

# الشك العلمي: عندما تتحول الهواجس العربية إلى ظاهرة عالمية

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## الملخص

إن الهدف من الدراسة هو التأكيد على أهمية التعليم في مكافحة التشكيك العلمي ونظريات المؤامرة في العالم العربي، الذي تحوّل إلى ظاهرة عالمية في العقد الأخير. يؤدي التعليم دورًا حاسمًا في تعزيز التفكير النقدي والعقلانية. هذه السمات ضرورية للتمييز بين الحقائق العلمية الصحيحة والمقاربات غير الصحيحة. يجب على المجتمع الأكاديمي العالمي أن يدعو إلى إصلاح المناهج التعليمية لتعزيز ثقافة التساؤل العلمي والتحليل المنطقي. وهذا أمر ضروري لتقديم المجتمعات وتطورها. إن أهمية التعليم العلمي والتفكير النقدي في مكافحة نظريات المؤامرة السياسية والتشكيك بالعلوم يعزز المعرفة الدقيقة بمواجهة تفشي الجهل والإيمان بالأساطير. إن التعليم هو المفتاح للتغلب على الفقد العلمي والجهل المعرفي، والتي غالبًا ما تستخدمها الأنظمة في الدول الفاشلة لتسويغ فشلها التنموي.

تتضمن أسئلة البحث المستندة إلى النص الآتي:

- 1 - كيف يمكن إصلاح الأساليب التعليمية لتعزيز التفكير النقدي ومكافحة الجهل الفكري في المجتمعات العربية؟
- 2 - كيف يمكن التأكيد على الأدلة الموثوقة والحقائق العلمية في عمليات صنع القرار، ولا سيما فيما يتعلق بقضايا مثل جائحة كوفيد-19؟
- 3 - إلى أي مدى يعدّ التشكيك في الدراسات العلمية ظاهرة عالمية، وما العوامل الكامنة التي تسهم فيها؟
- 4 - ما تأثير نظريات المؤامرة على تصور الجمهور للحقائق العلمية، وكيف يمكن معالجة ذلك من خلال التعليم ومحو الأمية الإعلامية؟

وأخيرًا، عبر المنهجين الوصفي والتاريخي ينبغي أن نسلط الضوء على أهمية نشر المعرفة من خلال التعليم لمكافحة التشكيك ونظريات المؤامرة. سيضمن ذلك أن تستند القرارات إلى أدلة موثوقة وتفكير منطقي وتحليل موضوعي. الكلمات المفتاحية: التعليم، التفكير النقدي، التشكيك العلمي، نظريات المؤامرة، الجهل الفكري، صنع القرار، الدراسات العلمية، محو الأمية.

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الاستلام: 2023/4/30، التعديل النهائي: 2023/12/20، إجازة النشر: 2023/12/27.

<https://doi.org/10.34120/ajh.v42i167.331>

To cite this article: Badawi, Habib: "Scientific Skepticism: From Arab Doubt to a Global Pandemic". *Arab Journal for the Humanities*: 167, 2024, 257-275.

# Scientific Skepticism: From Arab Doubt to a Global Pandemic

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## Abstract

The study underscores the pivotal role of education in addressing scientific skepticism and countering conspiracy theories prevalent in the Arab world and beyond. Education stands as a cornerstone in fostering critical thinking and rationality, crucial for discerning between information and misinformation. This research sheds light on the adverse effects of totalitarian regimes that stifle critical thought to perpetuate their authority.

The global academic community is urged to advocate for educational curriculum reforms aimed at instilling a culture of inquiry and analytical thinking. Emphasizing scientific education and critical thinking is crucial in countering political conspiracy theories and skepticism toward scientific knowledge. Education stands as the antidote to countering scientific ignorance and cognitive biases often exploited by failing regimes in developing countries to justify their shortcomings.

The research explores several critical questions:

- How can educational methodologies be redesigned to nurture critical thinking and combat intellectual ignorance in Arab societies?
- How can the emphasis on reliable evidence and scientific facts be amplified in decision-making processes, particularly concerning issues like the COVID-19 pandemic?
- To what extent is skepticism towards scientific studies a global phenomenon, and what are the underlying contributory factors?
- What impact do conspiracy theories have on the public's perception of scientific facts, and how can education and media literacy address this impact?

Reforming educational curricula is imperative, redirecting them towards scientific methodologies, critical thinking, and inquiry-based learning. Such reforms are pivotal to combating intellectual ignorance and advancing scientific reasoning within societies.

**Keywords:** education, thinking, scientific skepticism, conspiracy theories, intellectual ignorance, scientific studies, illiteracy.

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Submitted: 30/4/2023, Revised: 20/12/2023, Accepted: 27/12/2023.

<https://doi.org/10.34120/ajh.v42i167.331>

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## Introduction

Skepticism, also spelled scepticism (British spelling), embodies a questioning attitude or doubt toward knowledge claims perceived as mere belief or dogma. The term originates from the Greek «σκέπτομαι» (skeptomai), signifying the act of searching, thinking, or seeking. The Greek philosophical roots of skepticism trace back to philosophers such as Xenophanes (c. 570–c. 475 BCE) and Democritus, evident in their expressed skeptical views.

A distinctive philosophical movement, Greek philosophical skepticism emerged notably from Pyrrho of Elis (c. 360–270 BCE). Pyrrho and his followers, the Pyrrhonists, raised the issue of the criterion, asserting that theories and sensory perceptions fail to discern truth from falsehood, thus advocating suspension of judgment (Epoche). They carried their doubt even to the principle of doubt, rendering their skepticism universal and avoiding reliance on a fresh dogmatism.

Scientific skepticism, or rational skepticism, sometimes referred to as skeptical inquiry, involves questioning claims lacking empirical evidence. This form of skepticism predominantly addresses claims seemingly outside mainstream science, distinct from routine scientific discourse. It differs from philosophical skepticism, which questions the human capacity to claim knowledge about the world, and methodological skepticism, a systematic process of doubting one’s beliefs.

The skeptical movement stands as a contemporary social movement rooted in scientific skepticism. Its primary objective involves scrutinizing claims on fringe topics to ascertain empirical support and reproducibility, aligned with a methodological norm aiming to extend certified knowledge.

Scientific skeptics advocate empirical investigation as the path to reliable empirical knowledge, emphasizing the scientific method’s effectiveness in verifying results. They evaluate claims based on verifiability and falsifiability, discouraging reliance on faith or anecdotal evidence.

Scientific skepticism is a vital concept in modern society, especially considering the current global pandemic. It is a way of looking at the world with an open mind and asking questions to ensure that the facts are correct. It is a way to assure that claims are evaluated and evaluated through the scientific method before they can be accepted as true.

Exploring the root of “skepticism” leads us to the Greek word «σκέπτομαι» (skeptomai), originating from the works of Pyrrho of Elis, a prominent figure in ancient Greek philosophy. Pyrrho, who lived around 360–270 BCE, was the founder of Pyrrhonism, a philosophical school that greatly influenced the development of skepticism.

Pyrrhonism advocated for a suspension of judgment, asserting that absolute certainty or knowledge about the nature of things was unattainable. This school of thought focused on attaining a state of mental tranquility, or *ataraxia*, through the suspension of judgment regarding truth or falsehood.

The term “skepticism,” derived from Pyrrho’s ideas and the Greek word “σκέπτομαι” (*skeptomai*), implies inquiry, examination, or investigation rather than outright denial or affirmation. It encapsulates an attitude of continual questioning, critical examination, and the withholding of final judgments in the quest for knowledge.

The Pyrrhonian skepticism of Pyrrho advocated for an attitude of *epoche* (suspension of judgment), urging individuals to refrain from affirming or denying the truthfulness of any proposition. Pyrrho emphasized the relativity of perceptions, arguing that different people have varying perspectives due to individual experiences, making it challenging to ascertain absolute truth.

This philosophical strand of skepticism, originating from Pyrrho’s teachings, underscores the importance of continuous inquiry, critical examination, and the recognition of the limitations of human perception and understanding. It advocates an open-minded approach, acknowledging the potential for fallibility in our perceptions and beliefs.

The essence of Pyrrhonism, rooted in skepticism, encourages a reflective and questioning attitude towards knowledge and truth, emphasizing the significance of constant inquiry and the recognition of the uncertainty inherent in human comprehension. Understanding the origins of skepticism through Pyrrho’s philosophical contributions provides a profound insight into the ongoing quest for knowledge and the inherent limitations of human cognition. It invites us to adopt an attitude of humility, curiosity, and perpetual inquiry as we navigate the complexities of understanding the world around us.

In the Middle East, the origin of scientific skepticism can be traced back to the Arab world. During the Islamic Golden Age, scientists and philosophers questioned traditional beliefs and used the scientific method to reach their conclusions. They were among the first to question the validity of existing theories and introduce novel ideas such as *al-Bīrūnī*, *Ibn al-Haytham*, and, to a certain degree, *al-Ghazālī*.

This skepticism has since spread around the world, leading to the development of many of the scientific breakthroughs that have shaped the modern world. It is now a fundamental part of the scientific process and has been especially relevant during the current pandemic.

In this study, we looked at scientific skepticism and its importance in the current global pandemic. Scientific skepticism is a vital concept in modern society, as it helps

to ensure that claims are evaluated and assessed before they are accepted as true. It has been especially critical during the current pandemic. This has helped to protect the health and safety of individuals and communities by ensuring that decisions are based on facts and not on fear or superstition. In conclusion, scientific skepticism is an invaluable tool in modern society that should be embraced and utilized.

The methodology for this study will involve a qualitative approach, using secondary sources and literature reviews. This will involve researching existing literature about scientific skepticism and its importance in the current global pandemic. This will help to provide a comprehensive understanding of the role of scientific skepticism and its importance in the current context.

Since the beginning of the twentieth century, scientific skepticism has been commonplace in societies in the Arab East. The outcome of WWI, which made the map of the Middle East far more complicated than the other continents of the world, brought with it an obsession with doubting what is clear, obvious, and scientifically proven, but generated in the West—even among the educated classes, most of whom are graduates of the most prestigious universities in the world. This rejection of what is already scientifically proven, caused by the Middle East’s “new” political reality, is reflected in local academic circles as uncertainty and suspicion in “Western” sciences of all kinds. It can be argued that scientific skepticism and conspiratorial thought dominate the Arab mind because they spare the public both the conscience and the trouble of looking for causes of failure, rid them of attempts at self-criticism, and absolve them of any ethical responsibility. Additionally, this skepticism supports the widely held belief in the region that Arabs have always been targets and victims of Western conspirators seeking to destroy their faith and identity. Meanwhile, today, some individuals and groups of the “First World” reject scientific facts and question their validity for a variety of reasons, some of which are political, and ideological, but not religious in nature. For example, the election of Donald Trump, an upfront climate change denier, as President of the United States has strengthened the position of skeptics of science in general while encouraging climate change deniers.

During the twenty-first century, skepticism towards the scientific method prevailed around the world. It should be noted that proven facts and established events are also doubted by citizens in Western countries, where scientific research has a long and successful history. Prominent examples of such widely doubted facts include the landing of the first man on the moon; the emergence of the AIDS virus; the cause of the Coronavirus pandemic; vaccines; global warming; the spherical nature of Earth; in addition to the presence of secret societies that rule the world. As a result, even today in the West, many scientific, political, and socially substantiated theories and facts are being challenged.

Furthermore, most people suffer from “confirmation bias,”<sup>(1)</sup> which is the tendency for people to seek out information that supports their beliefs while ignoring all established and affirmed studies going against them. For example, some old-school scientists continue to rely on outdated scholarly research from the 1970s, which questions the prevalence of climate change (as a model) while simultaneously ignoring thousands of recent scientific studies that show climate change is a threat to peace and our existence more generally, and how it has negative effects on cultural heritage, conversation, and diversity<sup>(2)</sup>. The clear fact is that scientists are human beings, and they are subject to this assertive bias<sup>(3)</sup>. For instance, polls in the United States show that 46% of Americans believe that global warming is a hoax<sup>(4)</sup> and that 25% believe that there is governmental covered evidence of aliens that has been hidden<sup>(5)</sup>, while 12 million Americans believe we are actually being ruled by extraterrestrials!<sup>(6)</sup> As for the moon, 6% to 25% believe that the moon landing<sup>(7)</sup> was a hoax and was, in fact, merely a Hollywood production.<sup>(8)</sup> In addition, according to 26% of Americans, the sun revolves around the Earth rather than the established opposite<sup>(9)</sup>.

As such, it is not surprising that, at the present, we are currently witnessing the spread and acceptance of science-skeptical movements, some of which may reach the highest level of folly<sup>(10)</sup>, such as “The Flat Earth Society<sup>(11)</sup> - which is a popular theory in the United States<sup>(12)</sup>! Furthermore, most Americans believe in the existence of a secret gang of “elites” conspiring to rule the world according to their own specific agenda and who aspire to achieve a new world order<sup>(13)</sup>. Meanwhile, in Europe, a study revealed that almost 80% of the French believe in at least one of the world’s main conspiracy theories<sup>(14)</sup>. It could be for this very reason that Stephen Hawking described this phenomenon of doubt as the world “witnessing a global revolt against experts”<sup>(15)</sup>. All the studies and polls were conducted and based on societies in the West, considered to be “advanced” societies characterized by education, enlightenment, and awareness. The alternative results would be more devastating if these polls were conducted in our region.

The global pandemic has led to a renewed interest in scientific skepticism. This is because people have become more aware of the need to question and verify claims to protect their health and safety. Scientists have been at the forefront of this process, as they have worked to understand the virus and develop treatments. This has also led to an increased focus on the importance of transparency, accountability, and evidence-based decision-making when it comes to public health issues.

As the world continues to grapple with the pandemic, scientific skepticism will remain a valuable tool. This will ensure that decisions are based on facts and not on fear or superstition. It will also ensure that the highest quality scientific evidence is used to make informed decisions that protect the health and safety of individuals and communities.

## 1. Grounds for the Growing Public Doubts about the Results of Scientific Studies

Scientists' attempts to respond logically to skeptics of documented and established facts no longer work and may even have the opposite effect – as the more one adheres to the conspiracy theory, the more one shakes their own confidence in scientific facts. Skeptics feel that the academics trying to persuade them otherwise (and more specifically, more accurately) engage in a global network to promote scientific lies<sup>(16)</sup>. Therefore, three important points make up the conviction of the rejectionists of modern science, centered on the premise that the universe is governed by a design and is embodied in three principles: nothing happens by chance, nothing is what it seems, and everything is interconnected. The following are the three most important reasons why people are drawn to skepticism, and why they preach their inaccurate ideas and theories:

- a) People who expressed an ardent desire for exclusivity through a referendum were more likely to believe conspiracy theories than others. These people have an innate, almost narcissistic tendency for exclusivity and distinction, and this characteristic may be achieved when one feels that he or she has rare information or secret explanations for specific world events<sup>(17)</sup>.
- b) Skepticism provides an opportunity for individuals to gain access to subtle, important, and intuitive information, so that it makes those who repeat it feel that they are part of an “inner circle” that holds information that no one else knows, not even the so-called experts<sup>(18)</sup>.
- c) Other studies show that skepticism about science helps people understand what is going on in the world around them, especially when they feel out of control of their lives, anxious, or unable to protect their needs if they are threatened.<sup>(19)</sup>

The public's growing doubts about the results of scientific studies can be attributed to several varied factors. One of the main reasons is the proliferation of fake news and the difficulty of distinguishing between reliable and unreliable sources. This has made it difficult for people to trust scientific studies, as they cannot be sure they are getting accurate information. Additionally, there has been a growing mistrust of institutions and experts, as there is a perception that they are not always objective or transparent. Finally, there is a lack of understanding of the scientific method and the process of conducting research. This can lead to confusion and a lack of confidence in the results.

## 2. The Most Dubious Scientific Studies in the World

Skepticism has been able to penetrate all fields, including religion, politics, society, and, most importantly, science. Disbelief, uncertainty, and apprehension theories

are so numerous that it is difficult to enumerate or even categorize and list them. Most mistrust approaches seem very absurd, while some have the possibility of being verified by some, although most of them are impossible to prove. The logical roots of skepticism lie in the ancient civilizations of the East, where society had a literary heritage rich in superstitions and full of deep meanings. As such, their conspiratorial theories became premised on literary works based on wild imagination. More importantly, in our region, one of the main factors contributing to the creation and flourishing of conspiracy theories is the presence of brutal dictatorships that – often – force their citizens to think.

Most Arab countries are under the control of absolute oppressors, either secular or cleric, who apply force to subordinate their societies. Within this compromised society, a few privileged people know the truth about anything with certainty, while fear and ignorance make the masses more vulnerable to rumors, blather, and superstitions, and make it easier to govern and overpower. Under oppression, people abandon the familiar principles of scientific research to prove the validity of clear events. At the same time, they resort to the idea that evil forces are working in secret to harm them, thus opening the way for myths and irrationality stemming from the vast imagination of their long history.

What about the West? Why do many individuals in the “First World” countries question established scientific theories, despite the fact that these theories have been validated by numerous prestigious universities and research institutions? What explains this social phenomenon? One of the most famous conspiracy theories circulating in the world today, and mostly in the West, concerns the presence of aliens who live in Area 51 in the US state of Nevada, which is secretive to the US government<sup>(20)</sup>. Other conspiracy theories include the presence of international pharmaceutical companies that own the drugs capable of treating dangerous and incurable diseases—such as cancer—but who hide them to trade medicines and maximize their profits<sup>(21)</sup>. Furthermore, many Westerners believe that the Earth is flat and not spherical<sup>(22)</sup>, or are convinced that Freemasonry is the institution that runs and controls the world<sup>(23)</sup>. Other Western conspiracy theories include a belief that scientists are hiding the results of research on the ecological climate, confirming the approaching end of human existence<sup>(24)</sup>; and that the US government does not want to reveal the true party responsible for Kennedy’s assassination<sup>(25)</sup>, as well as other popular allegations that reveal unbelievable parallels between Westerners and developing countries. What explains such non-rational beliefs in regions of the world where scientific discoveries have been central to the development of their modern society?

The explanation is simple: people who suspect one branch of science are often more likely to believe in other conspiracy theories. Furthermore, it is even possible that these theories are found to be contradictory, i.e., believing in one of them logically means that the other is inevitably fabricated. People tend to be skeptical not because

of the obvious scientific details but rather because of the ideology they are committed to, which often influences their beliefs. At the same time, it supports the pattern of thinking about science in general. Most individuals look at simple and complex facts through their own ideological lens. For that reason, the suspicion of science often appears in individuals who feel a loss of power, dubiousness, and questionability. These theories help them perceive the world around them by providing them with simple explanations of complicated and complex societal facts. As a result, they regain control and the ability to anticipate events, making them feel stronger on an individual level as well as in the eyes of their local community. Skeptics claim to explain what institutional analysis cannot clarify, pretending to make the confusing world more intelligible<sup>(26)</sup>.

Proponents of the theory of skepticism in science believe in three principles that form the basis of this theory: that nothing happens by chance, nothing is what it seems, and everything is interrelated. Opponents of this theory, however, argue that it is a justifying doctrine to explain the results of causative studies, in contrast, its supporters' resort to it to exonerate themselves and escape forward instead of taking responsibility and admitting error. Unfortunately, there are undoubtedly many gaps in some scientific studies, and there are specific indicators by which to distinguish, and by which the results of the study are likely to be incorrect. The most prominent of these indicators are:

1. Proof of the study has arisen by default from the linking model of facts or equations that do not need to be causally related.
2. Scientific hypotheses have grown from minor clues that may or may not be true to exceptionally large and less likely facts.
3. Scientific theory tends to mix facts with conjectures without distinguishing between them.
4. Some experts could be affiliated with governmental or private organizations.
5. Some scientists categorically refuse to accept alternative conclusions and reject any evidence or research that contradicts their previously defined truth.
6. The conspirators, who are supposed to exist, may need superhuman abilities to achieve their goals.

The most dangerous indication is that skepticism leaves behind its association with the rejection of science. It investigates resentfully the relationship between the acceptance of science and conspiratorial thought patterns. Being convinced of multiple conspiracy theories and being skeptical of science noticeably predicts one's rejection of important objective conclusions, making the public indifferent to social, political, and health issues.

How has this affected the world, and more importantly, societies? How do we as individuals engage with one another? One example of the sad and very unfortunate re-

sult of this skepticism in science is that many diseases that were on the verge of extinction (thanks to modern medicine) are now reappearing in large numbers today because of the popularity of a conspiracy theory that vaccines cause autism<sup>(27)</sup>. Wistfully, a study of people who believed that global warming was a world-controlled ploy<sup>(28)</sup> found that this public was less willing to engage socially, ethically, and politically, and less willing to achieve individual behavioral changes, such as reducing carbon footprints. In addition, another example of a conspiracy is that HIV/AIDS was produced by medical institutions as a biological weapon to wipe out certain minorities of the population. This irrational approach may lead to risky sexual behavior or negative attitudes toward medication and low therapeutic commitment in people infected with the virus<sup>(29)</sup>.

Certified scientific studies attempt to explain the world around us and simplify the complex universe by converting randomness into causality. Scientific theories must be demonstrable, true, or false, and must be able to make reliable predictions about our world, and if those predictions are incorrect, they must be retractable. Skepticism, by contrast, is difficult to refute or prove invalid, and its proponents can continue to produce theories increasingly frequently as they are made to suit new developments. Unfortunately, skepticism is spreading uncontrollably in various countries of the world. In developing countries, such as our Arab world, everyone resorts to it periodically because of its frequent use, and the masses become convinced of it until it becomes an essential part of our lives in the East.

There are many dubious scientific studies around the world, but some of the most notable include the infamous “cold fusion” experiment conducted by Stanley Pons and Martin Fleischmann in 1989. This study claimed to have achieved nuclear fusion at room temperature, but it was later debunked when other researchers were unable to replicate the results. Another notorious example is the Piltdown Man hoax of 1912. In this hoax, the fossil of an early human ancestor was revealed to be a composite of a modern human skull and an orangutan jawbone. Finally, the concept of phrenology, which attempted to link personality traits to the shape of a person’s skull, has been debunked as pseudoscience.

Those three examples—the cold fusion experiment, the Piltdown Man hoax, and phrenology—are indeed widely recognized as dubious or fraudulent scientific studies. The cold fusion experiment conducted by Pons and Fleischmann claimed to have produced nuclear fusion at room temperature. This could have revolutionary implications for energy production. However, subsequent attempts by other scientists to replicate the experiment failed to produce the same results. This led to skepticism and eventual debunking. The Piltdown Man hoax, on the other hand, was a deliberate attempt to mislead the scientific community and the public. The composite fossil, which purported to be a missing link in human evolution, was eventually exposed as a forgery. It was

made up of a modern human skull and an orangutan jawbone. Phrenology, which attempted to link personality traits to skull shape, was popular in the 19th century but is now widely regarded as a pseudoscience. There is no scientific evidence to support the idea that skull shape indicates character or intelligence. The practice of phrenology has been discredited and abandoned.

The scientific community values rigorous research, peer review, and replication of results to validate claims. Any study that does not adhere to these principles or that is found to be fraudulent or misleading is likely to be discredited and rejected by the scientific community.

### 3. Reasons for the Global Increase in Science Skeptics

Scientists complain these days that trust in science is declining, knowing that this development is not new in academia. In the 1960s, medicine lost a piece of its sanctity when classified documents revealed the agreement of sugar industry owners, who paid Harvard University to falsify findings suggesting a link between heart disease and diabetes and instead accused saturated fats of causing these diseases.<sup>(30)</sup> This came on top of American beverage companies such as Coca-Cola and Pepsi, which funded their own medical research, claiming that “there is no link between obesity and soda<sup>(31)</sup>”. Eventually, other studies that were not funded by commercial or private parties revealed that “sugary drinks such as cola and others are actually bad for our health and may cause death and disability<sup>(32)</sup>”. Other scientific and commercial scandals that have influenced society include the tobacco industry’s refusal to publish studies revealing negative results about its products, which took decades to uncover<sup>(33)</sup>. On the other hand, tobacco companies funded dozens of other scientific projects that demonstrated that “gases emitted by carpets are more harmful than tobacco smoke” to reassure consumers and obtain regulatory approval to continue promoting and selling their goods, attempting to conceal the entire truth from the greater public<sup>(34)</sup>.

It is not surprising that some scientific fact-finding is published with results that suit the interests of financiers, who may not always be satisfied with the real conclusions, but who need the results to be modified to become suitable for the products of the financier. For example, a study may discover that following a certain diet leads to weight loss and an increased risk of heart disease. However, to keep the product free of negative influences, only the fact of “weight loss” is mentioned, which is an appealing and appropriate conclusion to the consumer’s desire, but it is harmless to the financier’s reputation or sales. Many experts have criticized the interference of commercial ambitions in the field of scientific studies and have called for the shunning of their research through the imposing of a comprehensive ban on the funding of companies and corporations in the field of research. When applying this strategy, many drugs will no longer exist in the first place because food industry companies will focus on improving

the quality of their products, and thus, the health of the consumer will improve at the same time. However, the issue of poor financial funding for scientific research remains a debilitating topic for scientists who receive modest grants from the government or the National Institutes of Health, so the money provided by private actors is more tempting and satisfying<sup>(35)</sup>.

The problem is not limited to the fact that many studies and research are linked to the policies and interests of the funders alone but is also associated with the pressure placed on journalists to publish scientific evidence or urgent news of interest. Therefore, many publishers are forced to cover only preliminary research without addressing or waiting for final reviews, which contradicts the key role of science in finding the objective truth and harms its function of knowledge accumulation and accurate analysis. Furthermore, it should be noted that more than half of the studies that were circulated in scientific journals were later proven wrong by follow-up studies. On the other hand, the mistakes of the scientific press and the world media more generally prioritize coverage of studies that achieve positive results, while they ignore studies with negative results. This occurs to draw attention and promote new treatments and drugs. Although the results may be different and have nothing to do with reality or science, the biggest concern of publishers in this field is to sell this news and research instead of telling the truth and communicating it in its correct form<sup>(36)</sup>. As such, it is not surprising that the problem of poor communication between scientists and the public affects the understanding of science, as the absence of effective ways to communicate science to the public sometimes leads to misunderstandings of science. Some leading institutions suggest adding programs to train students on how to communicate scientific information to the public within the university curriculum to respond to how the media sometimes contribute to complicating the problem. For example, about half of the medical advice provided on the medical television programs *The Doctors* and *Dr. Oz* contains information that is either false or lacks evidence, as the goal of these programs is primarily financial profit<sup>(37)</sup>.

It seems to some that the natural sciences that result from the empirical scientific approach are the peak of human knowledge, so they have become the judges of other knowledge. Even if scientists are the ones that believe or lie, life may pass on them without having a moment of real awakening, and they engage in the corridors of physical science, interacting with it and surrendering to all the “scientific” information that has been immersed in their minds throughout their scientific career. The scientific flow in the minds of humankind is a semblance of certainty, which turns their dealings with it into a kind of faith through firm and unquestionable belief, even though scholars realize that the scientific method is subject to criticism, reversal, and refutation.

The global increase in science skeptics can be attributed to a combination of

factors. One of the main causes is the proliferation of fake news and unreliable sources, which has made it difficult for people to distinguish between accurate and inaccurate information. Additionally, there has been a growing mistrust of institutions and experts, as there is a perception that they are not always objective or transparent. Finally, there is a lack of understanding of the scientific method and the process of conducting research. This can lead to confusion and a lack of confidence in the results.

The natural sciences have indeed emerged as the most respected and authoritative form of knowledge in modern times. This is due to scientists' rigorous and empirical approach, which relies on evidence-based observations, experimentation, and analysis to conclude. However, scientists are also human beings, and they are not immune to bias, errors, or even intentional fraud. The scientific method is designed to minimize these risks and allow for criticism, replication, and refutation of findings. Nevertheless, there have been instances of academic misconduct, flawed studies, and controversies that have cast doubt on science's credibility and objectivity.

The increasing skepticism towards science can be seen as a reaction to some of these issues. However, it is also influenced by broader social and cultural factors. For instance, the rise of social media and the internet has made it easier for false information and conspiracy theories to spread rapidly and widely. This has created confusion and distrust among the public. Additionally, there is growing suspicion towards institutions and experts, as they are seen as part of a privileged elite that does not represent or listen to ordinary people's concerns. There is a lack of education and awareness about the scientific method and how it works. This can make it difficult for people to understand and evaluate scientific claims.

While the scientific method is a powerful tool for understanding the natural world, it is fallible. Scientists are not immune to human biases and errors. Scientists must be transparent and accountable, and the public must be educated and informed about the scholarly process. Only by promoting critical thinking, transparency, and public engagement can we ensure science remains a reliable and trustworthy source of knowledge.

## Study outcome

Skepticism towards scientific studies pervades global societies and arises from diverse influences. Research indicates that vaccine hesitancy often correlates with religious beliefs and educational levels. Both scientists and skeptics assess claims based on verifiability and falsifiability. A prevalent global trend manifests itself in growing skepticism towards science, attributed to misinformation, political biases, and waning trust in scientific institutions and experts. Addressing these challenges necessitates bolstering science education, refining communication strategies, and rebuilding trust in scientific authorities.

To foster critical thinking and combat intellectual ignorance in Arab societies, comprehensive educational reforms are imperative. This encompasses equitable budget allocation and striking a harmonious equilibrium between conformity and innovation. Introducing philosophical education and balancing religious and secular teachings can substantially enhance critical thinking skills. Totalitarian regimes may exploit conspiracy theories to suppress dissent and retain power. Politicians often resort to conspiratorial rhetoric during unexpected events or to manipulate political narratives. Conversely, grounding decisions during crises like the COVID-19 pandemic on practical evidence can significantly enhance clinical judgment and policy formulation. Trust remains a pivotal concern; therefore, efforts to reinforce confidence in scientific institutions and experts are indispensable.

Conspiracy theories wield considerable influence over public perceptions of scientific facts, impacting public health and environmental policies. Promoting education and media literacy equips individuals to evaluate claims based on verifiability and falsifiability, countering the blind acceptance of assertions rooted in faith or anecdotal evidence. Effective science communication and enhancing trust in academic institutions and experts are paramount to mitigating the influence of conspiracy theories.

## Concluding Thoughts

“Science is not just a collection of facts; science is a way of determining whether or not the thing we have chosen to believe depends on the laws of nature”<sup>(38)</sup>. Science, as a guiding light in unraveling hidden truths, stands firm within the circles of legitimate scientists, upheld by its foundation of verifiable evidence. The seismic shift instigated by Copernicus’s revolutionary discovery disrupted established beliefs, challenging the entrenched notion of Earth’s centrality to the universe. However, despite the widespread acceptance of these scientific truths, deeply ingrained intuitions persistently clash with these established facts.

The landscape of skepticism toward science assumes multifaceted contours. While science remains an invaluable tool for decoding the mysteries of the natural world, it is not impervious to fallibility. Instances of scientific malpractice, flawed studies, and the rapid dissemination of misinformation via social media have cast lingering shadows over its credibility. Yet, in this labyrinth of doubts, the scientific method stands resolutely as the most robust and evidence-based pathway to fathoming the intricacies of our reality.

The specter of doubt encircling scientific studies has metamorphosed into a global phenomenon, particularly conspicuous in developing regions like the Arab world.

Within these territories, totalitarian regimes wield opposition against scientific knowledge as a means to nurture societal ignorance while absolving themselves by attributing underdevelopment to alleged external conspiracies. Through the orchestration of conspiracy theories, these regimes muzzle dissent, manipulate collective beliefs, and stymie societal progress, cementing their authority through the narratives they weave.

In the proclivity to attribute all occurrences to malevolent supernatural forces, an introspective query about resistance emerges. The contrasting landscape between democratic Western nations and certain Arab states bereft of a unified national agenda underscores their susceptibilities to external influences. Hence, the crux of the matter pivots not on external conspiracies but rather on the fragility that plagues these Arab states.

Conspiracy advocates within the Arab world willingly embrace these narratives, using them as shields to dodge accountability and evade genuine exploration of the root causes behind regional crises. The prevalence of societal ignorance serves as a stark reminder of the urgent need for educational reform. These reforms should prioritize the pivotal role of families, underscore the significance of moral education in schools, and effectuate a transition from indoctrination-based teaching methods to curricula designed to cultivate critical thinking skills.

A fundamental inquiry surfaces concerning the annals of humanity's scientific history: Could falsehoods have masqueraded as indubitable truths, thereby perpetuating misconceptions? In response, education emerges as the quintessential antidote to skepticism, bestowing upon individuals worldwide the tools of knowledge and critical thinking indispensable for distinguishing fact from fallacy.

Education, as the harbinger of enlightenment, serves as the beacon illuminating the path toward comprehending scientific truths and principles. It is through this educational prism that the discernment between authentic scientific facts and baseless conjectures gains clarity, fostering rationality and critical thinking skills.

The hallmark of genuine knowledge rests upon the pillars of certainty, shielded from doubt, error, or deceit. Al-Ghazālī, the revered Arab philosopher, championed certainty in knowledge as the realm where doubt, error, and deception find no abode. While the scientific method's robustness commands respect, acknowledging its inherent limitations highlights the indispensability of evidence and transparency in the quest for knowledge acquisition.

Science, fortified by its empirical underpinnings, meticulous testing, and peer scrutiny, crafts theories and conclusions. When these scientific methodologies are

diligently adhered to, the outcomes render themselves dependable and trustworthy. However, acknowledging the potential for scientific fallibility stands as a pivotal sentinel, underscoring the need for rigorous scrutiny, robust evidence, and transparent substantiation of claims.

The ceaseless struggle to reconcile entrenched beliefs with established scientific facts lays bare the intricacies of human psychology, where intuitive beliefs occasionally collide with empirically proven scientific truths. This dissonance accentuates the urgency for an unceasing process of education, one that perpetuates critical thinking and evidence-based reasoning.

The Arab world's wrestling match with skepticism toward science finds its roots entrenched within socio-political structures. Totalitarian regimes, entrenched in power, perpetuate societal ignorance by manipulating beliefs and narratives, effectively serving as impediments to progress. In this light, the reform of educational institutions emerges as a cornerstone imperative.

Education, in its transformative essence, emerges as the catalyst for reshaping societal perceptions and dismantling the ramparts of skepticism. A recalibrated educational framework, accentuating critical thinking, evidence-based reasoning, and ethical education, forms the bedrock upon which future generations build their cognitive prowess.

As societies navigate the labyrinthine maze of established scientific truths interwoven with entrenched beliefs, the imperative for fostering open dialogue and critical thinking assumes paramount importance. The integrity of science and its unwavering contributions to humanity's progress mandate a concerted endeavor to bridge the chasm between empirical evidence and entrenched beliefs.

The pursuit of knowledge unfurls its sails on the vast ocean of evidence and transparency. Al-Ghazālī's clarion call for certainty in knowledge harmonizes with the resonance of evidence-based reasoning and transparency, asserting their salience within scientific discourse. Acknowledgment of the fallibility inherent in scientific endeavors underlines the exigency of perpetually refining methodologies and adhering staunchly to conclusions borne of evidence.

In summary, skepticism toward science perpetuates itself, entangled within societal frameworks, political maneuverings, and the clash between established verities and intuitive beliefs. Education emerges as the harbinger of enlightenment, infusing critical thinking and evidence-based reasoning, thereby discerning the wheat of factual knowledge from the chaff of ungrounded claims. Bridging the chasm between empirical

evidence and entrenched beliefs necessitates an ardent commitment to transparency, unwavering critical inquiry, and the perennial pursuit of knowledge.

*“Then it became clear to me that sure and certain knowledge is that in which the thing known is made so manifest that no doubt clings to it, nor is it accompanied by the possibility of error and deception, nor can the mind even imagine such a possibility”<sup>(39)</sup>—Abū Ḥāmid Al-Ghazālī.*

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