master how one should practice perfect virtue. “Look not at what is contrary to propriety; listen not to what is contrary to propriety; speak not what is contrary to propriety,” Confucius answered. In some portrayals a fourth monkey is added; he covers his genitals to indicate that one is to “do no evil.”

The motto—not to see, not to hear, not to speak—is considered a wise dictum in the Far East, indicating noble conduct, but this is not so in the Western world. To turn a blind eye toward evil, to close one’s ears to wickedness, or to fail to speak out

against misdeeds suggests a lack of moral responsibility. People who refuse to acknowledge impropriety are not considered noble but rather the opposite. Feigning ignorance by looking the other way indicates spinelessness or, worse still, complicity.

The lack of courage to speak out calls to mind the code of *Omertà*, the conspiracy of silence of Mafia-type criminal organizations. Accordingly, the response of the above-mentioned Yen Yuan to the master's exhortation befits a member of a street gang rather than an adherent to Confucian values: "Though I am deficient in intelligence and vigor, I will make it my business to practice this lesson."

There is another facet to "See Not, Hear Not, Speak Not." Overlooking everything by closing one's eyes or disregarding everything by plugging one's ears means ignoring not only the evil but also the good; keeping one's mouth shut means not only refraining from slanderous rumors but also ignoring the praiseworthy.



Epistemology, the theory of knowledge, is an intellectual discipline that has been discussed, dissected, and debated for thousands of years. Ignorance, on the other hand—its nature, causes, and implications—has received relatively little systematic attention as a theory, despite its profound influence on human behavior, societal structures, and—somewhat paradoxically—even on the pursuit of knowledge itself. It is true that Socrates, Plato, and Aristotle, and myriad thinkers who followed them, discussed ignorance, but mainly as a contrast to their primary interest: the pursuit of knowledge.

Only in modern times has ignorance emerged as an area of scholarly study in its own right.¹ If knowledge was defined as

true belief by Socrates in the fifth century BCE, or as *justified true belief* by Edmund Gettier in the twentieth century, today ignorance is considered not just as the absence of belief but as a phenomenon shaped by societal, political, psychological, and even scientific and mathematical factors. Reflecting the limits of human understanding, the inherent constraints of nature and logic, the prohibitions against what must remain undisclosed, and the inner resistance to what is unwelcome, ignorance arises from what one does not know, cannot know, must not know, or refuses to know.



Generally, humankind's efforts are directed toward the accumulation of knowledge through education, research, observation, innovation, and experimentation. Whereas knowledge is actively produced and shared, ignorance results from neglect, systemic barriers, or deliberate efforts. Although generally deemed a negative state, ignorance does have a redeeming feature: as long as it is acknowledged, it motivates curiosity and drives the quest for knowledge.

One could suppose that as more and more knowledge is accumulated ignorance should diminish. Paradoxically, the opposite is true. In this, ignorance may be likened to the expanding universe. The more that cosmologists explore it, the more they realize how vast the as yet unseen—and expanding—parts are. Similarly, each new piece of knowledge unveils new pockets of ignorance and raises additional questions. For this reason, ignorance should not be viewed as a static void but as a dynamic, ever-expanding expanse.



In this book I classify concepts, ideas, and phenomena about which we are ignorant into four categories: what we do not know, cannot know, must not know, and refuse to know. The demarcations are not strict, and the choice to include a subject in this or that category may at times be arbitrary. Some chapters could fit into multiple categories.



DO NOT KNOW

In this part of the book, we explore subjects that are unknown and questions that are unanswered. Some of them may become known and answered in the future if scientists and mathematicians keep looking hard enough. Ignorance about other matters may be self-imposed; still others remain unknown due to an inherent lack of self-awareness. Finally, some puzzling problems may never be solved because philosophers cannot agree on fundamental principles.

1

DO ALIENS VISIT US?

Flying Saucers and Other UFOs

Theories about unidentified flying objects (UFOs) have been something of a playpen for conspiracy enthusiasts, paranoia peddlers, rumor mongers, alternative thinkers, truthers, deniers, and sundry fringe hobbyists since the late 1940s. Photographs of flying saucers, accounts of sightings, reports about visitors from outer space, and stories of abductions have filled the tabloids.

Although most dismiss UFOs, the US Air Force took it upon itself to investigate UFO reports. *Project Sign* in 1948 was followed by *Project Grudge* and *Twinkle* in 1949 and *Project Blue Book* (1952–1969). Other countries undertook similar investigations. According to the official announcements, no evidence of alien visitations or extraterrestrial visitations was ever found. The typically fuzzy and shaky sightings, captured by sensors or cameras that were not designed or calibrated for this purpose, were explained as the result of natural phenomena, faulty technology, delusions, and practical jokes. Indeed, after further investigations, most alleged flying objects turned out to be banal occurrences that were misidentified by amateur astronomers or impressionable observers: planets or comets or bright stars, military or civilian aircraft, surveillance or weather balloons, unusual