EXPLORING THE RESILIENCE OF RELIGIOUS BELIEF: COGNITIVE, CULTURAL AND HISTORICAL PERSPECTIVES

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I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

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KEY TERMS

Agency detection, anthropomorphism, appeal to authority, belief formation, belief systems, belief transmission, beliefs, circular reasoning, cognitive biases, cognitive mechanisms, Cognitive Science of Religion, cultural frameworks, cultural narratives, cultural traditions, critical thinking, education systems, empirical evidence, false cause fallacy, flawed reasoning, history, intuitive thinking, logical fallacies, logical reasoning, mentalising, myths, pseudoscience, reflective thinking, religion and science, religious resilience, religious symbols, secularisation, spirituality, supernatural, teleological thinking, theology

ABSTRACT

This thesis investigates the foundations of religious beliefs and their persistence in contemporary society through a systematic literature review. It examines how cognitive predispositions (mentalising, anthropomorphism, teleological thinking) and biological factors (genetics, brain structure, neurochemistry) shape the formation of religious beliefs, which are then influenced by cultural forces.

The Cognitive Science of Religion provides insights into how cognitive biases reinforce misleading beliefs. This thesis proposes promoting logic education to foster rational thought and critical engagement as a countermeasure.

Although rational inquiry is crucial in a world saturated with information, for some, scientific discoveries may not offer the same sense of wonder, meaning, or purpose

that religious beliefs have historically provided. This explains the continued endurance of such belief systems alongside scientific progress.

As scientific advancements challenge traditional sources of meaning, individuals struggle with the existential question of purpose. In such a context, this thesis argues for prioritising individual freedom in seeking meaning.

Finally, the thesis contends that although some aspects of metaphysics may transcend empirical methods, this does not preclude evidence-based research from engaging with supernatural claims. Society must strive to balance the pursuit of objective knowledge with preserving cultural richness and existential fulfilment.

Acknowledgements

I express my sincere gratitude to Professor Christo Lombaard for his invaluable comments, which greatly enhanced the quality of this study and to Anthony for his unwavering support.

I am well aware that neither good books nor good counsel have purged my thesis of ignorance and dull vision, but I take comfort from the conviction that the topic is infallibly interesting.

(Kermode 2000: 3)

Contents

Introduction

The influence of religion and superstition on human behaviour has been a significant focus of study in fields such as theology, philosophy, psychology, sociology and anthropology. This persistent aspect of human nature has shaped societies and cultures throughout history, with many cultures revolving around concepts involving at least one deity or central mystical figure, often accompanied by a corresponding supernatural realm (Thomson & Aukofer 2014: 27). Religion, therefore, is more than just a set of beliefs – it functions as a social and cultural force, with lasting impacts on the way societies are structured and sustained.

This thesis investigates the persistence of religious beliefs in today's society, even as secularisation and scientific progress continue to rise. The central focus of this research is the prevalent association with religion, but the existence of gods is not pertinent. What is significant is that most people profess religious beliefs and that most religions affirm the presence of a deity or deities. Belief in these supernatural beings is intrinsic to most religious phenomena (Stark 2017: 1)[1].

Considering various definitions of religion proposed by scholars and thinkers can offer valuable insights into its nature and societal role. Several clear patterns arise from definitions of religion in theology, philosophy, psychology, sociology and anthropology, each illustrating different ways religion is understood.

One prominent theme is the social and communal nature of religion. Many definitions regard it as a social institution, such as the Church, that brings people together into a collective moral community. Religion is often seen as a force that unifies individuals through shared beliefs and practices, contributing to social harmony and order (Taves 2009: 16—17; Durkheim 1915: 47; Bellah 2011: 1).

Another common thread is the search for meaning and transcendence. Multiple

[1] Although most religions affirm the presence of a deity or deities, believing in supernatural beings is not intrinsic to all religious phenomena. Some religious systems, such as certain forms of Buddhism, do not centre on deities. Theravāda Buddhism, for example, focuses on personal enlightenment, ethical conduct, and meditation rather than the worship of gods (Smart 1989: 77).

definitions describe religion as a way for individuals to find purpose and meaning in life. Whether through shared narratives or a personal quest for harmony with life's fundamental forces, religion is portrayed as a path toward existential understanding (Armstrong 2011: 17; Stenger & Stone 2002: 23).

The personal, inward dimension of religion is also strongly emphasised. Several definitions focus on the individual's moral and spiritual journey, whether through a relationship with God or solitary reflection on the sacred. This highlights the intimate side of religious life, where personal encounters with the divine or spiritual forces take precedence (Otto 1958: 7; Clément 1995: 35).

Many definitions also touch on the idea of the divine or sacred, pointing to a connection with a transcendent being or reality. Whether through a direct response to a divine entity or a quest for the numinous, religion is seen as engaging with something that lies beyond the ordinary. This reflects religious belief's theological and metaphysical aspects concerned with realms beyond the mundane (Eliade 1959: 210; Taves 2009: 3—5; Otto 1958: 7; Pascal 2013: 39; 68).

Religion is also frequently described as a system for understanding the world. Several definitions suggest that it offers a worldview or framework for interpreting reality. By providing beliefs that relate humanity to the supernatural, religion helps people make sense of their existence and the world around them (Thomson & Aukofer 2014: 32; Guthrie 1993: 5; 16; Leeming 2010: xix—xx).

Ethical and moral guidance is another key aspect. Many definitions present religion as offering moral principles for human behaviour. Whether seen as a pursuit of virtue or through doctrines and ethical teachings, religion provides standards that guide individuals in their moral and spiritual conduct (Rappaport 1999: 18—22; Durkheim 1915: 47; McKay & Whitehouse 2015: 447—449).

A recurring theme is the distinction between the sacred and the ordinary. Some definitions suggest that religion draws a clear line between what is holy and what is not. The sacred is often set apart, forbidden, or viewed as a supernatural reality that transcends daily life. This sense of separation between the sacred and the profane

is central to many religious systems (Clément 1995: 102; 123; Eliade 1958: xi—4; Taves 2009: 3—5).

Lastly, there is the contrast between human initiative and divine revelation. Some definitions focus on religion as humanity's effort to reach out to the divine, while others emphasise revelation as the divine reaching down to humanity. This distinction reveals different theological views on how religious experience originates and unfolds (Barth 2004: 109—122; Heisenberg 1958: 195; Mitchell 1896: 152; Clément 1995: 173; 217; 266).

These diverse definitions highlight the multifaceted nature of religion and its significance in human experience. From personal quests for meaning to intrinsic social structures, religion manifests in various forms across cultures and individuals. Some definitions emphasise the supernatural or divine aspects and others focus on the societal and psychological functions of religious beliefs and practices. This range of interpretations underscores the challenge of encapsulating religion within a single, comprehensive definition. It also reflects the enduring importance of religious thought in shaping human understanding, behaviour and social organisation

Religion serves multiple functions in human societies. One key function is the sanctification of community and social cohesion. When applied to society, sanctifying frames communal ties as part of a divine order or purpose, thus giving them more significant meaning and reinforcing their importance within the religious and social framework. This sanctification strengthens group unity and ensures adherence to shared norms and values, creating a moral framework that enhances social cohesion.

Historically, religion has nurtured unity and purpose among individuals, manifesting in various forms across different societies (Wilson 2004: 170). For example, in hunter-gatherer societies, religious rituals and shared beliefs in deities or spirits reinforced social bonds and norms (Durkheim 1915: 427). Similarly, ancient Egyptian death rituals harmonised society's political, economic and religious dimensions, strengthening national unity through the royal mortuary cult (Hoffman 1979: 327—336). Greek religious practices, such as sacrificial feasts and festivals, promoted

solidarity and collective identity by involving the entire city and temporarily overcoming societal divisions (Bellah 2011: 369—374).

Religion provided the foundation for societal structures, offering moral guidance and leadership models. For instance, Egyptian kingship rituals were templates for emerging political leaders, demonstrating how religious symbolism was necessary for social integration and political consolidation (Hoffman 1979: 327—336). In addition to its social role, religion offers existential meaning and comfort. Through rituals, symbols and narratives, it helps individuals and communities navigate life's uncertainties and challenges, offering stability and reassurance in the face of adversity (Eliade 1959: 210).

Even in modern secular states, religious traditions influence cultural practices, holidays and ethical frameworks. Religion remains a cultural force, shaping behaviours and social norms, even when its influence appears to diminish. Religious belief systems also serve as cosmological frameworks, explaining the universe’s origin, essence and significance. These frameworks typically begin with devotion to one or more revered central figures or instructors and often incorporate the concept of a deity or deities capable of intervening in daily life (Thomson & Aukofer 2014: 32).

Voltaire’s Enlightenment perspective offers insight into humanity’s desire for order and purpose. He suggests that, when confronted with the vastness of nature, this tendency intensifies, as the idea of God provides a framework through which humans attempt to comprehend the world's complexity. Voltaire acknowledges both the boundaries of human knowledge and the role of God in offering a sense of supreme order while emphasising the pragmatic approach of making the best of one’s circumstances in the face of existential uncertainty. He famously writes (Voltaire 2021: 127):

> If God did not exist, it would be necessary to invent Him. But all nature cries out that He exists, that supreme intelligence, an immense power, an awesome logic exists and everything we know tells us that we are but a lesser part of it.

In our profound ignorance, then, let us do our best[2].

This focus on the human need for order, as exemplified by Voltaire's views, helps explain the widespread adherence to religion today. According to the Pew Research Centre, over 84% of the global population identified with a religious group in 2015, with the projected percentage for 2060 being 87.5% (Pew-Templeton Global Religious Futures Project 2017). A 2017 survey by the Gallup International Association indicates that 62% of people worldwide consider themselves religious. Additionally, 74% of the global population believes in the existence of the soul and 71% believe in God. Beliefs in the afterlife are also prevalent, with 56% of people believing in heaven, 54% in life after death and 49% in hell (Gallup International Association 2017). Although the two surveys report different percentages, both indicate that most people identify as religious.

The persistence of religious belief, even in an increasingly secular and scientifically advanced world, suggests that religion fulfils fundamental human needs – social, existential, or psychological. Therefore, this research examines the underlying factors contributing to religion's ongoing relevance and influence in modern human societies.

Research Problem and Objectives

The persistence of religious beliefs amidst rapid secularisation and significant scientific advancements presents a compelling area of inquiry. As societies become increasingly influenced by empirical reasoning and rational thought, the question of why religion continues to hold sway over human experience remains both pressing and relevant. Historically, secularism has been associated with a gradual decline in the authority of religious institutions and a shift towards evidence-based reasoning.

[2] The first sentence is often used as a stand-alone quote without context or reference. In the case of philosophers of religion McCraw & Arp, committing such a fallacy of context leads to a misleading oversimplification: 'Voltaire is famous for having said, "If God did not exist, it would be necessary to invent Him" … Voltaire likely was a deist who believed that God was moral and just, that some kind of Heaven and Hell exist, that we have immortal souls, and that God would have no problem sending your soul to Hell as a righteous and just punishment if you were an immoral sinner in this life. The fear of eternal damnation is an efficient way to keep people acting fairly civil toward one another in this life – so thinks Voltaire and countless others throughout history. Thus, even if God did not exist, then it would be necessary for governments, churches, organizations, or any group of people to invent Him so as to "scare people straight" for the sake of social order' (McCraw & Arp 2015: 16).

Yet, despite these trends, many individuals maintain deeply rooted religious beliefs that inform their worldviews and provide them with a sense of meaning and belonging.

At the heart of this investigation lies the central research question: Why do religious beliefs persist despite the forces of secularisation and scientific advancement? This inquiry seeks to uncover the mechanisms by which cognitive biases, cultural narratives, existential concerns and the perceived limitations of science in addressing these concerns sustain religious adherence.

This persistence of faith presents a gap in the current literature. Much of the existing research has focused either on the shortcomings of science or on cognitive processes in isolation without adequately addressing the interaction between cognitive, cultural and existential factors in sustaining religious belief. This study aims to bridge a small part of this gap by adopting an interdisciplinary approach, drawing from cognitive science, cultural anthropology, psychology and philosophy.

The significance of this research extends beyond academic interest. In an era where scientific literacy is increasingly vital, understanding religious beliefs' cognitive and cultural underpinnings has important implications for education, public discourse and policy. Insights from this study may inform strategies for fostering critical thinking while respecting diverse belief systems, particularly in educational contexts where both religious and secular perspectives coexist. As societies continue to grapple with issues that span the domains of science and faith, the need for informed discussions becomes ever more pressing.

Methodology Overview

This study utilises a qualitative research approach involving critical interpretation, with a systematic literature review as its primary method. The following sections detail the research process, recognising potential biases and limitations inherent in qualitative research, particularly in selecting and interpreting sources.

The literature review process began with a comprehensive search of academic databases. Initial searches were guided by keywords derived from the research questions, with the scope gradually refined by tracing citations from initial sources to identify additional relevant literature. Identifying key experts in each field helped locate seminal works and engage with current debates.

Selection criteria for the inclusion of sources in the review were based on relevance to the research questions, scholarly peer-reviewed publications and books written by respected academics. A limited number of non-scholarly items were included to provide alternative perspectives, enriching the scope of the analysis.

This review draws upon a diverse range of sources, including both contemporary academic articles and historical texts, some dating back several centuries. This approach allows for an exploration of both recent developments and long-standing perspectives on religious belief systems.

The systematic literature review methodology analyses the cognitive and cultural factors underpinning religious resilience. By drawing on existing studies from theology, the Cognitive Science of Religion, psychology, anthropology and philosophy, this research aims to provide a multifaceted view of how cognitive processes and cultural narratives shape individual and collective religious beliefs. The collected data were analysed using thematic analysis to identify recurring patterns and themes across the literature.

Although the literature review methodology presents minimal ethical risks, careful attention was given to accurately representing authors' views and correctly attributing all sources. To enhance the clarity and precision of the writing, Large Language Models were used to refine the academic language and ensure the accuracy of my own work[3]. These tools were carefully managed to avoid introducing biases or altering the integrity of the original scholarly material.

[3] ChatGPT 4o, Claude 3.5 Sonnet, and Grammarly.

Thesis Structure

The structure of the thesis is organised into several chapters, each addressing different dimensions of the research question. Following this introductory chapter, Chapter 1 explores how cognitive processes underpin the endurance of religious belief. It discusses how human cognitive tendencies – such as anthropomorphism, teleological thinking and mentalising – make religious concepts intuitive and compelling. Cultural influences also play a significant role, as religious narratives and symbols provide the content for these cognitive foundations. The chapter examines logical fallacies that often sustain religious beliefs and argues that understanding the cognitive architecture behind religious belief can promote better education and interfaith dialogue. The research advances the discourse on the endurance of religion by clarifying cognitive biases and logical fallacies that can lead to rejecting scientific evidence favouring superstitious beliefs.

Chapter 2 explores the scientific method's capacity to provide empirical knowledge while recognising its limitations, particularly in addressing questions traditionally within the religious sphere. The chapter also examines how public scepticism towards science stems from past misconduct and the perceived alignment of scientific research with political and economic interests. This increasing scepticism inadvertently strengthens the persistence of religious belief, as it undermines science's standing as an alternative to religious worldviews. Finally, the chapter advocates for a balance between science and other forms of knowledge, acknowledging that human experience cannot always be fully understood through scientific methods alone.

Chapter 3 analyses the role of creation myths and cultural narratives in shaping religious belief. Myths offer explanations for fundamental questions about existence and reflect societies' cultural, environmental and historical contexts. The chapter also discusses the concept of *ex nihilo* (creation from nothing) and how different cultures perceive divine causality and the origins of the universe. It highlights how creation myths contribute to the resilience of religious belief by providing meaning and a sense of order.

Chapter 4 examines the historical tension and dialogue between science and religion. It discusses the divergence between science and religious thought and considers how both fields approach questions about the supernatural. The chapter suggests that although science has encroached on domains once reserved for religion, both can coexist, contribute to human understanding and address the problems created by pseudoscience.

Chapter 5 explores various attempts to harmonise science and religion. It considers different frameworks, such as Non-Overlapping Magisteria and methodological naturalism, which seek to define the boundaries between these two domains. The chapter also critiques materialist perspectives in science and proposes that religious thought continues to evolve in response to scientific discoveries.

Chapter 6 addresses the impact of education on religious belief, particularly how promoting critical thinking and scientific literacy can influence religious perspectives. It discusses the ongoing tension between scientific and religious instruction, especially concerning topics like evolution and creationism. The chapter emphasises the importance of teaching logic to combat cognitive biases and suggests ways in which such education can be approached.

Scope and Limitations

Although the review aims to be comprehensive, several limitations are acknowledged. First, there is a language bias, as the review primarily includes English-language publications, potentially overlooking valuable insights from non-English sources. Additionally, the review predominantly reflects Western perspectives due to the availability of scholarly works and data constraints, although efforts were made to include cross-cultural viewpoints where possible.

In line with qualitative research principles, I acknowledge my position as a researcher and its potential influence on the study. My background as an Afrikaans woman from a Christian background may shape my interpretation of the literature. To mitigate this, I maintained a reflexive attitude towards my thoughts, decisions and potential biases.

Notably, the objective of this research is not to validate or invalidate religious claims. Instead, it seeks to understand the processes that render religious belief systems resilient in an ever-evolving world, prompting thinkers and scholars to examine their origins and persistence.

In conclusion, while acknowledging the inherent subjectivity in qualitative research, this methodology strives for rigour, transparency and reflexivity.

Contributions and Significance of the Research

This thesis makes an academic contribution by offering an interdisciplinary approach to understanding the persistence of religious belief in modern society. Unlike studies focusing solely on cultural or historical explanations, this research highlights the cognitive mechanisms – such as biases[4], agency detection and teleological thinking – that make religious beliefs intuitive and easily transmissible. It also bridges the gap between science and religion by clarifying the role of cognitive biases and logical fallacies in rejecting scientific evidence.

This cognitive dimension, coupled with the cultural narratives and psychological needs that sustain religion, challenges the notion that scientific progress inevitably leads to declining religious adherence. Instead, this research underscores religion's resilience, positioning it as a critical study area in understanding how belief systems adapt and endure in the face of modern secular pressures.

Although readers may not share my interpretations and conclusions from the research, I hope they find it meaningful and applicable to their own experiences.

[4] Cognitive biases are systematic patterns of deviation from rationality in judgement and decision-making. They occur when information is filtered through personal experiences, emotions, and preferences, leading to distorted perceptions or illogical conclusions.

Chapter 1
Cognitive Foundations of Religious Resilience: Biases, Fallacies and Cultural Influences

The enduring nature of religious beliefs across human cultures and history has long intrigued scholars from various disciplines. This chapter explores the cognitive foundations underpinning religious belief, drawing on insights from the philosophy of logic and The Cognitive Science of Religion (CSR)[5]. This study investigates the natural mental processes and biases that influence how people perceive the world. It aims to explain why religions endure in the face of secularisation and scientific progress. The discussion will explore how cognitive predispositions – such as mentalising[6], anthropomorphism[7] and teleological thinking[8] – form the foundation of religious beliefs, making them intuitive and compelling.

In addition to cognitive factors, this chapter will examine the significant role of cultural influences in shaping religious beliefs. Cultural narratives, symbols and practices provide specific content to the abstract cognitive templates underlying religious belief. By understanding the role of these cognitive mechanisms and cultural contexts, a clearer picture emerges of why certain aspects of religion persist and how they adapt to varying socio-demographic conditions. The objective is not to validate or invalidate religious claims but to provide an overview of the cognitive architecture that renders religious beliefs plausible and transmissible across generations.

The insights gained from this discussion aim to inform approaches to education, interfaith dialogue and a broader societal understanding of human nature. By

[5] The Cognitive Science of Religion combines psychology, anthropology, and neuroscience insights to explore the mental underpinnings of spiritual and supernatural beliefs. It seeks to uncover the cognitive mechanisms contributing to religious ideas' development, spread, and endurance (Barrett & Trigg 2014: 6—7).

[6] Mentalising is the human ability to interpret and infer the thoughts, feelings, and motivations of oneself and others. This capacity for understanding mental states plays a vital role in navigating social environments and in how individuals conceptualise and relate to supernatural beings (Norenzayan et al. 2012: 1).

[7] Anthropomorphism involves the widespread human tendency to assign human characteristics, behaviours, and emotions to non-human or supernatural beings.

[8] Teleological thinking focuses on the inherent goals or final causes of things. This approach to understanding the world emphasises objects' and processes' ultimate aims or functions within appropriate contexts.

shedding light on the cognitive and cultural underpinnings of religious belief, this chapter aspires to foster constructive conversations about the role of religion in the modern world.

1.1. Critical Thinking and Logical Reasoning

Central to this exploration is the recognition that subtle factors can significantly sway decision-making, often distracting individuals from critical information. This phenomenon is particularly relevant in religious belief, where cognitive biases and fallacious arguments can contribute to the resilience of convictions. Even when starting from factual premises, the human cognitive process is prone to flaws, frequently resulting in conclusions that deviate from rational thinking. Understanding these cognitive tendencies is necessary in religious discourse and its broader societal implications (Mercier & Sperber 2017: 205—250).

This underscores the need for greater awareness and mitigation of cognitive biases in decision-making, particularly in domains where beliefs and opinions hold significant personal or societal importance. The following pages on cognitive styles discuss mental processing and decision-making processes in detail.

Identifying and avoiding pitfalls such as fallacies is crucial for constructing and evaluating arguments in logical reasoning. An argument comprises at least two claims: a premise and a conclusion. The premise provides support, justification, or reasons for accepting the conclusion, which logically follows from the premises. Evaluating an argument involves ensuring that the conclusion logically follows from the premises and that all premises are true, thereby rendering the argument sound and worthy of acceptance. In religious beliefs, this logical evaluation process becomes especially pertinent when examining the foundations and persistence of faith-based claims (Arp et al. 2019: 7; 28).

Whether spoken or written, presenting an argument attempts to persuade others of the conclusion's truth. This persuasive aspect is inherent in prescriptive claims asserting that one should, ought to, or must do something, often necessitating an argument for validity (Arp et al. 2019: 9). For instance, advocating for a particular

religious practice or belief system requires a compelling argument to persuade others of its importance or veracity. The resilience of religious beliefs may partly be attributed to the persuasive power of arguments that resonate with individuals' existing cognitive frameworks, even when these arguments may contain logical fallacies.

Logical Fallacies and Religion

As rational beings, we must support our claims with evidence, recognising that convincing or persuading others involves constructing sound arguments. However, in the context of religious beliefs, the nature of evidence and the process of argumentation often diverge from strictly empirical approaches. Whether someone regards a religious claim as valid depends on observable phenomena, personal experiences, cultural traditions and philosophical reasoning. This complexity in evidential standards contributes to the resilience of religious beliefs, as adherents may employ various forms of justification that resist straightforward logical scrutiny (Rescher 2014: 10).

Valid logical techniques can be employed to examine and challenge beliefs. One such technique, which has been used effectively in philosophical and religious debates for centuries, is the reduction to absurdity (*reductio ad absurdum*) argument. The argument demonstrates the falseness or inconsistency of a claim by showing that accepting the claim leads to absurd or contradictory conclusions. To use this technique, one assumes that the original claim is valid for the sake of argument and then demonstrates that this assumption leads to a logical contradiction or an absurd result (Mackie 1955: 200—212).

By showing that the claim leads to absurdity, the argument concludes that the original claim must be false. This technique is widely used in mathematics, philosophy and other fields of reasoning and debate (Mackie 1955: 200—212). However, whether a conclusion is truly absurd or simply a challenging problem depends on one's perspective and the philosophical or theological arguments one finds convincing.

Philosophical Arguments and Logic

Logic is a tool for evaluating everyday arguments and a cornerstone of philosophical inquiry. Philosophers have long used logical reasoning to explore profound questions about existence, morality and the nature of the universe. By applying the principles of logic, philosophical arguments aim to unravel complicated issues and challenge established beliefs.

One notable area where logic plays a role is in the debate about the existence of God, the nature of good and evil and the justification of moral principles. These discussions often involve arguments that test the limits of our understanding and push the boundaries of logical consistency.

A classic example of such a philosophical challenge is the Epicurean Paradox, which questions the compatibility of an all-powerful, all-good deity with the existence of evil in the world. This paradox highlights the complexity of theological arguments and underscores the importance of logical coherence in philosophical reasoning. The paradox can be briefly outlined as follows (Mackie 1955: 200—212):

- If God is omnipotent, He can prevent evil.
- If God is omnibenevolent, He desires to avoid evil.
- If God is omniscient, He knows how to prevent evil.
- Despite these attributes, evil persists in the world.
- Therefore, God either lacks one or more of these attributes or does not exist.

This paradox poses a dilemma for the traditional understanding of God, as it appears challenging to harmonise the presence of evil and suffering with the concept of an omnipotent, benevolent and omniscient deity. The paradox is reduced to absurdity when proponents argue that the coexistence of an all-powerful, all-knowing and benevolent God with the existence of evil is inherently contradictory or absurd. It implies that the concept of a benevolent and omnipotent God is logically incompatible with the observed presence of evil in the world.

Many philosophers and theologians have offered responses to this paradox. These include the Free Will Defence, which argues that God allows evil to preserve human free will and the Soul-Making Theodicy, which suggests that encountering and overcoming evil is necessary for spiritual growth. Depending on their beliefs, values and philosophical outlook, what might seem absurd to one person may not seem absurd to another. Some argue that the presence of evil is not logically incompatible with an omnipotent, omniscient and omnibenevolent God. They propose that our understanding of ‘good’ and ‘evil’ is limited and that God's reasons for allowing evil are beyond human comprehension (Plantinga 1974: 29—33).

The Free Will Defence posits that God permits evil as an inevitable result of bestowing free will upon humanity. This freedom of choice is deemed a superior good that warrants the potential for evil, as it facilitates genuine moral decisions and fosters virtues like courage and compassion in the face of adversity (Plantinga 1974: 29—33).

An alternative perspective is the Soul-Making Theodicy, which contends that evil serves a purpose in human spiritual development. This approach argues that a world devoid of challenges and suffering would fail to provide the necessary conditions for moral and spiritual growth. Thus, evil and suffering can be viewed as instrumental in the process of soul-making, aiding individuals in cultivating virtues and attaining spiritual maturity (Hick 2010: 253—255).

Religious thinkers have also used teleological arguments, which involve looking for purposes or goals in things, to suggest that the inequalities and suffering in human conditions serve as a state of discipline and trial, integral to divine wisdom (Hick 2010: 173; Du Toit 2011: 3).

Critics of these theodicies often contend that they inadequately address the sheer magnitude and severity of evil and suffering in the world, underscored by 'the evidential problem of evil'. This argument suggests that although some evil might be explicable as necessary for a greater good or free will, the extent of seemingly gratuitous suffering undermines the plausibility of these explanations. This provides a compelling reason to reject theism unless more convincing arguments for its

validity can be found (Draper 1989: 331).

Dostoyevsky addresses the Free Will argument in *The Brothers Karamazov's Grand Inquisitor* section. This passage is a parable narrated by Ivan Karamazov, one of the novel's central characters, to his brother Alyosha. In the story, Christ returns to Earth during the Spanish Inquisition, performing miracles and being recognised by the people. However, He is arrested by the Grand Inquisitor, an elderly cardinal who explains why the Church no longer requires His presence (Dostoyevsky 1996: 273—293).

The Grand Inquisitor contends that humanity is too weak to handle the freedom that Christ offers. He asserts that people prefer security and order, which the Church provides by dictating moral laws and controlling their lives. According to the Inquisitor, the Church's power is justified because it relieves the burden of free will, which can lead to suffering and evil (Dostoyevsky 1996: 273—293).

This story explores profound philosophical and theological questions, such as the nature of freedom, the justification of evil and the role of religious authority. It challenges the notion of divine justice and human suffering, suggesting that pursuing freedom and truth can lead to profound existential dilemmas.

The discourse persists, with diverse philosophers suggesting refinements and alternative rebuttals to these criticisms. The various responses to the problem of evil underscore the difficulty of the challenge to reconcile the existence of a benevolent, omnipotent and omniscient deity with the reality of suffering. In conclusion, although some philosophical arguments pose a formidable challenge to theistic beliefs, it has equally fostered a rich tradition of theological and philosophical inquiry.

The Role of Logical Fallacies in Religious Beliefs

When considering religion's resilience, it is interesting to recognise how logical fallacies can unintentionally support belief systems. These fallacies often help sustain religious convictions, even when faced with opposing arguments. Understanding these fallacies and their influence on religious thought offers valuable

insight into why certain beliefs endure, even when challenged by rational critique or empirical evidence.

Valid individual cognitive processes contribute to effective communication, persuasive argumentation and successful problem-solving in various aspects of life. The essence of reasoning is the logical progression from premises to conclusion, but the landscape of argumentation is fraught with pitfalls known as fallacies. A fallacy occurs when the conclusion does not logically follow from the premises. Errors can be unintentional, with the arguer possibly unaware that their reasoning needs to be revised. Others may deliberately employ fallacious reasoning to deceive and manipulate people, as seen in the specious claims of certain politicians, evangelists and marketers (Arp et al. 2019: 19).

In deductive arguments, the conclusion is meant to follow necessarily from the premises. If this condition is met and all premises are true, the conclusion must also be true. Formal fallacies, which occur in deductive reasoning, are identified by examining the structure or form of an argument rather than its content. This means that even if the premises of an argument are true, the conclusion can still be false if the argument is structured improperly (Arp et al. 2019: 34).

Informal fallacies occur in inductive reasoning when the conclusion does not logically follow from the given premises upon scrutiny of the argument's content. These fallacies include the misuse of language, misconceptions due to biases, misstatements of fact or opinion and illogical thought sequences (Arp et al. 2019: 19—20).

One prevalent informal fallacy is the false cause (*post hoc ergo propter hoc*), wherein a supposed cause is presented as a premise and the event or phenomenon it purports to explain is presented as the conclusion. Superstitions are straightforward examples of the fallacy of false cause; for example, something terrible will happen if a black cat crosses your path (Arp et al. 2019: 22), or if a rain dance is performed, it will rain the next day.

Post hoc reasoning is a form of causal fallacy that arises when cause-and-effect is

erroneously assumed based solely on the temporal order of events. This reasoning assumes that if event A precedes event B, A must have caused B. Although *post hoc* reasoning is not inherently fallacious, it often neglects the essential distinction that the mere temporal sequence of events does not necessarily signify a causal connection (Boudry et al. 2015: 435).

Superstitions frequently rely on *post hoc* reasoning, as illustrated by this example: 'Last night I prayed to God and today my favourite team won!' This statement wrongly infers a causal link between the prayer and the team's victory without considering other factors. Superstitions often involve false cause fallacies, as they attribute cause-and-effect to unrelated events (Labossiere 2013: 98; Du Toit 2011: 1).

Beyond these innocuous examples, more dangerous instances of the false cause fallacy exist, as seen in arguments against vaccines. Some argue that the increase in autism diagnoses, occurring alongside rising vaccination rates, suggests a causal link. However, scientific research has consistently debunked any connection between vaccines and autism (Centers for Disease Control and Prevention 2021).

The prevalence of fallacies in human thinking has far-reaching consequences, impacting public policies, civil laws and moral principles. It is essential to distinguish between mere correlation and established causation, especially in public health, where misinformation can have serious repercussions (Arp et al. 2019: 27).

The causal fallacy is pivotal in perpetuating and sustaining religious beliefs through various mechanisms. Individuals often interpret occurrences as divine interventions, buoyed by their adherence to specific religious doctrines. Here, the causal fallacy acts as a self-reinforcing loop of confirmation bias[9], wherein events aligning with their beliefs are accorded heightened significance.

The positive outcomes or experiences attributed to religious practices provide individuals comfort, assurance and joy. This emotional reinforcement, in turn, fortifies

[9] Confirmation bias is the tendency to search for, interpret, favour, and recall information that confirms one's pre-existing beliefs or hypotheses while giving disproportionately less consideration to alternative possibilities. This cognitive bias leads individuals to prioritise information that supports their existing attitudes and to dismiss evidence that contradicts them.

their dedication to their religious beliefs. An additional layer is introduced when individuals share narratives of events seemingly affirming the effectiveness of their spiritual practices. This communal storytelling amplifies the causal fallacy, creating a collective endorsement of positive outcomes linked to shared religious convictions.

The belief that one's actions directly influence favourable outcomes fosters a sense of control and psychological well-being. This perception contributes to the notion that religious practices yield positive results, supplying individuals with a palpable feeling of agency and purpose.

Fallacies are errors in reasoning, not errors of truth or falsehood. Fallacious arguments do not necessarily contain factual inaccuracies. Just as the validity of a claim hinges on the correctness of both the thinking process and the facts, concluding that a claim is false solely because it contains a logical error is itself a fallacy, known as the argument from fallacy. Even within nuanced instances of fallacious arguments, the various labels attached to these fallacies (e.g., *ad hominem, ad ignorantiam, post hoc ergo propter hoc* and equivocation) indicate that a single flaw can undermine the entire argument (Cotton 2019: 125—126; Boudry et al. 2015: 434).

Some additional informal fallacies pertinent to why people maintain their religious beliefs are briefly explored below.

Circular Reasoning

In circular reasoning (*circulus in demonstrando*), an argument restates itself rather than providing proof. The proposition is based on a premise that, in turn, is based on the same proposition, creating a circular argument with no real meaning (Bennett 2021: 162). It is fallacious because the argument's conclusion is also one of its premises. Detecting circular arguments may be challenging when the underlying premises are concealed. For example, when someone tells an atheist that they should believe in God, or else they will go to hell, the assumption that there is a God who can send someone to hell supports the conclusion that there is a God. Or as a character from the TV series ‘Please Like Me’ said (Almossawi 2014: 42):

> You can't threaten an atheist with hell. It doesn't make any sense. It's like a hippie threatening to punch you in your aura.

In this circular argument, the assumption is that there is a God who is responsible for the version of the Bible that the person is reading: 'The Bible is the word of God because 2 Timothy 3:16[10] states that all Scripture is inspired by God' (Damer 2009: 71).

The Cartesian Circle, a well-known circular argument of the seventeenth-century philosopher René Descartes, reads as follows (Hatfield 2006: 122—141):

> Everything I clearly and distinctly perceive is true, I know this because God created me and He is no deceiver and I know that because I clearly and distinctly perceive it and everything I clearly and distinctly perceive is true.

Here, Descartes argues that our awareness of God is the truth, but this premise first assumes that there is a God. If the existence of God is used to guarantee the truth of clear and distinct perceptions and clear and precise perceptions are used to prove the existence of God, it raises questions about the validity of the entire framework (Hatfield 2006: 122—141).

Circular arguments that resonate with pre-existing religious convictions can be particularly compelling for individuals seeking confirmation of their faith.

Fallacies of Relevance

A relevance fallacy arises when the premises of an argument are determined to be logically unrelated to the conclusion despite initial appearances of relevance. This discrepancy often results from an appeal to psychological or emotional relevance. Everyday relevance fallacies pertinent to religion include the appeal to authority, the

[10] 2 Timothy 3:16: All Scripture is God-breathed and is useful for teaching, rebuking, correcting and training in righteousness, so that the servant of God may be thoroughly equipped for every good work (Holy Bible translation 2011: 965).

genetic fallacy, the appeal to popularity, the appeal to tradition, the appeal to ignorance, the burden of proof and the straw man fallacy (Arp et al. 2019: 25).

Appeal to Authority

In the fallacious appeal to authority (*ad verecundiam*), the authority in question pertains to epistemic rather than political or moral authority. The internet has flooded us with abundant information, making it crucial to discern between credible and non-credible sources. Developing the skills to evaluate appeals to authority, such as examining data sources and assessing expert opinions, should be a paramount focus in modern society for fostering informed individuals (Battersby 2019: 289—306).

The appeal to authority has been considered a fallacy since the Enlightenment. The seventeenth-century British philosopher John Locke, credited as the first to identify and name the *ad verecundiam* fallacy, observes that it exploits the widespread tendency to defer to authority to gain acceptance for a conclusion. He contends that relying on others' opinions and facts without personal understanding is akin to possessing counterfeit wealth. Actual knowledge arises from independent reasoning and comprehension, not merely accepting what others say, even if those individuals are esteemed or have a good reputation (Locke 1856: 446; Battersby 2019: 289—306). He writes (Locke 1856: 73):

> Truth has been my only aim; and wherever that has appeared to lead, my thoughts have impartially followed, without minding whether the footsteps of any other lay that way or not.

Like other Enlightenment philosophers, Locke was inspired by scientific achievements and sought to emancipate individuals from blindly accepting unexamined assertions passed down through generations. Intellectual freedom entails personally and autonomously verifying the validity of claims (Battersby 2019: 289—306).

Nonetheless, Locke's position overlooks that much of our understanding stems from

data supplied by credible sources, frequently deemed dependable. Even our autobiographical knowledge, such as birth date, relies on trusted sources like parents or official documents like birth certificates. In various aspects of our lives, from checking the weather forecast to making decisions, we frequently rely on the expertise of others (Battersby 2019: 289—306).

Personal reasoning is the preferred method for decision-making, but the sheer volume of choices in daily life often compels us to defer to other people's opinions. Many find themselves unable to personally verify most claims, placing us in a state of epistemic reliance that extends beyond our expertise (Pierson 1994: 398).

Although it is reasonable to depend on the epistemic advice of qualified authorities, citing the opinions of those lacking expertise or using them to dismiss opposing views without addressing their substance may lead to a fallacious appeal to authority. An appeal to authority becomes fallacious when pivotal criteria are violated. These criteria include aligning the appeal with relevant knowledge areas, expert consensus, the source's expertise, access to pertinent information and trustworthiness (Pierson 1994: 398—400; Battersby 2019: 289—306).

We also often rely on credible appeals to authority in the natural sciences. Although science possesses well-established proof procedures, it is not immune to mistakes. Expert consensus through peer review forms a basis for tentative acceptance and widespread acceptance over time strengthens credibility (Battersby 2019: 289—306).

Media personalities, including Nobel Prize winners, evangelists and movie stars, may offer advice outside their expertise, resulting in a fallacious appeal to authority. Another consideration is that financial incentives may influence the opinions experts present to the public. This bias highlights the need to assess personal integrity, humility, clarity in reasoning, a track record of integrity and peer reputation (Battersby 2019: 289—306).

This comment exemplifies the appeal to authority fallacy: ‘Given his lineage of esteemed antiquities experts, it is unquestionable that his perspectives on the worth

of ancient artefacts carry authority.' Asserting an individual's unquestionable authority based solely on their familial lineage in antiquities expertise can be fallacious (Battersby 2019: 289—306).

Another example is when an individual claims climate change is not a significant worry, citing their pastor's assurance that it is a natural cycle. Here, the speaker relies on the authority of their religious leader rather than presenting scientific evidence or logical reasoning, exemplifying the appeal to authority fallacy. The pastor's role as an authority figure does not automatically qualify him as an expert in climate science. His viewpoint should be subject to critical evaluation rather than unquestioning acceptance (Battersby 2019: 289—306).

An example of the appeal to authority surfaced when I encountered a music teacher dissuading primary school children from singing the national anthem of South Africa based on a misinterpretation of the word 'Nkosi'. She believes that Nkosi is the chief of the Xhosa people and that Christians should not pray to anyone other than the Christian God. The teacher should consider the word's broader context, historical background and diverse interpretations. If students unquestioningly adopt the teacher's view, they succumb to the fallacy of authority.

Historians have long recognised that history is not a mere chronological account of events but a constructed narrative influenced by various theoretical frameworks. Addressing this inherent subjectivity requires more than accumulating confirming evidence or a simplistic return to the sources. The crux of the matter lies in adopting a critical approach. When presenting documentary evidence, this critical approach necessitates thoroughly examining the interests, perspectives and methods of the author under study. To avoid the fallacy of authority, it is important to assess the source's credibility and weigh the evidence in the context of our understanding of the author's standpoint while being cognisant of the limitations inherent in their methods and sources (Hall & Kratochwil 1993: 480).

Although it is reasonable to depend on the assessments of experts, these experts must validate their opinions when bolstering their arguments (Damer 2009: 103). In academics, when faced with written evidence, one should analyse the author's

motivations, viewpoints and methodologies. It is prudent to evaluate the source's credibility by examining the author's identity and meticulously analysing the presented evidence within our understanding of the author's perspective and our awareness of the limitations inherent in their methods and sources (Hall & Kratochwil 1993: 480).

Specific categories of claims find inadequate resolution or insufficient support through appeals to authority. A notable example is moral suasion. Unlike scientific assertions, individuals cannot simply assert, ‘I believe it because experts endorse it,’ when it comes to ethical decisions. This stems from three reasons (Battersby 2019: 289—306).

Firstly, unlike scientific issues, where experts mostly agree, moral issues often cause disagreements between people like philosophers and theologians. They not only argue about what is right or wrong but also about how to decide what makes something right or wrong in the first place. There's also no clear agreement on who should be considered an expert in moral judgement, which makes it hard to rely on so-called authorities to settle ethical debates (Battersby 2019: 289—306).

Secondly, in a secular society, the onus of a moral judgement or decision ultimately falls on the individual. Although individuals may choose to heed the directives of their religious institutions or the moral counsel of friends, the ultimate decision and belief remain personal, with the responsibility squarely resting on the individual. This does not negate the value of listening to those who study ethical questions; however, it emphasises that their expertise cannot be invoked to assert moral knowledge (Battersby 2019: 289—306).

Thirdly, the lack of a well-established epistemology for moral judgements adds another layer of complexity. Disagreements exist concerning the substance of ethical decisions and extend to the verification methods. Unlike the certainty and agreed-upon observational basis for verification in the physical sciences, moral judgements lack a universally accepted epistemic framework. This uncertainty about criteria and objectivity similarly weakens appeals to authority in aesthetic judgements. Nevertheless, the aim is not to advocate dismissing expert arguments and opinions

but to acknowledge the challenges involved (Battersby 2019: 289—306).

Religious beliefs are passed down through generations and are deeply rooted in cultural traditions. The traditional origin of religion increases the likelihood of individuals embracing these beliefs from esteemed figures of authority, such as religious leaders, elders, or sacred texts. Reliance on tradition as an authority can impede critical examination or questioning of beliefs.

Religious doctrines often claim divine origins, stating that certain teachings or commandments come straight from God. Followers might accept these beliefs due to faith and the perceived legitimacy of their supernatural source. This appeal to authority can discourage doubt or questioning, as scrutinising religious teachings, leaders, or customs might be seen as defying God. Although this appeal to religious authority helps sustain faith in society, those outside these traditions may view such devotion to authority as flawed reasoning.

In religious contexts, the appeal to authority fallacy can manifest in various forms, such as accepting statements from religious leaders without scrutiny, unquestioningly adhering to religious texts, or unthinkingly following traditions without assessing their reasonableness or ethical implications. This fallacy is particularly powerful in religious contexts because the authority of religious figures is often perceived as divinely sanctioned, making their pronouncements difficult to challenge. In certain denominations, the authority of the church hierarchy is deemed infallible, and any challenge to it is regarded as heresy (Locke 1856: 446). This unquestioning acceptance obstructs critical scrutiny and sustains erroneous beliefs.

Although religious beliefs often rest on faith, encouraging critical thinking, fostering dialogue and maintaining openness to questioning and refining one’s views lead to a more intellectually rigorous approach to matters of faith.

Genetic Fallacy

The genetic fallacy occurs when an argument is rejected or supported solely based on its origin without considering other relevant factors. Although the origins of an argument or its advocate can provide valuable context, they do not inherently establish the accuracy of the claim. For instance, dismissing a scientific theory with the assertion, ‘You can't trust it because it was put forward by an atheist who is biased against religion,’ exemplifies the genetic fallacy. Here, the argument is rejected based solely on the individual's beliefs, neglecting to examine the evidence and reasoning supporting the scientific theory (Scalambrino 2019: 160—161).

Some of Freud's psychoanalytic reasoning regarding religious beliefs falls prey to the genetic fallacy. He writes (Freud 1961: 17):

> For once before one has found oneself in a similar state of helplessness: as a small child, in relation to one’s parents. One had reason to fear them, especially one’s father; yet one was sure of his protection against the dangers one knew. […] In the same way, a man makes the forces of nature not simply into persons with whom he can associate […] but he gives them the character of a father. He turns them into gods.

Freud posits that the root of religion lies in people's fear of and dependence on their parents. He suggests that people attribute personal characteristics to natural forces that pose a danger and on which they depend, leading to religious worship. Although Freud's argument about the origins of religion raises valid questions, it does not conclusively prove that religious claims are false. Concluding that there are no gods from such fallacious reasoning is itself fallacious (Scalambrino 2019: 160—161).

The assertion that belief in God lacks authenticity solely because the belief stems from fear is a prime illustration of the genetic fallacy. This argument focuses on one of the origins of the conviction rather than its content (Craig 2010).

A further illustration of the genetic fallacy is the assertion that religious beliefs lack validity merely because they stem from primitive societies' attempts to elucidate

natural phenomena.

Appeal to Popularity

Another fallacy that relies on others' opinions is the appeal to popularity (*argumentum ad populum*) fallacy. This fallacy hinges on accepting popular opinion, tradition, or common knowledge as a basis for considering a claim as accurate or valid rather than presenting substantial evidence (Labossiere 2013: 37). This can be referred to as the bandwagon argument. Such arguments can be persuasive because people often conform to the majority's views, even though the public rarely holds authoritative opinions (Williamson 2018:12).

It is essential to distinguish between common-sense knowledge (known and proven) and common-sense belief (what people think they know). Appeals to common sense may sometimes disguise reliance on widespread prejudice. For instance, societal expectations have frequently prescribed distinct roles and conduct for both men and women, often rationalising these expectations with appeals to conventional wisdom. Assertions like ‘It is simply common sense that women excel in caregiving and homemaking’ were employed to reinforce gender stereotypes, restricting women's opportunities (Williamson 2018:12).

The appeal to popularity fallacy reinforces the idea that a belief must be valid because it is widely held. This can result in individuals hesitating to question or challenge a religious belief prevalent in their community, as doing so may carry potential social consequences. This fallacy contributes to the persistence of religion by fostering a social environment where dissenting views are discouraged and socially penalised. For instance, in 1633, the Church accused Galileo of heresy when he asserted that the Earth revolves around the Sun. In this historical context, daring to challenge the prevailing viewpoint violated the forum of conscience (Kelly 2016: 727).

This fallacy also plays a significant role in perpetuating religious endurance in other ways. When a belief or spiritual practice gains widespread acceptance, individuals may be prone to accepting it uncritically merely because of its prevalence. The

phenomenon of social validation comes into play, fostering a sense of comfort and belonging that makes people more likely to adhere to religious convictions without subjecting them to rigorous scrutiny.

A similar argument, the appeal to tradition *(argumentum ad antiquitatem)*, is fallacious if it relies on the long history of widely held ideas or items to support their truth or worth. For example, the fact that people in all cultures have historically believed in some form of a higher being does not prove the existence of God or gods. The fact that something is old or constitutes the *status quo* does not make it better or correct. Conversely, new ideas are not inherently superior to old ones. If these longstanding claims are supported by evidence, the argument is not fallacious (Labossiere 2013: 41).

Appeal to Ignorance

An appeal to ignorance (*ad ignorantiam*) involves accepting something as accurate without proof simply because there is no evidence disproving it. One form of this fallacy is the argument from personal incredulity, where an individual believes something is false because they cannot imagine it to be true (Almossawi 2014: 24). For example, the eighteenth-century philosopher Thomas Paine argues that God exists because it is too difficult to imagine that God does not exist (Paine 1896: 61):

> The only idea man can affix to the name of God, is that of a first cause, the cause of all things. And, incomprehensibly difficult as it is for a man to conceive what a first cause is, he arrives at the belief of it, from the tenfold greater difficulty of disbelieving it.

Paradoxically, Isaac Newton, one of the most influential scientists of the seventeenth century, will be known in posterity for developing the law of gravity. He finds the notion of objects interacting at a distance absurd and writes that to declare gravity to be a fundamental force of matter is ‘so great an Absurdity, that I believe no Man who has in philosophical matters a competent Faculty of thinking, can ever fall into it.’ To circumvent this absurd notion, Newton suggests that God may be the immaterial agent who causes gravitational interactions (Chomsky 2010: 6).

Shortly after, Locke concluded that although he could not imagine that matter and motion work in the way experiments have shown, God created it to do so. Our understanding cannot limit God's power (Chomsky 2010: 3). In this way, gaps in our understanding have often been attributed to the actions of a higher power. However, as science progresses and offers natural explanations for previously unexplained phenomena, the 'God of the Gaps' recedes. Despite this, religious beliefs may endure within the remaining gaps in our knowledge, with the appeal to ignorance being used to argue that if science cannot explain something, it must be the result of divine intervention. When evaluating such arguments, however, it is important to recognise that what people find unbelievable is not a reliable measure of truth.

This principle extends beyond religious discourse to all forms of argumentation. In any debate, the burden of proof (*onus probandi*) lies with the claimant, not the sceptic. Shifting this burden constitutes a fallacy common in pseudoscience, politics and religious discourse. For instance, ufologists often challenge sceptics to explain all UFO sightings rather than providing evidence for their own claims (Pigliucci 2018: 93). This tactic neatly illustrates how the appeal to ignorance can be weaponised to support unfounded assertions across various fields.

The Salem witch trials of 1692 offer a sobering historical example of how multiple fallacies can lead to tragic outcomes. These trials relied heavily on spectral evidence, appeals to authority, anecdotal evidence and personal grievances. The widespread belief in witchcraft exemplified the appeal to popularity fallacy. The result was the execution of twenty people and the imprisonment of many others, demonstrating how logical fallacies can fuel social injustice and reinforce harmful beliefs (Boyer & Nissenbaum 1976: 1—33).

Straw Man Fallacy

The Straw Man fallacy occurs when someone takes an individual's words out of context, distorting the original position and creating a weaker, misrepresented argument (the straw man) with absurd consequences (Aikin & Casey 2011: 88). For example, Satya Pal Singh, while serving as India's minister responsible for higher

education, made a controversial statement in Parliament. He argued against teaching evolution, claiming that ‘nobody, including our ancestors, in writing or orally, has said they saw an ape turning into a man.’ This argument relies on a simplified and inaccurate understanding of evolutionary theory to convince his listeners that ‘Darwin’s theory is scientifically wrong’ (Devraj 2023).

Straw Man fallacies can hinder meaningful dialogue in discussions about religion and science. When opponents misrepresent each other's views, it becomes difficult to have a constructive conversation. This lack of genuine engagement can contribute to the persistence of conflict, as the real issues and concerns are not adequately addressed.

Fallacies of Ambiguity

Fallacies of ambiguity, such as accent, context and equivocation, hinge on vagueness, obscurity, or unclearness in language or expression. The meanings associated with such ambiguity undergo subtle shifts or changes at different points in the argument.

The fallacy of accent, for example, can emerge from uncertainty about the author's tone or the intended emphasis within a statement. For instance, when a preacher reads, ‘Thou shall not bear false witness against thy neighbour,’ emphasising the word ‘against,’ the audience might erroneously infer that it's acceptable to tell lies if they benefit someone else (Stock 1888: 306).

Reliance on words alone cannot guarantee the precise and unambiguous understanding of a statement. Knowledge of local history and customs, assumptions about others' mental states, tone of voice, facial expressions, body language, gestures and other contextual information are essential for accurately interpreting speech or text (Ruiz 2019: 241).

The use of accurate, well-considered punctuation is also crucial for avoiding ambiguity. For example, consider the phrase (Ruiz 2019: 243):
‘For my parents, Amy Brown and God.’

This sentence's misleading ambiguity can be resolved with proper punctuation, such as the Oxford comma:
‘For my parents, Amy Brown, and God.’

Quoting selectively or out of context is considered a fallacy if it introduces ambiguity into the premises that distorts the original meaning of a statement, misrepresents the speaker's intentions, or leads to misunderstandings or false conclusions. Although ambiguity is not fallacious, it can lead to a fallacious argument when a statement has multiple interpretations and it needs to be clarified which one is intended. For example, Colossians 2: 13—14 (Holy Bible translation 2011: 954—955) states:

> He forgave us all our sins, having cancelled the charge of our legal indebtedness, which stood against us and condemned us; he has taken it away, nailing it to the cross.

Prosperity teachers use this verse to assert that all monetary debts have been forgiven and Christians are entitled to financial wealth. However, the original meaning of the term χειρόγραφον (translated as riches) in Paul's letter to the Colossians refers to forgiving sins against God, not cancelling financial debts to creditors (Kim 2017: 239; Talbert 2007: 215).

Similarly, Copeland quotes 2 Corinthians 8:9[11] out of context (Copeland 2017):

> Financial Prosperity is God’s will for you. ‘You know the generous grace of our Lord Jesus Christ. Though he was rich, yet for your sakes he became poor, so that by his poverty he could make you rich’ (2 Corinthians 8:9). What that prosperity looks like will differ from family to family but be assured that God’s will is prosperity. You are not outside the will of God when you ask for financial provision and blessings.

[11] 2 Corinthians 8:9: 'For you know the grace of our Lord Jesus Christ, that though he was rich, yet for your sake he became poor, so that you through his poverty might become rich' (Holy Bible translation 2011: 939).

When considered within the broader context of Paul's writings in the New Testament, the word πλούσιος in 2 Corinthians 8:9 pertains to an abundance of love, not material wealth. Instead of promising financial blessings, Paul warned against the dangers of pursuing wealth, as seen in 1 Timothy 6:9[12]. Also, the disciple Matthew wrote that it is easier for a camel to go through the eye of a needle than for someone rich to enter the kingdom of God[13]. Presbyterian missionary Courtenay Fenn comments that instead of heeding the warnings in the Bible about a camel, Prosperity teachers parade a 'magnificently caparisoned and fiery steed' (Kittel et al. 1985: 875; Fenn 1928: 78).

These Prosperity teachers employ an associated but irrelevant concept to interpret Paul's reference to riches. They distort traditional Christian doctrines by emphasising material wealth as an indicator of God's favour. Certain prosperity preachers have been accused of manipulating tractable followers, urging them to make financial contributions in exchange for promised blessings and taking advantage of those facing economic challenges.

Another fallacy of ambiguity involves deliberately expressing oneself vaguely or ambiguously, thereby creating confusion. The fallacy of equivocation emerges when a pivotal term in an argument has a specific meaning in one segment and a different interpretation in another (Damer 2009: 121). Incorporating disparate meanings of the same word within an argument can impede its logical progression toward a valid conclusion. For example (Labossiere 2013: 65): 'Every day, we see miracles like antibiotics, the internet and space travel. So, when atheists say there are no miracles, they are wrong.'

In another example, someone said: 'You have faith in science and I have faith in God. Therefore, our beliefs are equally valid.' The term faith is used in two different contexts. In science, it signifies reliance grounded in evidence, whereas in religion, the term faith frequently denotes belief in the absence of proof (Damer 2009: 122).

[12] 1 Timothy 6:9: 'Those who want to get rich fall into temptation and a trap and into many foolish and harmful desires that plunge people into ruin and destruction' (Holy Bible translation 2011: 962).

[13] Matthew 19:24: 'Again I tell you, it is easier for a camel to go through the eye of a needle than for someone who is rich to enter the kingdom of God' (Holy Bible translation 2011: 800).

Attentiveness to language use and ensuring that terms are employed consistently with precise meanings allows for better identification of fallacies in arguments. This careful approach to linguistic precision enhances the ability to detect flaws in reasoning and improves overall critical thinking skills.

Fallacies of Presumption

Fallacies of presumption arise when an argument is built upon assumptions that lack proper justification. These assumptions can pertain to the evidence itself, its trustworthiness, or the inferences derived from it.

The complex question fallacy (*plurium interrogationum*) is a fallacy of presumption that arises when more than one question is combined into a single question, allowing only a yes or no response. Respondents may not answer each question separately. The complex question embeds an unsupported assumption not agreed upon by all involved, thereby advancing the questioner's intended narrative. For example, ‘If God did not create the universe, who did?’

This scenario has two underlying assumptions: God's existence and the universe's creation. The unjustified assumption implies a binary choice between God or some other entity as the creator, disregarding the possibility that the universe might have originated without deliberate intervention through alternative mechanisms (Pirie 2015: 60; Bennett 2021: 164).

A question remains fallacy-free when the underlying assumption is grounded in fact. For instance, the query ‘What is the duration one can endure without water?’ is not fallacious as there is scientific evidence determining how long a person can survive without water (Bennett 2021: 165).

Fallacious complex questions include: ‘How can a secular moral framework be justified if morality is exclusively derived from religious teachings?’ This question assumes that morality can only stem from religious teachings without providing a convincing argument. Another example is, ‘Can life have any meaning or purpose

without a belief in an afterlife?' This question presupposes that meaning and purpose in life are solely attainable through a belief in an afterlife (Bennett 2021: 165).

These questions can subtly push someone towards accepting certain beliefs without critically examining them. This can inadvertently foster a perception that the religious implication is justified.

Similarly, a false dilemma, also known as a false dichotomy, is an argument that incorrectly asserts that only two options are available and mutually exclusive. It excludes viable alternatives. For example, arguing that either evolutionary theory can explain everything or that intelligent design is true excludes other theories or combinations of these alternatives (Pigliucci 2018: 140).

Pascal's wager is a well-known philosophical argument by Blaise Pascal, a seventeenth-century French philosopher and theologian. It is another example of a false dilemma (Pascal 2013: 66—67):

> Let us then examine this point and say, 'God is, or He is not.' But to which side shall we incline? Reason can decide nothing here. There is an infinite chaos which separated us. A game is being played at the extremity of this infinite distance where heads or tails will turn up. What will you wager? According to reason, you can do neither the one thing nor the other; according to reason, you can defend neither of the propositions […] [Y]ou must wager. It is not optional. You are embarked. Which will you choose then? […] Let us weigh the gain and the loss in wagering that God is. Let us estimate these two chances. If you gain, you gain all; if you lose, you lose nothing. Wager, then, without hesitation that He is. […] I would have far more fear of being mistaken and of finding that the Christian religion was true, than of not being mistaken in believing it true.

Pascal's discourse on this topic has several flaws and may not hold for individuals with different worldviews. The probability that such a God exists may be too small to consider accepting the wager (Edwards 2021: 12—13).

At the Church Council of Constance in 1415, John Hus encountered an unjust predicament during his trial for alleged opposition to the Church. The Council presented him with a catalogue of statements attributed to him by his accusers, insisting on a simple yes or no response. This artificial dilemma placed Hus in an inequitable position, leading to his eventual declaration as a heretic and subsequent execution by burning at the stake (Foresman et al. 2016: 144).

People's responses to questions often illustrate how cognitive biases shape their perspectives. As psychological phenomena, these biases play a significant role in human judgement and decision-making. Individuals routinely make conscious and unconscious choices, often amidst uncertainty about potential consequences. Although rational choice theory suggests making optimal decisions based on available information, people frequently rely on more intuitive approaches that deviate from logical reasoning. Such intuitive methods, shaped by cognitive biases, often lead to decisions that diverge from purely rational considerations. This highlights the interaction between human psychology and decision-making processes. Cognitive biases, therefore, describe systematic and predictable tendencies that frequently result in suboptimal or inaccurate outcomes (Korteling & Toet 2021: 611—614).

Controversies exist about whether these deviations from formal choice models should be labelled 'irrational'. Intuitive decision-making involves making judgements or decisions quickly, often based on gut feelings or heuristics rather than a thorough and deliberate analysis of all available information. This approach proves helpful in certain situations, especially when time is limited or when handling extensive and detailed data (Blanco 2017: 1—7).

The systematic nature of cognitive biases is particularly concerning at the group level, where collective decisions can result in disastrous outcomes due to consistent errors. Even with an awareness of these biases, individuals often display overconfidence in their judgements, allowing biases to persist across various facets of society (Blanco 2017: 1—7).

The theory of bounded rationality posits that cognitive biases frequently stem from

the human mind's constrained processing capacity. This theory suggests that achieving rational solutions proves challenging when confronting complicated issues. Cognitive faculties, accessible information and time constraints inherently circumscribe decision-making. People regularly grapple with incomplete data, mental limitations and temporal pressures. Consequently, they resort to heuristics and intuitive reasoning to simplify problems, often yielding outcomes that fall short of optimal rationality or efficiency (Blanco 2017: 1—7).

This refined conceptualisation acknowledges individuals' pragmatic compromises in real-world scenarios where perfect rationality is seldom achievable. It underscores the influence of human cognition and environmental factors, highlighting how our mental shortcuts, while often useful, can lead to systematic errors in judgement and decision-making.

Cognitive biases lead to motivated reasoning, where people selectively interpret information and form beliefs that align with their preexisting attitudes, emotions and preferences. People use motivated reasoning to maintain or enhance their self-esteem, protect their social identity, or validate their worldview. This can lead individuals to filter evidence unconsciously, prioritise information supporting their preconceptions and dismiss or downplay data that challenges their beliefs (Blanco 2017: 1—7).

With confirmation bias, there is a psychological tendency where individuals, once committed to a belief, selectively seek and acknowledge only evidence that confirms their convictions while disregarding conflicting instances. This phenomenon is notably prevalent in the realm of paranormal claims. People eagerly embrace predictions fulfilled by religious prophets, psychics, or astrologers yet conveniently overlook unfulfilled prophecies and significant events that were not predicted (Shermer 2018: 81).

In religion, instances where cancers enter remission following intercessory prayer are frequently celebrated as religious miracles. This perspective tends to be biased, selectively ignoring cases where cancers spontaneously vanished without any faith-based intervention or instances where patients, despite fervent prayers, succumbed

to the disease. Instead, it only emphasises instances that align with the conviction that prayer can facilitate healing. Similarly, divine providence is often evoked when a few faithful individuals survive a disaster. This viewpoint tends to overlook the unfortunate fates of religious individuals and the resilience of unbelievers facing similar challenges (Shermer 2018: 81). Ignoring the complexity of such situations and focusing solely on occurrences that validate existing beliefs bolsters religious conviction, contributing to religion's resilience in society.

Confirmation bias extends beyond supernatural claims, seeping into all aspects of society. For instance, people often gravitate towards news outlets that mirror their political inclinations, disregarding or downplaying information from sources that offer divergent perspectives. An optimistic investor about a specific stock's performance might actively pursue positive news and financial analyses, reinforcing their expectation of economic success and selectively overlooking negative information.

Similarly, researchers driven by a particular hypothesis may inadvertently interpret experimental results in a manner that bolsters their hypothesis, disregarding conflicting data and thereby contributing to a biased body of scientific literature. It is, therefore, imperative to scrutinise both confirming and disconfirming instances to foster a comprehensive understanding of any phenomenon and avoid succumbing to biases. Without considering all evidence, arguments devolve into subjective speculation and the integrity of claims is compromised (Shermer 2018: 81).

We often overestimate the rationality of our attempts to comprehend the world and ourselves, falling victim to cognitive biases that cause us to oversimplify or distort reality to align with our preexisting beliefs. Demosthenes wisely noted that ‘self-deceit is remarkably easy; people tend to believe what they wish to be true, as desire often begets belief’ (Bevelin 2007: 59).

Consistency plays a pivotal role in shaping individuals' perspectives on religion. Motivated to maintain a positive self-image, people actively seek coherence in their beliefs and decisions. Once individuals commit, they earnestly work to validate their choices, often unconsciously seeking reinforcing evidence. The depth of commitment intensifies with increased investments of time, money, effort and

consideration of public opinion, creating a reluctance to reconsider their views. As German physicist Planck aptly noted, accepting a new scientific truth does not necessarily arise from convincing and enlightening its opponents. Instead, it often emerges as a new generation grows up, inherently familiar with the evolving truth, while the proponents of the outdated perspective eventually fade away (Bevelin 2007: 62).

The preceding discussion on fallacies provides a selective exploration, highlighting aspects of flawed reasoning that can significantly influence religiosity. These examples illustrate the potential consequences of erroneous thinking, which may shape unfounded belief systems and impact individuals. Fallacies act as reinforcing mechanisms, impeding intellectual exploration and evaluation. The perpetuation of causal fallacies through generations occurs as people pass down stories and experiences, solidifying the notion that spiritual and paranormal practices yield positive outcomes. Such fallacies thrive in environments where critical scrutiny of beliefs is discouraged and persist when religious community members refrain from questioning or critically assessing the links between events and spiritual practices.

The preceding discourse accentuates the facility with which fallacies can skew our perceptions and mislead others. This vulnerability is particularly acute when individuals embrace premises bereft of credible evidence or manipulate language in inappropriate or decontextualised ways. The ubiquity of confirmation bias, notably conspicuous in paranormal claims, underscores the imperative of fostering robust critical thinking skills.

To bolster our cognitive faculties, it is paramount to integrate comprehensive education on logic, argument formulation, fallacy recognition and strategies to navigate cognitive biases into every educational curriculum. Cultivating the acumen to identify and circumvent specious reasoning is a bulwark against biases, nurturing discerning thought and averting the deleterious consequences of flawed arguments (Blanco 2017: 1—7).

This approach fortifies individual cognitive resilience and enhances collective decision-making processes. By equipping learners with these essential tools, the

educational system fosters a populace better prepared to navigate the complexities of modern information landscapes, evaluate claims judiciously and contribute meaningfully to societal discourse.

Moreover, this educational paradigm shift could yield far-reaching benefits, from improving public policy debates to enhancing scientific literacy. It represents a crucial investment in intellectual capital, potentially mitigating the spread of misinformation and bolstering the foundations of a rational, well-informed society.

In conclusion, a genuine commitment to deepening our understanding of cognitive biases is essential for societal advancement. This commitment is crucial for individuals to effectively process the vast amounts of information available to them, ensuring that their choices and beliefs are grounded in rational thought rather than succumbing to flawed reasoning or misleading narratives (Blanco 2017: 1—7).

1.2 Insights from the Cognitive Science of Religion

The resilience of religion has long intrigued scholars, raising questions about the persistence of religious beliefs and practices across different cultures and generations. The Cognitive Science of Religion (CSR) offers a unique perspective on this phenomenon by examining the cognitive processes that underlie religious thought. CSR emerged in the 1990s as an interdisciplinary field, integrating perspectives from cognitive science, religious studies, anthropology, psychology, sociology, philosophy and neuroscience, among others (White 2018: 40; White 2021: 1). This interdisciplinary approach seeks to uncover why religion persists, focusing on the role of cognitive processes in shaping religious thought.

At the heart of CSR is the proposition that certain cognitive processes related to religion are products of our evolutionary past. Some scholars in this field suggest that these processes developed as adaptive responses to challenges faced by our ancestors, which in turn facilitate religious thought (White 2021: 1). By drawing on evolutionary psychology, CSR provides a framework for exploring the connections between human cognition, evolution and religious beliefs and practices.

For example, CSR researchers argue that our tendency to attribute agency to natural phenomena, such as seeing faces in clouds, may have provided evolutionary advantages that led to the widespread belief in supernatural entities. This predisposition could explain the widespread belief in gods, spirits and other supernatural entities (Barrett 2004: 21; Teehan 2014: 173).

CSR investigates not only belief in gods but also concepts like the afterlife and practices such as prayer and ritual, examining how these are passed down through generations. It explores how these beliefs and practices are transmitted and persist across generations, often focusing on shared community ideas rather than individual experiences (Barrett & Trigg 2014: 6—7). By comparing common features and patterns across cultures, researchers aim to improve our understanding without claiming to explain every aspect encompassed by the broad term 'religion' (White 2021: 1).

An important aspect of this investigation is the rejection of Aristotle's idea of *tabula rasa* – the notion that human minds are blank slates with equal capacity to learn all types of information. CSR scholars argue that humans are predisposed to certain cognitive biases, which influence the formation and transmission of religious ideas (Barrett & Trigg 2014: 5—6). These innate predispositions influence how religious ideas are formed, maintained and transmitted.

CSR employs scientific methods to explore these cognitive underpinnings, including systematic empirical research and data analysis such as inferential statistics. Researchers begin by examining phenomena previously documented by scholars who have categorised particular religious ideas and behaviours (White 2018: 40). However, unlike other approaches, CSR does not assume that these ideas are part of broader cultural systems or have causal relationships. Instead, they are treated as distinct subjects of study.

Breaking down religious systems into their core components facilitates a meticulous examination of the cognitive processes underpinning them. These components might include ideas about supernatural agents (e.g., gods, spirits, ancestors), beliefs

in an afterlife, explanations for misfortune (such as death or disease) and expressions of devotion like sacrifices or offerings. By examining these elements, researchers can identify shared cognitive processes that influence them, such as the tendency to anthropomorphise non-human entities (White 2021: 32—35).

For instance, the human propensity to attribute human characteristics to non-human things explains why concepts of gods or ancestors often resemble ordinary people. Recognising these shared cognitive processes demonstrates that ideas and practices appearing different across cultures may have underlying similarities (White 2021: 32—35). Cognitive predispositions, such as focusing on human faces and distinguishing between objects and agents, facilitate the formation and persistence of religious beliefs across generations (Barrett & Trigg 2014: 5—6).

This cognitive approach has enhanced our understanding of many aspects of religion. It sheds light on how children and adults reason about religious concepts, the origins of religious ideas and how they are transmitted and transformed within cultures. Additionally, it facilitates the development of broader theories about religion, such as the connections between rituals and social structures or the emergence of large-scale moralising religions (White 2021: 32—35).

CSR focuses on cognitive processes and why some religious concepts are prevalent across diverse cultures. It suggests that despite cultural variations, common psychological mechanisms may make particular religious ideas more likely to be adopted and retained. This approach underscores the role of innate cognitive tendencies in shaping religious expression.

Although CSR has deepened our understanding of religion, it faces criticism for treating religious belief as a subject of scientific inquiry, which some argue oversimplifies its social and cultural complexity. One objection arises from the notion that religion is *sui generis* – a unique phenomenon that cannot be fully explained through external frameworks (White 2021: 12—14; 57; 319). Critics argue that religious experiences and beliefs are irreducible to non-religious factors and that CSR's reductionist approach may overlook crucial social, cultural and emotional aspects.

Opponents contend that applying reductive methods to religious studies risks oversimplifying a subject that demands a more holistic treatment. However, most CSR scholars do not adhere to extreme ontological reductionism – believing that religious experiences are solely attributable to neurological processes. Instead, they advocate for a multifaceted approach that considers biological, psychological and cultural factors, acknowledging the limitations of any single explanatory framework (White 2021: 12—14; 57; 319).

CSR proponents argue that analysing religious phenomena through cognitive and neurological lenses yields valuable insights. They maintain that their approach, far from dismissing the significance of religion, offers a useful perspective that complements broader religious studies. While recognising the wider implications of religious experiences and practices, CSR researchers maintain that these phenomena are not beyond the scope of systematic scientific examination (White 2021: 12—14; 57; 319). The debate thus centres on the appropriateness and efficacy of applying scientific methodologies to studying religion, reflecting broader tensions within religious studies regarding the balance between reductive analysis and holistic interpretation.

Evolutionary Framework of Religious Belief

Exploring the evolutionary perspective further, experimental psychologist Justin L. Barrett argues that religion emerges naturally as a human cognitive function. He states (Barrett 2004: 21):

> Belief in gods requires no particular parts of the brain. Belief in gods requires no exceptional mystical experiences, though such experiences may aid it. Belief in gods requires no coercion, brainwashing or persuasive techniques. Rather, faith in gods arises because of everyday mental tools' natural functioning in familiar natural and social contexts.

Barrett suggests that our minds, shaped by evolution, naturally lead us to believe in supernatural beings. Although evolution does not dictate the specific details of these

beliefs, it establishes a fundamental cognitive framework for the conception of gods (Teehan 2014: 173). Concluding that religion is a natural aspect of the human condition does not imply the validation of religious claims or the accuracy of a spiritual interpretation of reality.

An ongoing debate within the field revolves around whether religion is a byproduct – an unintended result of cognitive processes evolved for different purposes – or an adaptation that actively contributes to human evolution (Teehan 2014: 169—171).

The emergence of evolutionary psychology has placed belief systems within scientific inquiry, setting the stage for possible conflicts with theological perspectives. An evolutionary cognitive explanation of religious belief does not necessarily lead to rejecting religion. However, it suggests that reasons for believing in religious ideas could be explained in alternative ways based on how human cognition has evolved (Teehan 2014: 173; 182).

Cultural Contexts in Religious Development

Although cognitive processes play a significant role, the influence of cultural, historical and environmental factors in shaping religious beliefs and practices cannot be overlooked. Critics argue that the diversity of religious expressions across cultures challenges the idea of cognitive universals, suggesting that CSR may overemphasise shared processes at the expense of context (White 2021: 319).

Evaluating the statement that 'humans are naturally religious' requires recognising the diverse factors influencing religiosity. Variations in belief and practice highlight how religious expression is shaped by context. For instance, Clifford Geertz's anthropological study of Balinese Hinduism illustrates how deeply religion is embedded in Bali's cultural and social systems. Despite its structured rituals, Balinese Hinduism lacks the rational doctrines associated with more formalised religions. This may be linked to pre-Hindu influences and Bali's geographical isolation since the fifteenth century, which limited its cultural development. By contrast, the island of Java experienced external pressures, leading to the rise of

more rational belief systems and a greater awareness of religious diversity and conflict (Geertz 1973: 174—175).

Similarly, the diversity of spiritual and secular expressions, along with the marked decline in religiosity in certain regions, such as Western Europe, calls into question the idea that humans are inherently religious. This regional trend indicates that although cognitive science highlights common mechanisms, religious expression is shaped by complex interactions among cultural, historical and environmental factors (Bruce 2002: 73).

Scholar of religion Robert C. Fuller's study of the 'Spiritual but Not Religious' movement unveils a significant shift: many people seek spiritual fulfilment beyond organised faiths, creating individualised practices. This phenomenon highlights how spiritual inclinations can thrive separately from conventional religious frameworks. It challenges the notion that humans are innately drawn to formal religious structures, suggesting that spiritual needs may be met through diverse, personalised approaches. Fuller's work adds depth to our understanding of modern spirituality, showing how it often diverges from traditional religious participation (Fuller 2001: 3—4).

I noticed the same trend in my current residence on the West Coast of South Africa. Most people still regard themselves as Christians, but the predominant religious affiliation has shifted towards independent charismatic churches and followers tend to develop a theology and spirituality that suit them.

Sensus Divinitatis and Innate Religious Belief

For those who believe in God, the origins and endurance of religion might not seem surprising. Theologians like Calvin often referred to a natural *sensus divinitatis*, suggesting that God has endowed humans with an innate capacity to perceive the divine. This view aligns with contemporary cognitive science, which posits that the human mind naturally possesses foundational aspects of religious thought (Barrett & Trigg 2014: 9).

The concept of *sensus divinitatis*, or an inherent sense of the divine, provides a theological explanation for humanity's natural inclination towards religious belief. CSR challenges the idea of religion as a private, unique phenomenon, instead asserting that religion is a natural part of human existence and serves as the default mode of thinking. Some CSR scholars suggest that religious thought is automatic and non-reflective, whereas philosophical and scientific thinking requires more conscious, reflective processes. Since religious impulses are deeply ingrained in human nature, rejecting religious beliefs may require deliberate effort (Barrett & Trigg 2014: 9—12).

However, asserting that the evolution of human cognition is purposefully geared towards fostering a belief in God, particularly in a traditional theistic sense, represents a selective interpretation of the evidence. The cognitive mechanisms that can engender belief in such a God also give rise to superstition and belief in other supernatural entities: spirits, demons and a myriad of gods. Some CSR scholars argue that monotheism cannot claim a privileged position, as polytheism appears to be the default religious inclination shaped by evolution (Teehan 2014: 171).

Expressions of religious inclinations display significant diversity. Recognising the inherent fallibility of natural inclinations, it becomes clear that their existence neither justifies the adoption of religiosity nor provides clear guidance in navigating the multitude of religions available. Debates about the influence of religions on human well-being and harm are pivotal within contemporary public discourse. It is incumbent upon human reason to scrutinise the positive or negative impact specific religions have on human flourishing (Barrett & Trigg 2014: 10; Trigg 2015: 221).

Furthermore, churches have integrated considerable superstition into their practices, a phenomenon considered acceptable when incorporated into an established faith framework. For instance, there is the reverence of relics, occurrences like stigmata associated with the cross and narratives surrounding saints and statues within the Catholic Church. In Protestantism, similar occurrences encompass healing experiences, visions and dreams. Theologian Cornel du Toit cited superstitious examples such as belief in miracles, feelings of guilt leading to fear of dire consequences and expectations of rewards like a lengthy and content life or an

afterlife. He expressed curiosity about what would endure in religion if the superstitious elements were removed, leaving only the dogmatic aspects intact (Du Toit 2011: 4—5).

Some Christians argue that a fundamentally sound notion of God is inherently present in our biological inheritance. However, this concept becomes tainted as we mature due to the challenges of living in a sinful and fallen world. The variety in perceptions of God is attributed to human error rather than divine intent, aligning with a longstanding Christian tradition. Within Christian theology, it is asserted that the diversity in religious beliefs arises from a corrupted world distorting God's message, leading to misinterpretations by human minds tainted by sin (Teehan 2014: 174).

Contemporary philosopher Alvin Plantinga uses the concept of *sensus divinitatis* to justify Christian beliefs. He argues that this faculty is designed to produce truth-conducive theistic beliefs when triggered by certain stimuli, such as the majesty of nature or our moral and physical vulnerability. However, critics raise objections to this justification. From a cognitive science perspective, appealing to the Holy Spirit as an explanation opens the door to an evolutionary cognitive analysis. This analysis suggests that belief in the Holy Spirit, like other supernatural beliefs, arises from cognitive mechanisms not equipped to validate religious claims, thus leading to a debunking argument (Plantinga 2000: 205—206; Teehan 2014: 183—184).

Logical scrutiny also questions the justification for the belief that the Holy Spirit guides us to truth from within. A circular and self-refuting argument emerges as this belief arises from cognitive mechanisms deemed corrupted and unreliable. If people operate with a corrupted *sensus divinitatis*, theological speculations, including the belief in *sensus divinitatis*, become unjustifiable (Teehan 2014: 184).

Understanding the cognitive processes underlying religious belief sets the stage for exploring how cognitive styles shape our beliefs. People's judgements and decisions often deviate from rationality, are influenced by seemingly irrelevant factors and fail to consider critical information. These departures from rational norms are systematic, with individuals consistently making similar mistakes across various situations (Blanco 2017: 1—7). The cognitive processes that lead to such errors, including

intuitive versus reflective thinking, biases and faulty reasoning, are crucial for understanding religion's resilience.

In the following section, the focus shifts to how cognitive styles – particularly the interaction between intuitive and reflective thinking – influence belief in the supernatural. By examining these cognitive processes, we can gain insights into the persistence and variability of religious and supernatural beliefs across different cultures.

1.3. Biases, Heuristics and Faith

Cognitive styles play a crucial role in shaping human beliefs and decision-making processes. These styles, which evolved to enhance survival and reproductive success, often operate below conscious awareness and involve the interaction between intuitive and reflective thinking. This dynamic is particularly evident in the formation and persistence of supernatural beliefs across cultures.

Research methodologies, such as the Cognitive Reflection Test (CRT), have been instrumental in examining how individuals balance intuitive responses with more deliberate, analytical thinking. This balance varies among individuals and cultures, contributing to the diversity of religious and supernatural beliefs observed globally.

Understanding these cognitive processes provides insight into why supernatural beliefs persist despite varying cultural and social contexts. It also illuminates how individual thought patterns interact with broader societal influences to shape and propagate religious concepts. By examining the relationship between cognitive styles and supernatural beliefs, we gain perspective on the complex interaction between individual cognition and cultural evolution in religious and supernatural thinking.

Our early ancestors developed mental tools that evolved to enhance their reproductive success. These tools function predominantly without conscious awareness, forming cognitive systems that influence thought. Cognitive styles,

particularly the balance between intuitive and reflective thinking, play a decisive role in shaping belief in the supernatural (Teehan 2014: 170; Shenhav et al. 2012: 423; Barrett & Trigg 2014: 5).

Critiquing Evolutionary Assumptions of Cognitive Tools

Cognitive biases often arise from the difference between intuitive and reflective responses. Intuitive thinking involves effortless, reflexive, heuristic, instinctive and visceral processes. This style frequently leads to quick judgements and increases the prevalence of belief in paranormal phenomena and religious ideologies. Although intuitive thinking is fast, it is susceptible to error. However, it serves a purpose by improving the likelihood of survival by instantly anticipating potential threats and identifying promising opportunities (Ward & King 2020: 1; Kutsch 2019).

Reflective thinking involves controlled, systematic, analytic, rule-based and rational processes. Reflective thinkers critically evaluate arguments and may be less likely to accept paranormal, pseudoscientific, superstitious and religious beliefs (Shenhav et al. 2012: 423—428). It is more precise and requires additional time and effort.

Intuitive processing, characterised by its automaticity, speed and minimal cognitive effort, facilitates quick decision-making via mental shortcuts or heuristics. Although efficient, this type of thinking can lead to systematic errors and biases. Reflective processing, being slow, effortful and deliberate, can override intuitive responses (Stanovich 2016: 23—34).

This analytical approach is essential for identifying and correcting the errors caused by heuristics, thereby promoting more accurate and rational decision-making. In religion and belief in the supernatural, these cognitive biases can result in the uncritical acceptance of superstitious or dogmatic beliefs. Encouraging reflective processing through critical thinking and scepticism is crucial for mitigating these biases, helping individuals to align their beliefs more closely with empirical evidence and rationality (Stanovich 2016: 23—34).

The results produced by these two systems can be characterised as non-reflective and reflective beliefs. Non-reflective beliefs function as the default assumptions for the reflective system, giving rise to explicit beliefs unless there is sufficient contrasting evidence. Intuitive cognitive style is associated with endorsing implausible ideas, including paranormal, pseudoscientific, superstitious and religious beliefs (Pennycook et al. 2012: 335; Barrett & Trigg 2014: 3—6).

This viewpoint aligns with the rationalist perspective that values analytic thinking. However, this interpretation might be biased towards a Western-centric view of rationality. In many non-Western cultures, intuitive thinking and spirituality are highly valued and considered legitimate ways of understanding the world (Nisbett 2003: 24—25). By comparing these perspectives, it becomes clear that cognitive styles are deeply embedded in cultural contexts and what is deemed rational or irrational varies significantly across societies.

Other factors, such as social learning and cultural transmission[14], significantly shape belief formation. Individuals often adopt beliefs prevalent in their communities, which can reinforce intuitive thinking patterns. Religious beliefs, which are frequently intuitive, help to enhance group cohesion by fostering trust and cooperation among members. This prosocial behaviour is beneficial for the stability and functioning of social groups (Nisbett 2003: 54—58; Norenzayan & Shariff 2008: 58—62).

Examining these alternative explanations can provide a more comprehensive understanding of why certain beliefs persist. The assumption that the balance between intuitive and reflective thinking is the primary factor may oversimplify the multifaceted nature of cognitive evolution. Although survival is critical, cognitive tools evolved for other purposes, such as social cooperation and cultural transmission.

Ideas that readily come to mind are granted a presumption of truth and goodness. An idea that captivates the human mind more readily stands a greater chance of being communicated effectively and disseminated across individuals and

[14] Transmission refers to the process by which beliefs, ideas, values, or norms are passed from one individual or group to another, often spanning generations or circulating within social networks. This transmission occurs through a variety of mechanisms, including communication, education, imitation, and social interaction, and plays a vital role in shaping cultural and societal dynamics.

generations. Belief in the supernatural may often arise from gut feelings, hunches, or experiences that individuals readily accept as valid justifications for their convictions. The hypothesis that supernatural beliefs are rooted in intuitive thinking provides insight into their widespread prevalence and persistence (Barrett & Trigg 2014: 3—6; Kutsch 2019; Ward & King 2020: 1).

According to philosopher John Teehan, the findings of The CSR posit that (Teehan 2014: 169):

> Religious belief is not the result of ignorance; it is not the result of particularly irrational or superstitious thinking; it is not the result of intellectual laziness—even if each of these elements is at times involved in religious belief. Religion is not the opiate of the masses (even if it is sometimes used as such); it is not a defence mechanism against death (even if it may serve this function), nor is it a comfort against the terrors of nature (even if it can play this role). From the cognitive science perspective, religion is the outgrowth of natural cognitive tools that help us make sense of our world. The mental tools that give rise to and sustain religious belief and practice are part of human nature—humans are naturally religious. This is not an apologetic for religion; it simply follows from the models being developed by cutting-edge research into the workings of the human mind.

Teehan's perspective aligns with the broader cognitive science framework, which views religious belief as an emergent property of natural cognitive processes rather than a byproduct of cultural or educational deficiencies. Considering religion through this lens allows for an appreciation of how deeply embedded these mental tools are in human nature, fostering a more detailed understanding of why religious beliefs are so resilient and pervasive across various societies and historical periods. This cognitive approach helps to demystify the origins of religion, positioning it within the context of human cognitive evolution rather than as a mere sociocultural artefact. By examining religious beliefs as a manifestation of innate cognitive tendencies, researchers can gain deeper insights into aspects of human cognition and how these fundamental mental processes shape cultural expressions across different populations and periods.

Measuring Rational Thinking and Its Impact on Belief

Psychologist Keith Stanovich addresses religion and belief in the supernatural within the broader context of cognitive biases and rational thinking. He categorises beliefs in the supernatural, conspiracy theories and other non-scientific attitudes as examples of 'contaminated mindware' – belief systems that lead to irrational thinking. Stanovich argues that rational thinking should ideally be free from such contaminated mindware, as it impedes the ability to make decisions based on logical and empirical evidence (Stanovich 2016: 23—34).

Stanovich argues that rationality and intelligence are distinct constructs, with rational thinking requiring its own assessment methods. He emphasises that although intelligence tests measure cognitive ability, they do not capture the critical aspects of logical thought. Stanovich and his research group developed the Comprehensive Assessment of Rational Thinking (CART) to measure individual differences in rational thinking. The CART aims to fill this gap by evaluating the processing and knowledge components of logical thinking, distinguishing between instrumental and epistemic rationality. The work is rooted in the tradition of heuristics and biases, reflecting the dual-process theory of cognition, which differentiates between automatic, intuitive responses and reflective, deliberate responses (Stanovich 2016: 23—34).

The CART includes subtests to assess an individual's susceptibility to superstitious thinking and anti-science attitudes. These subtests aim to identify how these beliefs might interfere with rational decision-making processes. The presence of such beliefs is considered a hindrance to epistemic rationality, which is the alignment of one's beliefs with the actual structure of the world (Stanovich 2016: 23—34).

Stanovich emphasises the importance of actively open-minded thinking and critical evaluation of evidence as crucial components of rational thought. He notes that rational thinking involves the ability to process information correctly and the disposition to apply critical thinking to one's beliefs, including those related to religion and the supernatural. His work suggests that beliefs in the supernatural compromise

rational thinking and that fostering critical thinking skills is essential for overcoming biases and achieving a more accurate understanding of the world (Stanovich 2016: 23—34).

Stanovich highlights the significance of the Nobel Prize awarded to psychologist Daniel Kahneman in 2002. This prize was granted for Kahneman's pioneering work with Amos Tversky on judgement and decision-making, which laid the foundation for understanding how human judgement often relies on heuristic shortcuts that deviate from basic principles of probability. Kahneman and Tversky's research uncovered systematic errors in decision-making, known as cognitive biases, which are crucial to studying rational thinking. Their work demonstrates the practical consequences of these biases, such as reduced life satisfaction due to poor decision-making. Although their findings have significantly influenced psychology, conventional intelligence tests do not measure the cognitive traits that Kahneman and Tversky identified as crucial to rational thinking. This omission underscores the irony that the Nobel Prize was awarded for insights into human cognition that are not measured by conventional IQ tests. Stanovich's CART aims to bridge this gap by providing a comprehensive assessment of rational thinking, reflecting the cognitive skills that underlie rational decision-making and judgement (Stanovich 2016: 23—34).

Research also indicates that the inability to identify and deal with conflicting information, stemming from reduced analytic and open-minded thinking, may reveal the correlation between these cognitive styles and religious convictions. Logical thinking, characterised by critically analysing and evaluating information, is crucial for discernment, while actively open-minded thinking entails receptivity to diverse perspectives and ideas (Bronstein et al. 2018: 115).

Psychologists Shenhav, Rand and Greene conducted studies examining the relationship between intuitive thinking and belief in God. Their research, comprising two correlational studies and one experimental study, revealed that individuals with more intuitive and less reflective thinking styles are more likely to believe in God and do so with greater confidence. These findings held even when controlling for variables such as education, socioeconomic status, political orientation, cognitive ability and personality (Shenhav et al. 2012: 427).

The studies demonstrated that cognitive style predicts current beliefs and plays a crucial role in how these beliefs evolve over time. The researchers established a causal relationship between cognitive style and belief in God through an experimental study. By inducing mindsets favouring intuition or opposed reflection, they observed a significant increase in self-reported belief in God (Shenhav et al. 2012: 427).

The researchers proposed several explanations for the observed relationship. They suggested that general features of human cognition, such as tendencies towards dualism and anthropomorphism, may produce automatic judgements that support belief in God. Additionally, they posited that belief in God might provide easily accessible explanations for mysterious phenomena, appealing to those with more intuitive cognitive styles. The authors also noted the possibility of a feedback cycle, where belief in God reinforces the intuitive cognitive style that initially favoured the belief.

While acknowledging the compatibility of their findings with cultural theories explaining variability in belief in God, the researchers emphasised the significance of their work in linking a profound social phenomenon to more basic cognitive tendencies. Their research suggests that the way people approach everyday cognitive tasks may be reflected in their metaphysical beliefs about the nature of the universe, providing valuable insights into the cognitive underpinnings of religious belief (Shenhav et al. 2012: 427).

Intuitive thinking and logical fallacies influence the propensity to believe fake news, financial scams and pseudoscience. Mental indolence may affect our susceptibility to embracing false or misleading information. When individuals lack the motivation, ability, or contextual cues to override their intuitive beliefs in supernatural phenomena, they tend to persist in these beliefs. Those inclined to trust their intuition strongly may readily embrace paranormal beliefs, perceiving them as subjectively correct. Remarkably, acquiescent individuals may maintain these intuitions even when recognising their irrationality and falsehood (Pennycook & Rand 2019: 39; Ward & King 2020: 2).

In conclusion, the balance between intuitive and reflective thinking significantly impacts the formation and persistence of beliefs, particularly in the supernatural. Although intuitive thinking allows for quick decision-making and survival advantages, it is also prone to cognitive biases and errors. More effortful, reflective thinking promotes rational decision-making and critical evaluation of beliefs. Understanding these cognitive styles, cultural contexts and methodological assessment, such as through the CRT and CART, promotes more accurate and rational thinking. Educating individuals, especially children, in these cognitive processes can enhance their decision-making skills and resilience against irrational beliefs.

Mentalising and Cognitive Biases in Religious Belief

The intersection of cognitive science and religious belief offers profound insights into how mental processes shape human perceptions of the divine. This exploration draws on the work of psychologist Jesse Bering, who examined the connection between innate mental mechanisms and the formation of religious concepts. This research offers a framework to examine the persistence of spiritual beliefs.

Bering posed a provocative question challenging the notion of God as an autonomous entity (Bering 2012: 34—38):

> What if I told you that God's mental states are also products of your mind – that God is a sort of scratch on our psychological lenses rather than the enigmatic figure out there in the heavenly world that most people believe Him to be?

While questioning the supernatural basis of religious beliefs, this perspective acknowledges their profound psychological and social functions in providing comfort, moral guidance and social cohesion. However, it raises questions about the legitimacy of religious teachings presented as divine revelations, potentially undermining religious authorities. Critically, religious beliefs may be natural cognitive constructs rather than supernatural truths.

A primary cognitive process implicated in this hypothesis is mentalising – the ability

to attribute mental states to others. Social psychologist Ara Norenzayan argues that mentalising facilitates forming concepts of supernatural entities like gods by allowing people to perceive them as intentional agents with human-like thoughts and desires. Neuroimaging studies show brain regions associated with mentalising are activated when praying, suggesting believers engage in similar cognition when reasoning about gods as understanding people's minds (Norenzayan et al. 2012: 1).

Furthermore, Norenzayan highlighted an inverse relationship between mentalising deficits and belief in God. Individuals with autism spectrum disorders, who often struggle with mentalising, tend to exhibit lower levels of religious belief compared to neurotypical individuals (Norenzayan et al. 2012: 5). This underscores mentalising's significance in supporting the cognitive framework enabling supernatural beliefs.

In summary, research suggests that mentalising plays a vital role in forming and persisting religious beliefs across the lifespan. By attributing mental states to non-human entities, mentalising facilitates the conception of gods as intentional agents, making religious beliefs cognitively sustainable and cross-culturally pervasive. Although it challenges supernatural underpinnings, this perspective elucidates how evolved cognitive biases contribute to religions' enduring psychological and social resonance in human societies.

Cognitive Tendencies and the Attribution of Agency

This section explores how evolved cognitive tendencies contribute to the formation and persistence of religious beliefs, focusing on agency attribution and its role in shaping supernatural concepts.

Religious beliefs may arise as a by-product of cognitive tendencies to attribute agency to unexplained events. For example, a rustle in the bushes may be perceived as a predator, even if it is just the wind or a small animal. Such quick assumptions help survival by preparing individuals to react to potential threats, even if they are false alarms. This ‘hyperactive agency detection device,’ which helped our ancestors survive by detecting predators, now predisposes humans to perceive intentional agents behind natural phenomena (Atran 2002: 59—60; Audi 2014: 21—22).

Similarly, when something unexpected happens, people often attribute it to an unseen agent, as it fits within their cultural and cognitive frameworks. For example, unexplained phenomena like mysterious sounds or movements are often attributed to ghosts or spirits. Some people also interpret powerful and unpredictable natural events as the actions of a sentient being with intentions. For instance, in Greek mythology, lightning bolts were seen as thrown by Zeus, the king of the gods (Burkert 1985: 126).

This pattern of attributing agency to mundane and extraordinary events underscores a cognitive tendency to see intentionality and purpose behind the unknown. The innate propensity for agency attribution is a cognitive bias that can explain the tendency to believe in gods, spirits and other supernatural beings (Barrett & Trigg 2014: 9—12; Murray 2009: 52). The mental framework underlying beliefs in supernatural agents may contribute to creating a culturally constructed imaginary world populated by menacing creatures and religious symbols designed to safeguard against these perceived threats, such as demons being repelled by holy crosses.

Philosopher Victor Reppert disagrees with the view that religious beliefs are solely the result of cognitive biases. Instead, he posits that these beliefs are complex, deeply ingrained in human cognition and subject to rationalisation and theological elaboration. From Reppert’s perspective, religious beliefs provide a coherent and meaningful framework for understanding the world and human existence that naturalism, the view that everything arises from natural properties and causes, might not fully capture (Reppert 2009: 26—46).

Reppert's argument is not without potential fallacies and weaknesses. Complexity alone does not justify supernatural explanations without empirical evidence and his appeal to complexity might be seen as an attempt to bypass this need for evidence. Furthermore, his assertion that religious beliefs are rational responses to the world relies heavily on philosophical reasoning rather than empirical support, which may be seen as speculative.

There is also a risk of begging the question, as Reppert assumes the rationality of

religious beliefs to argue against naturalism. This circular reasoning does not provide a solid foundation for his argument. Additionally, his perspective might be criticised for anthropocentrism, assuming that human cognitive faculties are uniquely capable of perceiving and rationalising the supernatural while overlooking the possibility of human cognitive limitations and errors. The subjectivity inherent in Reppert's argument is another potential weakness. What one person considers a rational response might be viewed as irrational by another, weakening the universal applicability of his argument.

The French reformer John Calvin’s view also contrasts sharply with cognitive theories of agency attribution. He offers a theological explanation that roots this persistence in a divinely orchestrated participation in the divine life. Calvin argues that Christ’s incarnation and ascension are pivotal events that draw humanity into a transformative relationship with God (Canlis 2010: 1—5). This perspective resonates deeply with the Christian narrative of salvation, where divine agency is not distant but intimately accessible through the Holy Spirit.

Calvin's views primarily rely on theological and doctrinal premises. Although these views are coherent within a Christian theological framework, they may contain fallacies such as the appeal to authority, circular reasoning, confirmation bias, *non sequitur* and a lack of empirical evidence when examined from a more secular or scientific perspective. The fallacies and lack of empirical evidence do not necessarily undermine the theological validity of Calvin’s views for believers. Still, they are potential weaknesses when evaluated against cognitive theories of agency attribution.

Anthropomorphism and Cognitive Biases

> But mortals think that the gods are born as they are and have perception like theirs and voice and form. Yes, and if oxen or lions had hands and could paint with their hands and produce works of art as men do, horses would paint the forms of the gods like horses and oxen like oxen. Each would represent them with bodies according to the form of each.
>
> (Xenophanes, 560—478 BC, quoted by Burnet 1892: 115)

Cognitive biases can lead to the rapid transmission of religious beliefs across generations with minimal communication. Because humans share many intuitive beliefs, these biases often result in similar interpretations. Consequently, local traditions remain consistent and anthropomorphism is a common and widespread feature in religious representations (Boyer 1996: 84).

Anthropomorphism, from ἄνθρωπος (human being) and μορφή (form), describes the inclination to attribute human characteristics, behaviours and emotions to non-human or supernatural entities. This reflects our innate propensity to interpret the world using familiar, predominantly human-centric frameworks, making it more understandable and emotionally engaging. By viewing non-human beings through an anthropomorphic lens, individuals can interact with them in familiar ways, such as prayer, rituals and storytelling (Werblowsky 1987: 316).

Young children attribute life and mental states to almost all environmental stimuli. This pronounced anthropomorphism diminishes as they acquire more knowledge about non-human entities through experience, indicating an inherent tendency to anthropomorphise that is tempered by learning. Cognitive processes, such as the accessibility of egocentric or homocentric[15] knowledge and motivational processes like effectance[16] and sociality motivations, collectively influence the extent of anthropomorphism. This process includes an automatic base of anthropomorphic inferences that are later adjusted through more deliberate reasoning, suggesting an innate predisposition to employ anthropomorphic knowledge when reasoning about non-human agents (Epley et al. 2007: 869—871).

Cognitive scientists Konika Banerjee and Paul Bloom argue against the idea that cognitive biases, such as agency and anthropomorphism, arise spontaneously in individuals without cultural influence. Their research indicates that such biases

[15] Egocentric knowledge is understanding the world from one's own perspective, focusing primarily on personal viewpoints. Homocentric knowledge, conversely, centres on the collective human experience, considering what is important or meaningful to humanity as a whole.

[16] Effectance motivation is the drive to feel competent by mastering tasks and overcoming challenges. Social motivation is connecting with others, fostering relationships and a sense of belonging.

predispose humans to be receptive to religious ideas but are insufficient to produce religious beliefs. Cultural traditions, teachings, practices and social interactions are crucial in shaping an individual's religious beliefs (Banerjee & Bloom 2013: 7—8)

Anthropomorphism strengthens religious narratives and cultural identity. By attributing human traits to gods and spirits, stories become more memorable, aiding the transmission of beliefs across generations. This approach enhances social cohesion by linking supernatural beings to human morality, encouraging adherence to ethical codes. Moreover, anthropomorphism is an adaptive mechanism that helps individuals predict and cope with unpredictable events by framing them within familiar human-like intentions. This cognitive strategy reduces anxiety and fosters a sense of control.

Although anthropomorphism renders supernatural beliefs more accessible and intuitive, it can impede critical analysis and perpetuate misconceptions about the nature of non-human phenomena. Attributing human-like intentions to non-human entities often leads to unwarranted generalisations and flawed judgements, such as the false cause fallacy, wherein adherents impute human-like motivations and actions to deities based on perceived patterns and coincidences. For instance, one might erroneously interpret natural disasters as divine retribution. This anthropomorphic projection elucidates the tenacity of religious beliefs, as it taps into fundamental aspects of human cognition that prove challenging to override (Wildman 2017: 38).

The dependence on anthropomorphism prompts questions about the essence of religious belief and experience. If cognitive biases substantially shape belief in gods, religious experiences and beliefs could be understood as products of the human mind and its psychological processes rather than as evidence of interactions with a supernatural or divine being. In his seminal work, The Essence of Christianity, the nineteenth-century German philosopher and anthropologist Ludwig Feuerbach argues that human beings created the idea of God by projecting their own best qualities onto a divine being. The essence of God is thus merely a reflection of human nature projected onto a celestial screen (Feuerbach 2008: 38, 118).

Christian theology endeavours to eliminate anthropomorphism to prevent idolatry and enhance the understanding of the divine as mysterious and unique. This process is integral to the broader aim of refining and deepening religious thought and practice. However, certain anthropomorphic elements persist. The ultimate residual anthropomorphism lies in the theistic conception of God as personal, contrasting with an impersonal divine entity. Verbal imagery, even when metaphorical, preserves fundamental anthropomorphic characteristics: God as father, mother, lover, king, shepherd and judge and the attribution of human emotions such as love, hate, desire and anger (Werblowsky 1987: 317).

A radical approach to eliminating anthropomorphism asserts that no adequate statements about the divine are possible in human language. Mystical traditions often emphasise the ineffable nature of the divine, leading to the assertion that human language and concepts are inadequate for describing God. This view, known as apophatic or negative theology, maintains that the divine transcends all human categories and descriptions. Mystics such as Dionysius the Areopagite, Eckhardt, Boehme and the author of The Cloud of Unknowing discussed a ‘hidden godhead’ and 'divine darkness' wherein the true nature of God remains hidden from human comprehension (Werblowsky 1987: 317).

Notwithstanding official disapproval, the concept of a physically humanlike God has endured. For instance, in the late nineteenth century, F. W. Newman, a classicist and religious rationalist, republished a poem that had been sent to him. The poet contemplates death, the soul's solitary journey and the manifestation of God's dominion in nature. However, he finds natural evidence insufficient and yearns for a more tangible, personal encounter – specifically, to behold a face (Guthrie 1993: 181):

> No! let me gaze, not on some sea far-reaching
> nor star-sprent sky,
> But on a Face in which mine own, beseeching,
> May read reply

Traditional theology attempts to purge facile anthropomorphism while avoiding the

radical purging that might lead to mystical silence[17] or atheism. The religious dilemma can be summarised thus: Can one pray to a non-anthropomorphic deity? This question addresses fundamental aspects of how believers perceive, relate to and interact with the divine. It highlights the tension between maintaining God's transcendence and ineffability and preserving faith's personal, relational aspects that render it meaningful (Werblowsky 1987: 320).

Core Ontological Confusions

Core ontological confusions refer to cognitive biases that lead individuals to mix fundamental categories of understanding about the world, such as the distinctions between mental and physical phenomena, animate and inanimate objects and living and non-living entities. A vital aspect of these confusions is the misattribution of mental properties to physical objects. This involves attributing intentions, desires and emotions to non-human entities and inanimate objects, leading to the perception that these entities have mental states akin to humans. For instance, a person might believe that a cat acts out of spite or jealousy when it knocks something off a table, assuming the animal has complex emotional states akin to those of humans or that a storm harbours malevolent intent (Williams et al. 2024: 18074). Core knowledge confusions are a cognitive basis for biases such as teleology and anthropomorphism.

Individuals experiencing ontological confusion often interpret metaphors as literal truths. This confusion arises from mistakenly applying concepts from one realm of reality, such as living beings, to an unrelated realm, like inanimate objects. These confusions support supernatural beliefs by providing a cognitive foundation that makes such beliefs more intuitive and relatable. The misattribution of mental properties and the blurring of categorical distinctions align closely with how supernatural concepts are structured, making them cognitively accessible and easier to maintain (Betsch et al. 2020: 4).

[17] Throughout church history, some individuals have emphasised the limitations of our capacity to speak confidently about God and celebrated the nobility of silence in the presence of God's ineffability. Dionysius the Areopagite, for example, stated, 'In relation to the divine, negations are true, while affirmations are inadequate'. Apophatic silence is thus portrayed as a way to honour God's mysterious otherness (Willimon 2024: 1).

Core ontological confusions manifest in various ways, each blurring the boundaries between mental and physical realms. For instance, conceptualising the mind as having physical properties underpins beliefs in an afterlife where consciousness persists in a tangible form. Similarly, attributing animate qualities to inanimate objects fuels beliefs in spirits inhabiting physical spaces. Psychokinesis, the notion that thoughts can directly influence physical outcomes, exemplifies the conflation of mental and material domains. Animistic beliefs, wherein inanimate objects and natural phenomena are imbued with consciousness or spiritual essence, further illustrate this cognitive tendency. These confusions align with innate human cognitive patterns, rendering supernatural beliefs intuitively plausible and readily acceptable (Lindeman et al. 2015: 65).

The narratives associated with supernatural beliefs often necessitate a fusion of mental and physical attributes. Core ontological confusions provide the cognitive scaffolding for such narratives, facilitating belief in phenomena that contradict known physical laws. This cognitive framework makes accepting concepts such as miracles, divine interventions and magical occurrences easier. By blurring the demarcation between the mental and physical realms, these confusions create a cognitive environment conducive to supernatural beliefs, allowing them to take root and persist within individual and cultural worldviews (Svedholm et al. 2010: 254).

Cognitive psychologists Lindeman, Svedholm-Häkkinen and Lipsanen investigated the hypothesis that mentalising abilities contribute to cognitive biases underpinning supernatural beliefs. Their study explored various dimensions of mentalising, including self-reported affective and cognitive empathy (mind reading), actual empathic abilities, hyper-empathising and two specific cognitive biases: core ontological confusions and promiscuous teleology (Lindeman et al. 2015: 63—76).

The findings provided limited support for the notion that mentalising abilities lead to supernatural beliefs via cognitive biases. The direct association between mentalising abilities and supernatural beliefs was weak and not significantly mediated by the identified cognitive biases. Promiscuous teleology explained only a small portion of the variance in supernatural beliefs and core ontological confusions emerged as the most robust predictor. These results were consistent across different types of

supernatural beliefs, including religious beliefs, paranormal beliefs and belief in supernatural purpose (Lindeman et al. 2015: 63—76).

Cultural practices and traditions often bolster cognitive biases, weaving supernatural beliefs into the fabric of social and cultural contexts. Rituals, myths and religious teachings capitalise on fundamental ontological confusions, making supernatural beliefs integral to cultural identity and lived experience. As discussed in Chapter 1, the genetic fallacy, where an argument is accepted or rejected based solely on its origin, can entrench belief in religious narratives passed down through tradition and authority. People may accept these stories as accurate without critically examining them simply because they come from trusted religious sources (Scalambrino 2019: 160—161).

This reinforcement between cognitive biases, cultural practices and religious traditions creates a self-sustaining cycle. Supernatural beliefs become deeply rooted in societal structures, rendering them resistant to change and scrutiny.

In conclusion, cognitive biases, such as misattributing mental properties to physical objects and blurring distinctions between categories, underpin superstitious beliefs. These confusions provide a cognitive foundation that renders supernatural concepts intuitively plausible and relatable. By understanding the role of core ontological confusions in shaping religious and paranormal beliefs, researchers gain insight into the cognitive mechanisms that sustain these beliefs across various cultures and historical contexts.

Teleological Reasoning

Another cognitive bias contributing to individuals' inclination to endorse personal religious ideas in information processing is our reasoning about teleology and design. The following pages explore the intersection of teleology and religion, examining how teleological reasoning supports the resilience of religious belief.

Teleology, derived from the Greek word τέλος (telos), meaning 'end' or 'purpose', refers to the explanation of phenomena by the purpose they serve rather than by

postulated causes. In religion, teleology is significant because many religious beliefs involve the notion that life events, natural occurrences and the universe have an intended purpose or design, typically attributed to a divine being or higher power. This argument closely aligns with the religious belief in creationism.

Teleological reasoning is deeply rooted in human psychology and emerges early in childhood. This suggests an inherent cognitive bias towards seeing the world as purposefully designed. Research CSR posits that this bias underlies many religious beliefs. Studies have shown that children naturally attribute purposeful design to natural objects and artefacts, a tendency that continues into adulthood (Kelemen 2004: 295; De Smedt & De Cruz 2020: 198).

This cognitive predisposition influences modern-day belief systems by providing an intuitive framework through which individuals interpret their experiences. The persistence of teleological thinking into adulthood indicates that these early cognitive biases play a significant role in shaping and maintaining convictions throughout life.

From a historical perspective, teleological arguments have been central to theological and philosophical discussions about the existence of God. Classical philosophers like Aristotle saw nature as working towards predetermined ends, akin to an artist's work with a specific plan. This idea was extended by the thirteenth-century theologian Thomas Aquinas, who argues that the purposeful order in the universe pointed to an intelligent designer, i.e., God. These teleological arguments, also known as arguments from design, suggest that the complexity and order evident in nature imply the presence of a purposeful creator (Du Toit 2011: 3; Du Toit 1997: 161—162).

Expanding on the religious aspects of teleology, it is worth noting that religious teleology often includes the concept of final causes, where the ultimate reason for an event or entity's existence is seen as part of a divine plan. Such teleological beliefs can offer a sense of order and purpose, aiding individuals in coping with uncertainty and adversity by viewing their experiences as part of a larger, meaningful narrative (Guthrie 1993: 5; 16).

In Christianity, teleology is reflected in the belief that God's creation of the universe and human life has an ultimate purpose, including believers' salvation and eternal life. This perspective aligns with the notion that a divine plan or intention underpins the existence and workings of the cosmos. Christian eschatology exemplifies this teleological outlook, as does the commonplace phrase 'everything happens for a reason', often employed as a teleological explanation in religious contexts (Ward 2020: 105; Arp et al. 2019: 198).

The development of mechanistic science, particularly during the Renaissance and Newtonian eras, challenged the teleological worldview by explaining natural phenomena in terms of matter and motion without resorting to final causes or inherent purposes (Du Toit 1997: 155—156). This shift marked a significant transition in human thought, moving away from purpose-driven explanations towards empirical and observable causality.

Although this posed a challenge, Christian theology has historically been pivotal in inspiring scientific inquiry by promoting a view of the universe as an intelligible and ordered creation. This belief in a rational, divine creator who fashioned the cosmos with inherent laws and structure fostered an environment where early scientists felt encouraged to explore and understand the natural world. The concept of a universe governed by consistent principles aligned with the theological perspective of a coherent divine plan suggests that searching for these principles could be both a scientific and spiritual pursuit. This view proved crucial during the Scientific Revolution, with pioneering scientists like Johannes Kepler and Isaac Newton drawing upon their faith as a foundation for their scientific endeavours. These thinkers often viewed their work as a means of uncovering the elegant mechanisms underpinning God's creation, thereby deepening their understanding of the divine through rigorous study of the natural world (Tanzella-Nitti 1995: 589—590).

Highlighting this interaction reveals that cognitive biases toward teleological reasoning did not vanish with the rise of mechanistic science but instead found new expressions that bridged scientific inquiry and religious belief. This observation underscores the persistence of innate cognitive tendencies even as scientific understanding progressed. The endurance of teleological thinking demonstrates

how deeply ingrained these cognitive biases are in human cognition, adapting to new contexts rather than being entirely replaced by purely mechanistic explanations.

Teleology is not inherently fallacious but can lead to erroneous conclusions when misapplied in scientific or logical arguments. When applied judiciously, teleological thinking can be a valuable cognitive tool. However, its indiscriminate use, termed 'promiscuous teleology', is a logical fallacy that often leads to misconceptions about the natural world and flawed scientific reasoning (Kelemen & Rosset 2009: 139—143).

Cognitive developmental psychologists Kelemen and Rosset conducted two experiments investigating teleological reasoning in adults to explore this phenomenon further. Their findings revealed that such fallacious reasoning is often not eliminated by scientific education and is swayed by personal beliefs, including religious convictions. These results highlight challenges for science education, as teleological fallacies may impede the acceptance of scientific discoveries (Kelemen & Rosset 2009: 139—143). To avoid such fallacies, one must critically examine causal links and refrain from ascribing intentionality to natural phenomena without sufficient evidence.

This persistence of teleological thinking in adults, even among those with scientific training, suggests that cognitive biases continue to influence modern belief systems. Cultural reinforcement of religious beliefs can sustain teleological reasoning throughout life, impacting the acceptance and interpretation of scientific explanations that do not align with teleological perspectives.

Although the theory of teleology offers valuable insights, the theory of promiscuous teleology has attracted some criticism. As an alternative, cognitive psychologists Ojalehto, Waxman and Medin introduced relational-deictic teleology, characterised by teleological thinking about nature rooted in relational reasoning regarding perspectival connections among living entities and their environments. This perspective suggests that teleology is not merely an unreflective stance but can be sensibly applied to examine various features of local ecology. For instance, one can appreciate the relationship between birds and trees by understanding that trees are

suitable nesting places. The proposal of relational-deictic teleology indicates that teleological thinking can result in diverse perspectives extending beyond a singular agential viewpoint (De Smedt & De Cruz 2020: 194—195).

This proclivity for teleological thinking is also evident in some religious texts. The Bible, for instance, contains teleological assertions. It declares that God created the sun and moon to illuminate the Earth[18] and portrays the rainbow as serving the purpose of signifying the covenant[19]. Such passages reinforce the cognitive bias towards interpreting natural phenomena as purposefully designed by a divine agent (Schachner et al. 2017: 31).

Teleological thinking is a common cognitive tendency, but cultural teachings and developmental experiences can influence its expression and specific forms. The dynamic link between innate cognitive predispositions and cultural inputs strengthens the connection between teleology and religious beliefs. For instance, the persistence of teleological thinking in adults, even among those with scientific training, suggests that cultural reinforcement of religious beliefs can sustain teleological reasoning throughout life (Kelemen & Rosset 2009: 139—141; Schachner et al. 2017: 29—48; Gervais et al. 2011: 391—397).

These cognitive biases impact modern-day belief systems by shaping how individuals interpret and understand the world around them. The tendency to attribute purpose and intentionality to natural phenomena supports the maintenance of religious beliefs and can influence attitudes towards scientific explanations that do not align with teleological perspectives.

In sum, teleological reasoning is a fundamental aspect of human cognition that significantly contributes to the resilience of religious beliefs. Teleology aligns with many religious doctrines that posit a purposeful creator by providing intuitive

[18] Genesis 1: 16-18: ‘God made two great lights — the greater light to govern the day and the lesser light to govern the night. He also made the stars. God set them in the vault of the sky to give light on the earth, 'to govern the day and the night, and to separate light from darkness’ (Holy Bible translation 2011: 1).

[19] Genesis 9:13: ‘I have set my rainbow in the clouds, and it will be the sign of the covenant between me and the earth’ (Holy Bible translation 2011: 7).

explanations for the purpose and design behind natural phenomena and life events. Historical, cognitive and cultural perspectives all underscore the enduring relevance of teleological thinking in sustaining religious belief systems. Understanding the role of teleology in religion helps explain why religious beliefs endure across various cultures and historical periods, emphasising the subtle connection between human cognition and spirituality.

Conclusion

Examining cognitive foundations underlying religious belief provides significant insights into the endurance of faith across cultures and generations. This chapter discussed cognitive mechanisms such as agency detection, anthropomorphism, teleological reasoning and core ontological confusions that make religious concepts intuitively appealing and easily transmissible. These cognitive predispositions, shaped by evolutionary processes, offer a natural foundation for religious beliefs to develop and thrive.

However, cognitive tendencies alone do not fully explain the variety of religious expressions worldwide. Cultural, social and historical factors interact with these cognitive foundations, resulting in the diverse religious traditions observed in societies.

Understanding the cognitive basis of religious belief does not diminish the significance or meaning individuals derive from their faith. Instead, it offers a deeper appreciation of the connection between human cognition and spirituality. This knowledge can inform approaches to religious education and contribute to a more comprehensive understanding of human nature.

The cognitive perspective provides a valuable lens through which to examine the interaction between evolved human mental faculties and cultural expressions of faith. Recognising the deep-rooted cognitive foundations of religious belief allows a more comprehensive understanding of religion's role in human experience and its notable resilience amid changing societal landscapes.

This approach highlights how innate cognitive processes contribute to the formation and persistence of religious concepts across diverse cultures and historical periods. By analysing religion through this cognitive framework, researchers can gain a deeper appreciation of the links between mental mechanisms and the varied manifestations of faith. This perspective offers insights into why religious beliefs remain prevalent despite significant social and technological changes. It contributes to understanding religion as a cultural phenomenon and a product of fundamental human cognitive architecture.

1.4. Genetics and Neurobiology

> When genes were discovered late in the second millennium of the Christian era, they found a place already prepared for them at the philosophy table. They were the fates of ancient myth, the entrails of oracular prediction, the coincidences of astrology. They were destiny and determination, the enemies of choice. They were constraints on human freedom. They were the gods.
>
> (Ridley 2004: 249)

This quote illustrates genetic discoveries' profound impact on our understanding of human nature and free will, setting the stage for discussing the biological factors influencing religiosity.

Sociologists Bradshaw and Ellison argue that ‘all living organisms, even human beings, are the product of a unique interaction between the genes they carry, the temporal sequence of external environments through which they pass during life and random events.’ This perspective on human development can also be extended to understand the factors influencing religiosity (Bradshaw & Ellison 2009: 242).

In my literature review, I have thus far encountered mainly research on environmental influences, but a growing body of literature on biological factors deserves further scrutiny. In the study of genetic aspects, for example, researchers tested the religiosity of adult male twins in Minnesota. They concluded that genetics affects whether adults are religious. Although the men's religiosity changed as they

got older, the degree to which they were religious remained stable. The researchers concluded that genetics strongly determines religiosity (Koenig et al. 2005: 486). This suggests that although religious practices and beliefs may change throughout a person's life, a significant genetic component predisposes individuals to a certain level of religiosity.

In addition, a study of the 'Virginia 30,000'[20] concluded that although religious affiliation is mainly influenced by cultural factors, religious attitude and behaviour are affected by both genetic and environmental factors (D'Onofrio et al. 1999: 968)

Hormones and neurochemicals play a significant role in shaping human experience, including spiritual and religious perceptions. A prime example of this is oxytocin, a hormone well-known for its role in social bonding. Recent research has revealed that oxytocin also notably impacts spirituality (Van Cappellen et al. 2016: 1580).

In a study of mid-life adults, oxytocin administration increased some participants' levels of self-reported spirituality, positive emotions derived from meditation and belief in more significant meaning and purpose in life. This effect was still substantial a week later, suggesting that hormonal influences can have lasting effects on spiritual perceptions and experiences. Furthermore, researchers found that genetic differences affect an individual's susceptibility to oxytocin's influence on spirituality (Holbrook et al. 2015: 46—47).

The naturally occurring neurochemicals dopamine and serotonin have also been proven to affect religiosity in healthy brains. Even subtle changes in the function of both transmitters are associated with religiosity. One study in neurochemical research concluded that a combination of low serotonin and high dopamine levels is more likely to result in spiritual and mystical experiences, highlighting the substantial influence brain chemistry can have on an individual's religious experiences. Certain drugs that act on serotonin levels, for example, magic mushrooms, Lysergic Acid

[20] A mainly Christian Caucasian sample of 14,781 twins and their family members was obtained from the Twin Registry in Virginia in the United States of America.

Diethylamide (LSD) and ecstasy[21], may awaken spiritual awareness, mystical experiences, vivid images and religious trances (McNamara & Butler 2013: 226).

In addition to genes, hormones and neurochemicals, the brain's structure[22] affects how people experience reality. Specific brain structures are essential for expressing religiosity. Religious experiences intensify when those brain structures are stimulated and decline when impaired. The brains of people with temporal lobe epilepsy and schizophrenia, for example, often show abnormal function in these areas. Patients with epilepsy more often experience mystical visions, hallucinations of a supernatural being and religious experiences than the general population. Reports of spiritual experiences are also more frequent among patients with schizophrenia (McNamara & Butler 2013: 221—222). This suggests that abnormal activity in the temporal lobes can trigger profound religious experiences, offering a neurological explanation for some types of spiritual encounters.

These studies show that biological factors influence how people interpret and remember their experiences. Each brain uniquely experiences and interprets events, dreams and memories. ‘There is no single version of reality. Each brain carries its own truth’ (Eagleman 2015: 74). Similarly, each person's religious or spiritual reality is probably also unique.

As the interest in neurotheology developed, researchers examined the brain activity of devout individuals, such as Buddhist monks and Catholic nuns, during meditation or prayer. The findings indicated increased activity in the bilateral frontal lobes and reduced activity in the right parietal lobe when the monks and nuns reported experiencing 'total absorption' or 'oneness'. The diminished parietal lobe activity, linked to the absence of a sense of self in deep meditation and prayer, correlated with these findings (Newberg & Waldman 2009: 49—50). This neural pattern highlights how specific brain structures are engaged during profound spiritual

[21] Common names for Psilocybin, Lysergic Acid Diethylamide and 3,4 Methylenedioxymethamphetamine (MDMA).

[22] "The most important regions of the brain for studies of religious expression appear to be a circuit linking up the orbital and dorsomedial prefrontal cortex, the right dorsolateral prefrontal cortex, the ascending serotonergic systems, the mesocortical dopaminergic system, the amygdala/hippocampus, and the right anterior temporal lobes" (McNamara & Butler 2013: 277).

practices.

Not all spiritual practices manifest in the same manner. Nuns using words in prayer exhibited heightened activity in the subparietal lobes associated with language processing compared to Buddhists, favouring visualisation over verbal expression. Researchers theorised that these changes were related to the feelings of 'surrender' and 'connectedness with God' experienced during intense prayer practices. The various states of union with God, the universe, or the loss of self or time were viewed as neural states that could be cultivated (Newberg & Waldman 2009: 49—50).

Additionally, as neuroscientists could link measurable temporal and parietal lobe activity to religious experiences, both intense and meditative, generic religious interests seemed to have neurological foundations. Although the discovery of notable neural correlates was not groundbreaking, it was noteworthy that practised Buddhist meditators had thicker cortexes in attention-associated brain regions. These observations are not unique to religious experiences; similar findings were made for non-religious activities, such as the study on London taxi drivers with a larger posterior hippocampus, attributed to their extensive spatial knowledge (Griesbauer et al. 2021: 3—20).

The biological factors discussed thus far provide valuable insights into the neurological foundations of religiosity. However, these findings must be considered within a broader context. Neuroscientists identified blood flow patterns or electrical activity, explaining human beliefs and behaviours, but geneticists found similar information in the genome. Evolutionary biologists and psychologists explain these phenomena through natural selection, psychoanalysts through the role of the conscious and unconscious, anthropologists through cultural development and norms and sociologists through patterns and structures of human association.

Although each explanation held merit and some were accurate, being correct did not imply exclusivity. Spiritual experiences result from brain activity, genes, evolutionary history, education, cultural practices, socio-economic circumstances and metaphysical beliefs. Humans can be described and understood in various ways but cannot be reduced to a single description (Malcolm 2003: 101—122).

The biological factors influencing religiosity, from genetics to brain structure and neurochemistry, offer compelling insights into religion's resilience. These findings indicate that religious experiences and beliefs are deeply embedded in our biological nature, which may help explain the lasting presence of religious phenomena across cultures and throughout history. These biological influences combine with environmental, cultural and personal elements to shape religious experience and belief.

Conclusion

Understanding the cognitive and biological factors underlying religious beliefs can significantly enrich academic discourse. Such insights elucidate the mechanisms that shape and reinforce belief systems and carry profound implications for broader societal contexts.

Shedding light on these cognitive processes paves the way for more informed public dialogue, fostering critical thinking and resilience against misinformation. Moreover, these findings offer a foundation for future research exploring how these cognitive phenomena intersect with other domains, such as politics, education and science.

As the discussion shifts to scientific inquiry, examining how the cognitive processes underlying religious beliefs influence the scientific approach is important. Although religion often draws on intuition and cultural traditions, scientific inquiry demands a rigorous, reflective engagement with evidence and reasoning.

Understanding the cognitive biases that contribute to the resilience of religious beliefs provides the tools needed to recognise and address similar biases in scientific reasoning. By exploring the foundations of scientific inquiry, it becomes possible to appreciate the contrasts and overlaps between these two modes of understanding the world. This lays the groundwork for a deeper exploration of how human cognition shapes perceptions of reality.

Chapter 2

Scientific Paradigms and the Limits of Knowledge: Implications for Religious Belief

The connection between science and faith continues to spark discussion, especially in an age where scientific breakthroughs constantly alter our perception of the cosmos. Even as scientific knowledge progresses, religious convictions endure as a robust and profoundly ingrained facet of human existence. This chapter seeks to explore the dynamics between scientific inquiry and religious belief, focusing on the scope and limitations of the scientific method, the rise of pseudoscience, criticisms levelled against science, the philosophical implications of quantum mechanics and the emerging field of astrobiology.

The first section of the chapter examines the scientific method, highlighting its role as a systematic approach to understanding the natural world. It underscores the significance of empirical observation, experimentation and the iterative nature of scientific progress. While recognising that science has achieved remarkable success in explaining natural phenomena, this section also addresses the inherent limitations of the scientific method, particularly in grappling with questions of meaning and existence that lie beyond the empirical realm.

Following this, the chapter turns its attention to pseudoscience, a phenomenon that often mimics the appearance of legitimate science but lacks its rigorous methodological foundations. This section discusses the criteria that distinguish science from pseudoscience and explores the psychological and social factors contributing to the persistence of pseudoscientific beliefs. The dangers posed by pseudoscience, especially when it masquerades as credible knowledge, are considered in the context of public understanding and policy.

The chapter then moves to criticism against science, addressing the scepticism that has increasingly infiltrated public discourse. This section examines the reasons behind the growing distrust of scientific authority, from historical instances of scientific misconduct to the perceived alignment of science with political and

economic interests. The replication crisis, the impact of financial pressures on research and the ethical challenges within the scientific community are all explored to provide a balanced view of the strengths and vulnerabilities of scientific practice.

The section on quantum mechanics discusses one of the most profound shifts in scientific thought. Quantum mechanics challenges the classical notions of determinism and certainty, introducing a world of probabilities and uncertainties at the subatomic level. This section explores the philosophical implications of quantum theory, particularly its impact on our understanding of reality and the limits of scientific knowledge. It also reflects on how the indeterminacy of quantum mechanics leaves room for metaphysical and religious interpretations of the universe.

Finally, the chapter considers the implications of astrobiology, a field that pushes the boundaries of our understanding of life and the universe. As scientists search for life beyond Earth, the potential discovery of extraterrestrial life poses profound questions for religious belief. This section discusses how such discoveries might challenge existing theological frameworks and how religion might adapt to new realities presented by astrobiological findings.

In conclusion, this chapter offers a comprehensive exploration of the relationship between science and religion, addressing both the power and limitations of scientific knowledge.

2.1. The Nature and Scope of Scientific Inquiry

> … we have a hunger of the mind which asks for knowledge of all around us and the more we gain, the more is our desire; the more we see, the more are we capable of seeing.
>
> (Mitchell 1896: 233—234)

In an era where scientific advancements have dramatically altered our understanding of the universe and our place within it, the persistence of religious

belief presents a paradox. Through its rigorous methods and empirical foundations, science has addressed questions that were once the preserve of religious doctrine. Yet, even with the explanatory power of science, religion remains a deeply rooted aspect of human experience. This resilience of religion raises questions about the nature of belief, the role of religion in society and the limitations of scientific understanding.

This chapter explores the reasons behind this resilience, examining the dynamics between science and religion, the psychological and social functions of religious belief and how religion has evolved to coexist with and sometimes challenge scientific perspectives.

Scientific Methods, Disciplines and Limitations

Science is a systematic method for understanding the physical world through empirical observation and experimentation. It builds a body of knowledge that is continually tested and refined. Scientific progress has enabled remarkable achievements, fostering widespread trust in its capabilities. We routinely rely on technologies like air travel, automobiles, GPS navigation and smartphones. Space exploration has taken us to the Moon, Mars and beyond. In medicine, scientific advancements have produced life-saving drugs, vaccines and treatments for previously fatal conditions (Singham 2019: 54).

Science encompasses diverse fields of study, broadly categorised into natural (or 'hard') and social sciences. Natural sciences include well-established theories like relativity, evolution, germ theory, plate tectonics, quantum mechanics and atomic theory. These fields typically involve controlled experiments with objective measurements and mathematical representations of results. Natural sciences seek to uncover fundamental principles of the universe, understand interactions among its elements and apply this knowledge to solve human challenges. The natural sciences aim to reveal the essential foundations of the universe, comprehend the dynamics among its components and employ this knowledge to address humanity’s challenges (Singham 2019: 2; Shermer 2013: 206).

Social sciences, including economics, psychology and sociology, are often termed 'soft' sciences. These disciplines study human behaviours, interactions and societal systems, presenting unique challenges. Unlike natural sciences, social sciences grapple with the difficulty of establishing universal laws due to the intricacy of human subjects. They often focus on subjective experiences, emotions and perceptions, leading to a greater emphasis on interpretation and qualitative analysis. Researchers in these fields face ethical and practical hurdles in conducting controlled experiments, limiting their ability to isolate variables and test hypotheses under stringent conditions. This complexity and variability in human subjects distinguish social sciences from their 'hard' science counterparts, necessitating different methodological approaches and interpretative frameworks (Pigliucci 2018: 289).

Protoscientific theories were early attempts to explain natural phenomena before the advent of modern scientific methods. Examples include Newton's interest in alchemy, the ancient geocentric model of the universe and the four humors theory of health and personality. Although often incomplete or inaccurate, these theories contributed to scientific thinking by stimulating curiosity and inquiry. They illustrate the evolutionary nature of human understanding and underscore the importance of empirical testing in advancing science (Pigliucci 2013: 17).

The line between protoscience and pseudoscience can be blurry, presenting challenges in scientific discourse. Although it is crucial to encourage unconventional perspectives, pseudoscientific ideas often mimic scientific concepts without empirical support or adherence to scientific methodology. Unlike protoscience, which can evolve into established science, pseudoscience is rejected by the mainstream scientific community due to its lack of rigorous evidence and failure to follow scientific principles (Shermer 2013: 216; Mahner 2013: 3).

Some efforts, such as theories of consciousness, the search for extraterrestrial intelligence, hypnosis, chiropractic and other alternative medical practices, can be classified as quasiscientific. They have some elements or attributes of scientific inquiry but only partially adhere to mainstream science's rigorous standards and methodologies (Shermer 2013: 206).

In science, there is more than one right way to use logic or one-size-fits-all language that we can use to understand everything. Different scientific fields use their specialised languages with other systems and ways of expressing ideas. As new areas of study develop, new languages are added, such as chemical symbols, calculus notation and artificial intelligence. All these different systems have limitations, but scientists can still communicate and progress by using other languages they create and agree upon (Peters 2020:1225—1232).

Science holds significant public attention and prestige and receives substantial government and private funding. The outcomes of scientific projects can potentially influence human welfare through favourable progress, but they also carry the potential for disastrous consequences. Therefore, we must understand the fundamental nature of science, its inherent epistemological principles, ethical considerations, limitations and influence (Pigliucci 2013: 3).

Assessing Scientific Credibility

> Unlike mathematical theorems, scientific results can't be proved. They can only be tested again and again until only a fool would refuse to believe them. I cannot prove that electrons exist, but I believe fervently in their existence. And if you don't believe in them, I have a high-voltage cattle prod I'm willing to apply as an argument on their behalf.
>
> (Brockman 2006: 55)

In a world that grows more complicated by the day, people must often form opinions on various subjects, many of which lie outside their education and training. Although personal judgement has value, the subtleties of many scientific theories require a deeper level of expertise. However, even this expertise is not immune to human fallibility.

Scientists, like all humans, are susceptible to cognitive biases such as confirmation bias, which can cause them to prefer evidence that supports existing beliefs and theories. Additionally, dominant cultural narratives and worldviews can influence the questions scientists ask, how they interpret data and even what research receives

funding. For example, research on using stem cells from embryos might face funding challenges in areas where religious opposition is strong, as funding bodies may prioritise projects that align with their ethical guidelines.

To counteract these potential biases, the scientific community depends on the consensus of experts, supported by the rigorous application of the scientific method. This process thrives on scepticism and peer review, ensuring that only well-substantiated insights prevail. By trusting the collective judgement of experts, particularly in fields requiring specialised knowledge, it becomes possible to navigate the noise of misinformation and arrive at more reliable conclusions. This approach allows people to benefit from the accumulated wisdom of the scientific community while acknowledging and mitigating the impact of individual biases.

Individuals can assess arguments from various perspectives and form their own judgements in certain situations. Still, many theories require expertise beyond the typical person's education and training, making the consensus among experts a more dependable criterion. This is where the scientific method assumes great significance. Scientists expected to exercise scepticism and rigorously examine one another's work, often subjecting it to intense and uncompromising peer review processes. By carefully evaluating the expertise of individuals, we can determine the genuine insights offered by science. Placing trust in the consensus of experts aids us in navigating through the noise and finding reliable information (Prothero 2013: 341—357).

Experimental experts and historical experts use different scientific research methods. Classical experimental research involves formulating and testing theories, often in controlled laboratory conditions. In agricultural biology, for example, classical experiments involve selective breeding of plants and animals to enhance desired traits. Developing high-yield crop varieties or breeding disease-resistant livestock often involves controlled experiments to test genetic hypotheses and improve agricultural productivity (Cleland 2001: 987—990).

Historical research cannot be entirely reproduced in a laboratory setting. It investigates the unobservable causes of observable phenomena like fossils and

archaeological artefacts. Historical scientists typically formulate multiple competing hypotheses concerning specific past events. The main focus of their research is to seek out a particular piece of evidence that distinguishes one hypothesis as a more plausible causal explanation for the observed clues, such as the notion that a colossal asteroid collision triggered the mass extinction of dinosaurs roughly 66 million years ago and compare it to other hypotheses (Cleland 2001: 987—990).

The type of reasoning often used in the scientific method is induction, which makes predictions about what may happen based on what we have seen many times. The theory of gravity, for example, predicts that objects that are not supported will fall towards the ground because we have repeatedly observed that objects that are not supported will fall towards the ground (Cleland 2001: 987—990). The problem with induction is that we cannot be sure that future events will happen in a certain way simply because of our past experiences and observations, irrespective of how many times we repeat and test our theory (Pigliucci 2013: 9).

In his efforts to distinguish science from non-science and pseudoscience, philosopher Karl Popper noted that proving a theory true is challenging, but it is easier to demonstrate that it is false. Falsificationism relies on the logical rule of '*modus tollens*,' where a theory is considered false if there is at least one counterexample – one instance where the theory fails. For example, if we hypothesise that all aluminium expands when heated but discover just one instance where aluminium does not expand, the theory is disproven. Although we might not be able to prove the theory is universally true, we can invalidate it by finding a scenario where it does not hold. If a theory can be shown to be false through contradictory evidence, it is deemed falsifiable and, therefore, scientific. According to falsificationism, if no evidence could disprove the theory, then the theory is not scientific (Popper 2002: 9— 18).

Although some contemporary philosophers support Popper's demarcation criterion of falsifiability for distinguishing science from pseudoscience and non-science, this approach has been criticised significantly. A fundamental critique is that numerous scientific theories are challenging, if not impossible, to falsify due to the difficulty in conceptualising evidence that could refute them. For instance, string theory posits

the existence of multiple universes, each with distinct properties, with our universe being just one among them. This hypothesis presents a significant challenge to falsifiability, as scientists currently lack the means to test predictions about other universes. Furthermore, some non-scientific theories may be falsifiable but still fail to qualify as scientific due to the absence of other essential characteristics inherent in scientific theories. Conspiracy theories, for example, often make testable claims but are generally devoid of robust empirical support and the capacity to generate reliable predictions. The lack of these critical elements disqualifies them from being recognised as scientific (Chalmers 2013: 82—96).

Physicist Sean Carroll proposes that abduction, or inference to the best explanation, offers a more robust approach to scientific inquiry than Popper's falsificationism. This method systematically evaluates competing hypotheses by accumulating evidence supporting the most plausible explanation for observed phenomena. Unlike falsificationism, which focuses on disproving hypotheses, abduction seeks to build a compelling case for the most promising explanations. The goal is not to achieve absolute certainty, often unattainable in science, but to strengthen confidence in a hypothesis to the point where reasonable doubt becomes increasingly challenging. This approach aligns more closely with how scientists work and scientific knowledge progresses. Abduction recognises that science is an iterative process of refining explanations rather than a binary process of proving or disproving theories. It encourages a more advanced view of scientific progress, where theories gain or lose credibility based on their ability to explain a growing body of evidence (Carroll 2016: 125).

In conclusion, although critical thinking and personal judgement are valuable, many scientific theories demand expertise beyond the average individual's scope. The scientific method – rooted in scepticism, peer review and rigorous evidence evaluation – is crucial for distinguishing reliable knowledge from misinformation. Scientists employ diverse methodologies, from classical experimentation to historical inquiry, to explore the natural world. Theories undergo continuous testing, challenge and refinement through processes like induction, falsification and abduction, driving the evolution of scientific understanding. By trusting the consensus of experts who build on these robust methods, people can navigate complicated issues with greater

confidence and clarity while maintaining a healthy balance between personal reasoning and deference to established scientific knowledge.

Distinguishing Science from Pseudoscience

> ... the foundation of morality is to have done, once and for all, with lying; to give up pretending to believe that for which there is no evidence and repeating unintelligible propositions about things beyond the possibilities of knowledge.
>
> (Thomas Huxley 1894: 146)

In a world inundated with information, distinguishing between science and pseudoscience is more important than ever. Pursuing rational inquiry lies at the heart of this distinction, serving as a beacon that guides us through the complexities of scientific assertions and spurious claims. Thomas Huxley's admonition to relinquish belief in unsupported claims underscores the moral imperative of engaging in rational thought, particularly when confronted with the allure of pseudoscience (Huxley 1894: 146).

This section discusses the process of differentiating legitimate scientific inquiry from pseudoscientific notions, exploring the foundational principles that underpin rational inquiry. It highlights the significance of understanding scientific methodologies, recognising logical fallacies and acknowledging the psychological and sociological dimensions that influence belief systems.

At the core of the scientific method lies the assumption that humans possess the discernment to distinguish between the rational and the irrational, especially when differentiating between legitimate science and pseudoscience. This endeavour requires a comprehensive grasp of scientific methodologies, limitations, logical fallacies, the psychology of belief and historical and sociological perspectives (Pigliucci 2013: 3).

Daily, we encounter legitimate scientific theories, pseudoscientific notions, and fraudulent assertions. Some intellectual circles disregard pseudoscience, presuming that specific ideas and theories are so manifestly false that they are unworthy of

consideration. However, pseudoscience is not a harmless pastime reserved for a niche group intrigued by mysteries; its consequences have wide-ranging implications. Understanding pseudoscience's philosophical, historical and sociological aspects is paramount in combating its detrimental effects and promoting a more rational and evidence-based approach to science and knowledge (Pigliucci 2013: 3).

Three critical criteria identify pseudoscience: it pertains to a subject within the broad purview of science (the scientific domain criterion) and lacks substantial reliability. It cannot be considered trustworthy in any sense (the unreliability criterion), and it is associated with a doctrine whose proponents strive to present it as the most credible knowledge in its domain (the deviant doctrine criterion). Pseudoscience often claims to be grounded in scientific principles or relies on mysterious or supernatural phenomena. Yet, it consistently lacks substantial evidence, theoretical rigour and the ability to provide precise and replicable predictions (Ladyman 2013: 55; Pigliucci 2013: 24).

Pseudoscientific beliefs include anachronistic thinking, reliance on myths, disregard for evidence, irrefutable hypotheses, undue emphasis on spurious similarities, reliance on storytelling over empirical evidence, interpretations that lean toward literary rather than practical foundations, resistance to revising beliefs, a penchant for shifting the burden of proof and a predisposition to favour a theory solely based on its novelty or audacity. Other examples are unvalidated assertions such as Holocaust revisionism, astrology, the Bible code, alien abductions, unidentified flying objects, Freudian psychoanalytic theory, reincarnation, angels, ghosts and extrasensory perception (Shermer 2013: 206).

Pseudoscience often centres on charismatic figures and networks that deviate from established scientific research methods. In contemporary society, conspiracy theories frequently target perceived hidden malevolent influences within political systems, healthcare, multinational corporations and scientific institutions. In an informed society, citizens should be equipped to distinguish between legitimate science and pseudoscience, enabling them to make well-reasoned decisions based on empirical evidence. This ability is particularly crucial when addressing issues in

healthcare, public policy and legal matters, as the acceptance or rejection of pseudoscientific claims can have far-reaching consequences (Ladyman 2013: 56 — 57; Mahner 2013: 35; Harambam & Aupers 2015: 471).

Distinguishing between science and pseudoscience starts with the initial assumption about a claim before conducting research. In science, the null hypothesis assumes a claim is invalid until proven otherwise. It places the burden of proof on the claimant, requiring them to provide substantial evidence for their viewpoint. If such evidence is lacking and there are no logical or theoretical contradictions to the claim's nonexistence, the most reasonable stance is to consider it non-existent (Shermer 2013: 218).

Pseudoscientists often employ fallacious tactics, such as shifting the burden of proof to sceptics rather than providing evidence for their claims. This logical error impedes meaningful debate and scrutiny. They also maintain vague and mutable hypotheses, making their ideas resistant to critical evaluation. While asserting bold empirical claims, they create loopholes to evade consequences when confronted with contrary evidence (Boudry 2013: 87).

Throughout history, pseudoscientific beliefs – including alternative medicine, climate change denial and conspiracy theories – have led to significant harm. Their superficial resemblance to legitimate science underscores the importance of scientific education and critical thinking skills. Combating pseudoscience requires distinguishing between well-established scientific findings and more speculative claims. It is crucial to recognise that some questions fall outside the realm of scientific inquiry. Although scientific methods can be applied broadly, it remains essential to uphold principles of logical inquiry and rational argumentation, even when exploring topics beyond traditional scientific boundaries. This approach acknowledges that not everything is entirely amenable to scientific analysis (Ellis 1994: 24).

A contributing factor to the enduring allure of pseudoscience is that medical science may not yet offer solutions for specific physical, mental, or emotional ailments, prompting some individuals to seek comfort in pseudoscientific remedies.

Additionally, pervasive scepticism towards scientists and the scientific establishment plays a significant role. This scepticism arises from past instances of scientific misconduct and the abuse of scientific knowledge, such as corporate influence on research. Such incidents blur the line between science and pseudoscience, leading people to perceive that both are driven by a quest for control over money and power (Ladyman 2013: 53—55). The following section explores how these criticisms have been directed against science, further complicating the public's understanding of its role and authority.

2.2. Hermeneutic Suspicion and the Rise of Scientism

Religion and science have undergone rigorous scrutiny in the evolving discourse on truth and knowledge. The late nineteenth and early twentieth centuries saw the rise of what philosopher Paul Ricoeur termed the ‘hermeneutic of suspicion’, a critical approach to uncovering the hidden meanings and underlying power structures within cultural and intellectual traditions. This method became particularly influential in the works of the 'masters of suspicion' – Karl Marx, Friedrich Nietzsche and Sigmund Freud – who applied it to religion, revealing the political, economic and psychological forces that sustain religious beliefs. These thinkers unmasked the ideological underpinnings of religion, portraying it not as a divine truth but as a construct that perpetuates specific power dynamics (Wuthnow 2009: 155—157).

Though initially applied to religion, Ricoeur's approach has since found resonance in science. Increasingly, once revered as the pinnacle of objective truth, science is being examined with a more critical lens as questions arise about the integrity and motives behind scientific inquiry. This growing scrutiny reflects a broader societal shift where trust in institutions, including science, is being reassessed. Historical events such as the development of nuclear weapons, the unforeseen environmental and health impacts of synthetic chemicals and unethical medical trials have prompted a more critical view of science's presumed impartiality (Wuthnow 2009: 155—157).

Although public confidence in science remains strong for many, modern challenges

like climate change, the COVID-19 pandemic and concerns over corporate influence on research have led some to question the extent to which political, economic and ideological pressures can influence science. While highlighting potential vulnerabilities, this critical examination also emphasises the importance of conducting science with transparency, rigour and ethical considerations.

The rapid dissemination of information and misinformation in the digital age has amplified public scrutiny of scientific claims. The complexities of emerging fields like genetics and artificial intelligence further complicate public understanding, sometimes leading to fear or mistrust. Additionally, the replication crisis in various scientific disciplines has raised questions about the reliability of research methodologies and peer review processes.

These factors, coupled with the increasing politicisation of scientific issues such as climate change and vaccine efficacy, have collectively fostered a more critical public stance towards scientific authority and practice. This shift challenges the scientific community to improve transparency, address ethical concerns and effectively communicate findings to a discerning public (Wuthnow 2009: 159—165). There is a growing perception that science's once-pristine purity may not be as flawless as it once appeared and that some published research may need to be revised.

The truthfulness of a research claim depends on several factors, such as the potential for bias, the number of similar studies and the balance between valid and false findings within a particular field. When multiple teams compete for statistically significant results in a field, the reliability of the outcomes may diminish. In contemporary scientific fields, these research findings may predominantly reflect the existing biases within those fields (Ioannidis 2022: 0696—0701).

Replicability is a strong foundation in science. It ensures that scientific knowledge is built on a solid base of reliable and consistent evidence. The inability to replicate scientific findings not only tarnishes the credibility and impact of scientific research but has also given rise to the term 'replication crisis', a phrase born out of mounting awareness following several high-profile replication failures (Pashler & Harris 2012: 531—536).

Unfortunately, scholarly journals often hesitate to accept studies that report failures in replication. A group of researchers who participated in an online survey exploring reproducibility in research said that they encountered resistance when they tried to publish their unsuccessful replication attempts. Editors and reviewers pressured them to minimise their comparisons with the original study. The respondents identified pressures to publish, selective reporting, inadequate laboratory replication and insufficient oversight contributing to reproducibility issues (Baker 2016: 452—454).

These challenges are exacerbated by competition for research grants and academic positions with time-consuming administrative tasks that reduce valuable research time. The consequences extend beyond individual research endeavours. When graduate students receive training in laboratories where senior members have limited time for mentoring and guidance, they may establish their own research groups without a solid model of practical training and mentorship practices to emulate (Baker 2016: 452—454).

For example, in July 2023, neuroscientist Marc Tessier-Lavigne resigned from his position as the President of Stanford University after an investigation revealed that some laboratories under Tessier-Lavigne's supervision had inappropriately manipulated research data and engaged in substandard scientific practices. This led to significant flaws in published scientific papers, including falsified data in Tessier-Lavigne’s Alzheimer’s Research. Tessier-Lavigne is the principal author of some investigated papers (Yang 2023).

Scientific integrity is a paramount concern in modern research, with growing apprehension about false findings and the pervasive influence of bias. Contemporary scientist John Ioannidis contends that some purported research findings are false, attributing this to factors including bias, financial interests and the pressure to publish significant results. Bias, a substantial issue, stems from a combination of design, data, analysis and presentation. This problem is often exacerbated by flexible research designs and selective reporting practices prevalent in many fields, resulting in published research findings that may merely reflect prevailing biases (Ioannidis

2022: 0696—0701).

The pressure to publish and the impact of financial interests contribute to the erosion of scientific integrity. Ioannidis argues that the likelihood of accurate research findings diminishes as financial and other vested interests in a scientific field increase. This observation underscores the issue of conflicts of interest, which can distort results and interpretations. Furthermore, gatekeeping within the scientific community can hinder the publication of dissenting opinions and reinforce conformity. Influential investigators may use their power to suppress findings that contradict their own, thereby perpetuating false dogmas within the field (Ioannidis 2022: 0696—0701).

The COVID-19 pandemic highlighted the manipulation of findings and the suppression of dissenting voices within the scientific community. The rush to publish COVID-19-related research led to expedited peer-review processes, often riddled with conflicts of interest, where established scientists with editorial influence could push their preferred narratives. This, coupled with the need for more data sharing, resulted in the dissemination of flawed or biased studies that were difficult to challenge or replicate. The misuse of preprints by the media further exacerbated the issue, allowing unverified findings to gain undue attention, thereby overshadowing more rigorous but less sensational research (Besancon et al. 2021: 1—18).

However, the pandemic also acted as a catalyst for positive changes, particularly in the adoption of ‘open science’ practices. The pandemic's urgency encouraged major publishers to make COVID-19 research freely accessible and prompted researchers to share preprints more systematically, fostering quicker dissemination of knowledge. Initiatives like OpenSAFELY[23] exemplify the benefits of increased collaboration and data sharing, contributing to a more cooperative and transparent scientific environment. The heightened scrutiny and feedback made possible by open peer-review processes helped improve the quality of research before formal publication (Besancon et al. 2021: 1—18).

[23] OpenSAFELY is a secure, transparent, open-source software platform for the analysis of electronic health records data: https://www.opensafely.org/

The ongoing scrutiny of religion and science underscores the importance of maintaining a critical and sceptical approach to all forms of authority. Just as the hermeneutic of suspicion revealed the power structures underlying religious beliefs, contemporary critiques of science expose the vulnerabilities within what was once considered an objective and unassailable field. Failing to ask critical questions and challenge those who present themselves as bearers of truth, whether in science, religion, or any other domain, risks falling prey to misinformation and fraud.

To address these challenges and restore scientific integrity, several steps are necessary. The scientific community must embrace transparency by encouraging open scrutiny of research findings, particularly by those outside established circles. Peer review processes need reform to ensure a more rigorous and unbiased evaluation of published research. Addressing conflicts of interest through more robust policies to identify and mitigate such conflicts in research and publication is crucial. Continued support and expansion of open science initiatives that foster collaboration, data sharing and reproducibility are essential. Finally, cultivating critical thinking by encouraging scepticism and critical analysis of scientific claims, both within the scientific community and among the general public, is vital.

Addressing these issues can help the scientific community restore integrity and ensure that research findings are more reliable and trustworthy. In an era where the integrity of information is increasingly under threat, embracing scepticism and rigorous scientific practices is not just advisable – it is essential for safeguarding the pursuit of genuine knowledge and truth.

Feyerabend's Critique of Scientism

Paul Feyerabend was an Austrian philosopher of science whose statements received mixed reviews in academic circles. In 1974, he commenced his speech entitled ‘How to Defend Society Against Science’ with these words (Feyerabend: 1975: 3):

> About a year ago I was short of funds. So I accepted an invitation to contribute to a book dealing with the relation between science and religion. To make the

> book sell I thought I should make my contribution a provocative one and the most provocative statement one can make about the relation between science and religion is that science is a religion. Having made the statement the core of my article I discovered that lots of reasons, lots of excellent reasons, could be found for it.

Feyerabend's views on ideologies, including science, reflect a profound scepticism towards any singular, dominating framework of thought. He argues that religious, political and scientific ideologies can be harmful if followed uncritically and rigidly. He emphasises the need to protect society and individuals from the overwhelming influence of any ideology, including science, which he controversially considers just another belief system (Feyerabend 1975: 5).

Feyerabend's critique extends beyond mere caution; he proposes a radical reframing of how ideologies are perceived. He suggests treating them as akin to fairytales – narratives rich with imaginative and exciting ideas yet also replete with inaccuracies and potential dangers. This metaphor underscores his view that ideologies can serve as ethical guidelines with practical utility, provided they are not adhered to with undue rigidity. This perspective challenges the often unquestioned authority granted to scientific knowledge, encouraging a more critical stance that recognises the value and limitations of science as an ideology (Feyerabend 1975: 7).

Central to Feyerabend's argument is that although ideologies might offer valuable insights, they invariably contain misleading falsehoods that can lead to dogmatism and societal harm if not viewed with a balanced perspective. His critique is not a wholesale rejection of science but a call for epistemic humility and pluralism. Feyerabend contends that the common belief in the inherent link between science, enlightenment and liberation from outdated modes of thinking is overly simplistic and potentially dangerous (Feyerabend 1975: 5—9).

Feyerabend acknowledges science's crucial role in challenging authoritarianism and superstition but argues that this historical contribution does not exempt it from scrutiny. He notes that many find his perspective absurd due to the widespread

association of science with progress and freedom. However, Feyerabend posits that even science, when treated as an absolute ideology, could contribute to new forms of dogmatism and control, thus necessitating a more balanced and critical approach (Feyerabend 1975: 9)

Feyerabend argues that the state plays a crucial role in upholding and amplifying scientific authority. He points out that scientific principles and reverence for scientific expertise are disseminated through public education systems, funded by all taxpayers regardless of their personal beliefs. In policy debates, he notes, the opinions of scientists often take precedence, while alternative approaches or traditional practices are frequently dismissed, even when they align more closely with public preferences (Feyerabend 1978: 87).

He provocatively challenges the status quo by asserting that publicly funded educational institutions should be directly accountable to the taxpayers who finance them rather than to the preferences of academic elites. He posits that if the majority of taxpayers were to express a desire for their universities to include unconventional subjects in the curriculum – even topics like Voodoo, folk medicine, astrology, or indigenous rituals – then these institutions would be obligated to offer such courses. This argument emphasises his view that public education should reflect the will of its funders rather than adhere solely to established academic norms (Feyerabend 1978: 87).

Feyerabend's views challenge the role of ideologies in society, advocating for an understanding that recognises their potential benefits while remaining vigilant against their inherent risks. This perspective encourages intellectual diversity and resists the temptation to elevate any single worldview – including scientific materialism – to unquestionable truth. In other words, if science is treated as the only source of truth and understanding, disregarding different ways of knowing or aspects of human experience, it can lead to a narrow and dogmatic view known as scientism. This perspective may ignore the complexities of certain phenomena that scientific methods, such as ethical, philosophical, or subjective aspects of human existence, may not fully capture. The caution here is against reducing the richness of human knowledge and experience solely to the lens of science without recognising the value

of other disciplines and perspectives.

Feyerabend's scepticism towards the unchallenged dominance of science as an ideology has elicited substantial criticism. His radical pluralism and comparison of science to fairytales have been accused of undermining scientific inquiry's objective and empirical nature. Philosophers of science argue that Feyerabend's relativism could engender an 'anything goes' mentality, potentially eroding science's credibility in addressing real-world issues (Sokal & Bricmont 1998: 78—85; Kitcher 2011: 140).

Although Feyerabend calls for epistemic humility, critics argue that his reluctance to recognise the practical superiority of science in explaining and predicting natural phenomena is flawed. They contend that his relativism fails to fully acknowledge scientific knowledge's cumulative and self-correcting nature, which, though imperfect, continues to be a powerful tool for understanding and enhancing the world. Although Feyerabend raises important questions about science's societal role, critics assert that his approach risks devaluing the methodological rigour and empirical foundations that set science apart from other ideologies (Sokal & Bricmont 1998: 78—85).

Furthermore, his critics highlight the potential ramifications that Feyerabend's opinions may have on public policy and education. If science is relegated to merely one ideology among many, pseudoscientific or non-scientific perspectives might gain undue influence in educational curricula and public discourse. Philip Kitcher, a prominent philosopher of science, warns that such a shift could precipitate a decline in scientific literacy and weaken the public's capacity to make informed decisions on critical issues (Kitcher 2011: 140).

Feyerabend's advocacy for pluralism and tolerance of diverse viewpoints holds merit. However, this should not undermine science's crucial role as a dependable and impartial method for comprehending the world (Kitcher 2011: 140). This critique bears particular relevance to the endurance of religion, underscoring the friction between scientific and religious worldviews in modern society. As we grapple with this tension, we must acknowledge how scientific progress has consistently challenged and refined our grasp of reality.

The Physics of Immortality

In 1994, the book *The Physics of Immortality: Modern Cosmology, God and the Resurrection of the Dead* (Tipler 1994) gained attention due to the author's credentials and a substantial marketing campaign. I do not recommend investing valuable time in reading the book, as it is a notable example of flawed arguments, fallacies, misleading claims and pseudoscience.

The author, F.J. Tipler, is a professor of mathematics and physics. He argues for the merger of science and religion, asserting that theology can be viewed as a branch of physics. By treating theology as a part of physics and assuming that life is immortal, physicists can employ calculations to infer the existence of God and the likelihood of resurrecting the deceased into eternal life, much like they calculate the properties of subatomic particles such as electrons. He suggests that the core principles of Judeo-Christian theology are valid and can be logically derived from our current understanding of physical laws (Tipler 1994: ix; 17).

In the introduction, he stated (Tipler 1994:1):

> This book is a description of the Omega Point Theory, which is a testable physical theory for an omnipresent, omniscient, omnipotent God who will one day in the far future resurrect every single one of us to live forever in an abode which is in all essentials the Judeo-Christian Heaven. Every single term in the theory – for example, “omnipresent”, “omniscient”, “omnipotent”, “resurrection (spiritual) body”, “Heaven” – will be introduced as pure physics concepts. In this book I shall make no appeal, anywhere, to revelation. I shall appeal instead to the solid results of modern physical science; the only appeal will be to the reader's reason. I shall describe the physical mechanism of the universal resurrection. I shall show exactly how physics will permit the resurrection to eternal life of everyone who has lived, is living and will live. I shall show exactly why this power to resurrect which modern physics allows will actually exist in the far future and why it will in fact be used. If any reader has lost a loved one, or is afraid of death, modern physics says: ‘Be comforted, you and they shall live again.’

Tipler introduces the term ‘Omega Point’ borrowed from Jesuit theologian Pierre Teilhard de Chardin (Teilhard de Chardin 2008: 257—272). While Teilhard de Chardin envisioned the Omega Point as the ultimate culmination of God's plan for creation in line with his Catholic faith, Tipler presents a mathematical framework, drawing on physics, cosmology and computation theory, to argue that the universe is evolving toward the Omega Point, which he equates with God (Tipler 1994: 239). Tipler asserts that he used theological terms like ‘God’ and ‘Resurrection of the dead’ to maintain clarity and consistency because, in a discussion on how physics can prove the existence of God and the resurrection of the dead, it would be impractical to adopt entirely new terminology. Adhering to the established, universally comprehensible meanings would be more rational (Tipler 1994: xiv). This equivocation allows Tipler to leap directly from his mathematical theory to a theistic theology.

He challenges the dominant atheistic viewpoint in the scientific community that regards religion as a remnant of a pre-scientific worldview. Although scientists generally lean toward the belief that theology will, in time, disappear from society, history has shown instances where seemingly discredited theories made surprising comebacks (Tipler 1994: 328). Tipler contends that his Omega Point theory is such an instance and that this is an opportune moment for scientists to reconsider the concept of God. The time has come to integrate theology into the realm of physics ‘to make Heaven as tangible as an electron’ (Tipler 1994: xv).

Tipler's Omega Point theory suggests that the universe eventually reaches maximum entropy, converging all matter and energy into a singular Omega Point. This point is envisioned as a repository of infinite information and intelligence capable of resurrecting past conscious beings. His theory blends physics, theology and technological revival elements, proposing a cosmic eschatology where the universe's evolution leads to preserving and reviving conscious entities, akin to the Christian concept of heaven. He writes: ‘if it could be shown as a physical fact that your emulation will be created in the far future to live in heaven forever, you should be comforted… it's you and not a mere replica, that will have immortality’ (Tipler 1994: 239).

By the time Tipler wrote this paragraph about the universe converging into the Omega Point, scientists had long embraced the opposite theory of the universe expanding. The study of the universe's expansion rate began in the 1920s through the research of Georges Lemaître, a Belgian Roman Catholic priest and physicist. Subsequent research uncovered the existence of dark energy, which further accelerates the universe's expansion. Extensive observations have consistently validated that the universe's ultimate destiny does not adhere to Tipler's vision of all matter and energy converging into a single point. Instead, it suggests a slow fade into a cold, dark continuum where nothing happens and nothing changes (Imran and Sajjad 2022: 42).

He stated that theology faces two potential fates: it is either deemed devoid of substance and destined to vanish, or it must eventually evolve into a subset of physics. If the existence of God is a reality, then God must either be an integral part of the universe or encompass the entirety of the universe. Physics, as a discipline, strives to comprehend the fundamental essence of the cosmos. Therefore, if God does indeed exist, physicists will eventually be able to prove it (Tipler 1994: 2).

His book attempts to bridge science and religion by suggesting that the Omega Point could be identified with God and the resurrection of the dead could be viewed as a scientific interpretation of religious ideas like the afterlife and divine judgement. Tipler appealed to Tillich's concept of God as the Ground of Being (Tipler 1994: 188) to argue that his Omega Point theory is like traditional Christian theology, but this is a false analogy. Tillich’s atypical idea of an abstract and impersonal God is different from the personal God of traditional Christian theology, which is rooted in the Bible and has been developed by theologians throughout the history of Christianity (Tillich 1951: 21).

Tipler writes that people want a personal God who demonstrates care and concern. The Omega Point represents a Personal Ultimate Reality responsible for our resurrection and the bestowal of eternal life upon us. The probability of the Omega Point's love for us is what leads to the gift of eternal life in a new Heaven and a new Earth. Hence, the ultimate reason for humans attaining eternal life in the Omega

Point Theory is the same as in the Judeo-Christian tradition: God's selfless love. Physics can serve as a basis for religion only if it demonstrates that God possesses a personal nature and that the existence of an afterlife is a definite outcome of physics. The Omega Point theory meets these requirements and can serve as a cornerstone for all human religions (Tipler 1994: 327; 5; 14).

His assertion that our ultimate ancestors were self-replicating patterns in metallic crystals challenges conventional biological origins and suggests that life is not tied to specific materials but to dynamic patterns that persist and adapt over time. In other words, life is essentially information preserved through a process resembling natural selection (Tipler 1994: 125).

He also draws an analogy between computer programs and the medieval Christian notion of the soul, suggesting similarities in their immaterial nature. A computer program is an immaterial sequence of integers; the soul (as Aquinas and Aristotle defined it) is the body's intangible, substantial form. A human soul requires a physical body to engage in thinking and experiencing emotions like a computer program that needs a physical computer to operate. The argument concludes that because a computer program is like a human soul in some way, a machine (for example, an automobile) should be considered alive (Tipler, 1994: 127). This false analogy erroneously assumes that a few similarities between a computer program and a human soul imply they are identical in all aspects, especially in the vital attribute of being alive.

This reasoning is flawed because there are significant differences between a computer program and a human soul. First, human souls are immaterial and spiritual according to many philosophical and religious traditions. On the other hand, computer programs are entirely material, consisting of code and data stored on physical hardware. Second, although a computer program can perform complex functions and computations, it does not possess life in the biological or philosophical sense. It lacks consciousness, self-awareness, independent thought and agency capacity. Third, human souls are often associated with moral agency, consciousness and pursuing values and meaning. By contrast, computer programs are tools humans create for specific tasks without intrinsic moral or existential purpose. The

argument does not provide a sound basis for concluding that a machine is alive. It is essential to distinguish between symbolic or analogical comparisons and the fundamental differences between the nature of computer programs and the concept of life, as understood in biology and philosophy (Ellis 1995: 2).

Tipler quotes Dawkins' writings out of context to support his argument that Dawkins endorsed the idea that life is ‘information preserved by natural selection’. In ‘The Blind Watchmaker’, Dawkins used the analogy between design in living organisms and human-made objects to demonstrate that both can be explained by natural processes, even though one is a product of human intelligence and the other of evolution. In an analogy, he treated manufactured objects like computers and cars as biological, applying evolutionary biology principles to understand their complexity and functionality, regardless of their non-biological origin. This supported his argument that natural processes can explain the apparent design in the natural world, eliminating the need for a supernatural creator or designer (Dawkins 1986: 1). He did not assert that computers and cars are living entities. Tipler’s conclusion that a car is alive serves as a *reductio ad absurdum* of his method of argumentation (Ellis 1995: 2).

In ‘The Selfish Gene’, Dawkins argues that the processes of natural selection act on genetic information that resulted in the adaptation and diversity of life forms we observe today. In this context, he discussed how life, in its various forms, can be seen as a product of information (genetic information) preserved and modified over time through natural selection. However, although physics plays a fundamental role in describing the underlying laws and forces of the universe, the study of life involves more than just the physical aspects. Biology, for example, explores the complexity of living organisms, their structures, functions and behaviours, which cannot be fully explained by physics alone (Dawkins 1976: 17). When Tipler writes that Dawkins regarded information as life, he misquotes Dawkins. This misrepresentation bolsters Tipler's claims but does not accurately reflect Dawkins' views.

Tipler called his mathematical theory a theistic theology and, throughout the 528-page book, declares that Omega Point is a loving God who will ensure that all people live forever. Then, towards the end of the book, he made this surprising statement

(Tipler 1994: 305):

> I am at present forced to consider myself an atheist… I do not yet even believe in the Omega Point. The Omega Point Theory is a viable scientific theory of the future of the physical universe, but the only evidence in its favour at the moment is theoretical beauty, for there is as yet no confirming experimental evidence for it. Thus scientifically one is not compelled to accept it at the time of my writing these words. But of course I also think the Omega Point Theory has a very good chance of being right, otherwise I would never have troubled to write this book. If the Omega Point Theory is confirmed, I shall then consider myself a theist.

Fellow physicist George Ellis writes that the entire discourse appears to be a form of play up to this point in the book. This performance guides optimistic readers into the innocent assumption that the author genuinely means what he writes. Ellis criticises Tipler's book as full of fantasy, absurdity and extravagant claims beyond the scope of science. It presents a flawed and pseudoscientific perspective built on improbable assumptions, claims that lack empirical evidence and fallacious arguments. Tipler misuses analogies and misquotes other authors to support his ‘own special branch of physics’. The fact that a professor of mathematics and physics published this not only undermines the credibility of science but also undermines the efforts of those committed to the ongoing debate on the intersection of science and theology (Ellis 1995: 2—3; Tipler 1994: x).

This may be another reason why religion endures: for those who honestly seek scientific evidence for their religious beliefs, there are pseudoscientists who will provide such ‘proof’.

2.3. Scientific Advances Reshape Religious Perspectives

This section explores the profound implications of scientific progress on our understanding of reality and the resilience of religious belief. As scientific theories evolve and expand, they often challenge long-held assumptions, leading to paradigm

shifts that reshape our worldviews.

One of the most striking examples is quantum mechanics, which has revolutionised how scientists understand particles' behaviour at atomic and subatomic scales. This theory has not only transformed physics but has also raised philosophical questions about the nature of certainty, determinism and the limits of human knowledge. As science pushes the boundaries of understanding, these developments prompt reflection on the relationship between science and religion, highlighting areas where the two intersect and diverge. Furthermore, exploring life beyond Earth, particularly in fields like astrobiology, introduces new questions about humanity's place in the cosmos and the potential for religious doctrines to adapt to a universe that may be far more diverse and populated than previously imagined.

Quantum Mechanics and the Limits of Scientific Certainty

Scientific progress often involves revising or expanding existing theories to better explain the natural world, leading to paradigm shifts in understanding. Quantum mechanics is a striking example of this process, introducing a revolutionary way of describing the behaviour of particles at atomic and subatomic scales. This paradigm shift has reshaped the understanding of the universe's nature and challenged fundamental assumptions about certainty and determinism in science.

Quantum mechanics provides a means to compute the characteristics and behaviour of physical systems and is commonly used for analysing tiny entities like molecules, atoms and subatomic particles. At its core lies the uncertainty principle, formulated by physicist Werner Heisenberg in 1927. This principle states that the more accurately one tries to measure a particle's position, the less accurately one can know its momentum and vice versa. This uncertainty is not due to a flaw in measurement tools or techniques but is a fundamental characteristic of these particles (Heisenberg 1958: 18).

The implications of the uncertainty principle extend far beyond mere measurement limitations. All measurable qualities of these particles are prone to unpredictable change. Even with extensive information about a system, it is impossible to predict

precisely how it will behave. Two identical systems might exhibit different outcomes under seemingly identical conditions. This inherent unpredictability represents a significant departure from the deterministic and predictable behaviour observed in the macroscopic world (Heisenberg 1958: 18).

Although quantum mechanics can accurately describe the probabilities of different outcomes and provide precise predictions about groups of identical systems, it usually cannot give reliable predictions about individual systems. This probabilistic nature starkly contrasts classical statistical theories, such as those used in weather prediction. In classical theories, uncertainties arise from incomplete knowledge of initial conditions and relevant variables. Quantum mechanics, however, incorporates inherent randomness and indeterminacy into the fundamental nature of the system itself. This intrinsic uncertainty is often described by concepts such as Heisenberg's uncertainty principle and wave-particle duality (Heisenberg 1958: 8).

The philosophical implications of quantum mechanics have sparked intense debates among scientists and philosophers alike. Albert Einstein, a key figure in the development of quantum theory, was deeply unsettled by the uncertainty principle's contradiction of critical philosophical ideas such as determinism and locality. He expressed concerns about the uncertainty principle and argued that even if it holds to a certain extent, quantum mechanics is not the complete picture. Einstein posited that deeper, hidden factors must influence the system, giving it only the appearance of being unpredictable and uncertain. His famous quote, ‘God does not play dice with the universe’, reflects his profound scepticism about the indeterministic nature of quantum mechanics (Heisenberg 1972: 81—82).

Einstein's resistance to the probabilistic interpretation of quantum mechanics highlights a crucial aspect of scientific enquiry: the tension between the desire for certainty and the limits of knowledge. This tension is particularly relevant to the study of religion and its resilience in the face of scientific advancement. Just as quantum mechanics challenges an intuitive understanding of the physical world, it also opens up space for philosophical and metaphysical considerations that science alone cannot fully address.

Although the fundamental principles established by Heisenberg and Einstein, such as the uncertainty principle and wave-particle duality, remain cornerstones of quantum mechanics, our understanding has evolved dramatically since their time. Modern research has deepened our grasp of quantum phenomena and spawned new interpretations and theories. The emergence of quantum information theory has been particularly transformative, bridging quantum mechanics with information science and opening up revolutionary applications. This synthesis has given rise to quantum cryptography, which promises unbreakable security protocols and quantum computing, with its potential to solve problems intractable for classical computers. Quantum mechanics now informs diverse fields beyond physics, from chemistry and materials science to biology and even aspects of cognitive science, demonstrating its far-reaching impact on our understanding of nature at its most fundamental level.

The uncertainty inherent in quantum mechanics is a reminder that even the most advanced scientific theories may not provide absolute certainty or complete understanding. This realisation has important implications for the dynamic between science and religion. It suggests that there may always be room for multiple interpretations of reality, including those offered by religious worldviews. The persistence of uncertainty and mystery at the frontiers of scientific understanding may contribute to the enduring appeal of religious and spiritual perspectives, which often provide frameworks for engaging with the unknown and the unknowable.

As scientific knowledge grows, it is important to recognise the limits of our understanding and the potential for new findings to alter our views. The way scientific advances and religious ideas influence each other keeps changing, mirroring the varied approaches to human curiosity and our ongoing search for purpose amidst life's uncertainties.

Astrobiology and the Future of Faith

As the boundaries of scientific understanding are pushed further, the implications for religious thought grow ever more profound. The discoveries and theories emerging from quantum mechanics, with their challenges to traditional conceptions of reality, have already begun to reshape how humanity views its place in the universe. In

parallel, astrobiology – a field dedicated to exploring the potential for life beyond Earth – presents a new frontier where science and faith intersect unexpectedly. The prospect of discovering extraterrestrial life raises questions about the nature of life and the resilience of religious belief in a universe that may be teeming with unknown forms of existence.

In 2015, the National Aeronautics and Space Administration (NASA) found itself at the centre of a dispute that shed light on the difficult balance between scientific research, religious beliefs and governmental financial support. The agency allocated a $1.1 million grant to the Center for Theological Inquiry (CTI) at Princeton University, sparking a legal challenge from the Freedom From Religion Foundation (FFRF), a non-profit organisation dedicated to maintaining the separation of church and state (Seidel 2017).

The FFRF's objection centred on the constitutionality of using taxpayer money for a project they viewed as implicitly promoting Christianity. The grant aimed to study astrobiology's societal implications, particularly how the discovery of extraterrestrial life might impact religious perspectives. Critics argued that the CTI's religious affiliations and the project's focus on theological responses to potential extraterrestrial life discovery violated the Establishment Clause of the First Amendment (Freedom From Religion Foundation 2016).

With the grant from NASA, the Center of Theological Inquiry hired ten Christian theologians, one spiritualist and one scientist. Their focus was to formulate a Christian response to scientific studies on morality, develop a new model of biblical interpretation, relate themes from First Corinthians to astrobiology, reconcile a potential astrobiology discovery with Christian theology, look at how astrobiology would affect the Christian doctrine of redemption; examine Christian ethics and Christian principles of human obligation; look at societal implications of astrobiology with theological ethics; and write a monograph on Christian forgiveness (Seidel 2017).

Although the FFRF's challenge highlighted potential constitutional issues, it also underscored the broader religious implications of the possibility of life elsewhere in

the universe. This concern is not new; as early as 1794, Paine questioned the compatibility of Christian doctrine with the idea of a plurality of worlds. He argues that the existence of multiple habitable worlds would render the Christian system of faith ‘little and ridiculous’ (Paine 1896: 48):

> Though it is not a direct article of the Christian system that this world that we inhabit is the whole of the habitable creation, yet it is so worked up therewith from what is called the Mosaic account of the Creation, the story of Eve and the apple and the counterpart of that story, the death of the Son of God, that to believe otherwise – that is, to believe that God created a plurality of worlds, at least as numerous as what we call stars – renders the Christian system of faith at once little and ridiculous and scatters it in the mind like feathers in the air. The two beliefs cannot be held together in the same mind and he who thinks that he believes both has thought but little of either.

The FFRF's view – that scientific progress should proceed without regard for its impact on religious beliefs – may face significant challenges if extraterrestrial life is discovered. Once confined to science fiction, some scientists increasingly see this possibility as a likely eventuality rather than a remote one.

The shift from 'if' to 'when' in discussions about encountering alien life is driven by various astronomical developments, particularly the accelerating rate of exoplanet discovery. Before the year 2000, astronomers had identified only thirty-one such exoplanets. By September 2024, this number had grown to 5,759[24], dramatically increasing the likelihood of finding evidence of life beyond Earth. As our observational capabilities improve, so does our conviction that Earth is not the sole potentially habitable world.

Although it would take tens of thousands of years to reach the closest exoplanet with our current technology, the possibility of discovering extraterrestrial life is a fascinating idea. It would be a watershed moment in human history, profoundly impacting our understanding of existence and potentially reshaping religious

[24] NASA Exoplanet Archive 2024: https://exoplanetarchive.ipac.caltech.edu/

doctrines. Organisations like the FFRF, which advocate for the separation of science and faith, may find these lines blurred by such a significant finding, as its implications would extend far beyond scientific circles to touch the core of human belief and identity.

Humanity's insatiable curiosity about our place in the cosmos has driven our quest for understanding from the earliest stargazers to the present day. Fundamental questions persist: Where are we? Who are we? Modern scientific inquiry has revealed our position on an unremarkable planet orbiting an ordinary star on the outskirts of a galaxy—one of countless others in a vast universe (Sagan 1995: 183). This perspective, humbling as it may be, showcases humanity's remarkable ability to develop and refine mental models of the cosmos.

Astrobiology, the study of life in the universe, investigates how life begins, where it can exist and how common it might be. NASA’s Astrobiology Program supports research into how life started and evolved on Earth, what makes other places in space suitable for life and whether there might be other habitable worlds and life beyond Earth. At the core of astrobiology lies another unresolved question: what precisely constitutes life? One might assume this question would have been resolved after centuries of study, at least for life on Earth. However, defining life grows increasingly challenging as we discover diverse lifeforms on our planet and consider the potential for life beyond Earth. A commonly used definition of life is ‘a self-sustaining system capable of Darwinian evolution’, but many more definitions circulate (Kaufman 2022; Voytek 2023).

Astrobiologists argue that a true understanding of the nature of life will only arise when we encounter a form that fundamentally differs from the DNA-based, carbon-dependent life known on Earth. This viewpoint highlights the significance of astrobiology in understanding the origins and principles of early life on Earth, as this knowledge informs the search for extraterrestrial life. The exploration of potential alien life forms could provide crucial insights into the core characteristics that define life, potentially revealing universal principles that extend beyond Earth's specific biochemistry. This approach brings attention to the limitations of Earth-centric definitions of life and emphasises the need for a broader, more inclusive framework

that can account for the potentially diverse forms of life across the universe. By expanding the search for life beyond familiar terrestrial paradigms, astrobiology seeks to uncover fundamental truths about the nature, origin and distribution of life in the cosmos (Kaufman 2022).

The question then arises: How can a person of faith reconcile the belief that humans are the pinnacle of God's creation with the reality that Earth is just one among billions of planets? The revelation of intelligent extraterrestrial life could prompt a profound shift in human self-perception, potentially leading believers to feel a sense of insignificance and triggering a re-evaluation of their faith. Some Christians, particularly those adhering to a literal interpretation of Scripture, may find it difficult to accept the possibility of extraterrestrial intelligence (Peters 2018: 14—20).

The discovery of extraterrestrial life could significantly impact religion by challenging and broadening theological perspectives. The doctrine of creation may need to expand to include the entire universe, recognising that God's creative work could extend beyond Earth to intelligent beings on other planets. This would require rethinking geocentrism and anthropocentrism, acknowledging that humanity may not hold a unique or superior place in the cosmos (Peters 2018: 14—20).

However, this paradigm shift could also lead to theological dissonance, where existing religious frameworks may be seen as inadequate to fully explain the new realities presented by the existence of extraterrestrial intelligence. Each discovery has gradually displaced humanity from the central stage of the cosmic narrative. For example, the James Webb Space Telescope[25] has provided groundbreaking observations that continually reshape our understanding of the cosmos and our place within it.

In conclusion, the discovery of extraterrestrial life could be a transformative event, not only for science but also for religion. Although some organisations advocate for a clear separation between science and faith, such a discovery could blur these lines,

[25] The James Webb Space Telescope was launched via rocket in 2021 and orbits the earth at approximately 1.5 million kilometres from Earth. It is designed to conduct advanced infrared astronomy, allowing observation of old, distant, or faint cosmic objects: https://science.nasa.gov/mission/webb/

as its implications would reach deep into the core of human belief and identity.

Conclusion

This chapter examines the interaction and challenges between science and religion when addressing questions beyond the scope of empirical inquiry. The scientific method's effectiveness in exploring the natural world is apparent, but its limitations also highlight why religious belief persists, even in an era of significant scientific progress. The examination of the scientific method showcases its unparalleled power in unravelling the mysteries of the natural world while highlighting its inherent limitations. These limitations become evident, particularly when addressing questions of meaning and existence that lie beyond the scope of empirical inquiry. Such boundaries explain the persistence of religious belief, even within an era deeply influenced by scientific progress.

Examining pseudoscience highlights how vital it is to uphold strict scientific standards. Pseudoscientific ideas often masquerade as genuine knowledge, attempting to answer questions that science has not yet resolved. This trend poses a significant risk to public understanding of scientific matters.

As discussed in Chapter 1, research suggests a link between intuitive thinking and stronger religious beliefs, while reflective thinking is associated with scepticism towards religion and greater acceptance of scientific explanations. This does not imply a strict divide but highlights how cognitive tendencies influence views on religion and science and the ability to identify pseudoscience (Stanovich 2016: 23—34).

Criticisms directed at science, particularly regarding its perceived alignment with political and economic interests, serve as a reminder that science, like all human endeavours, is susceptible to fallibility. The replication crisis and ethical challenges within the scientific community further illustrate the vulnerabilities in scientific practice, emphasising the need for continued scrutiny and reform to uphold the integrity of scientific inquiry.

The philosophical implications of quantum mechanics introduce uncertainty and indeterminacy, challenging classical notions of a predictable universe and blurring the lines between science and metaphysical speculation. By acknowledging the limits of scientific certainty, quantum mechanics permits the coexistence of multiple interpretations of reality, including those offered by religious worldviews.

As an emerging field, astrobiology extends the boundaries of understanding life and the universe, raising profound questions about humanity's place in the cosmos. The potential discovery of extraterrestrial life may challenge existing theological frameworks, yet it also presents an opportunity for religion to adapt and evolve in response to new scientific realities.

In conclusion, this chapter examines the various ways science and religion interact, revealing a challenging landscape where both address the fundamental questions of existence. As science broadens our understanding, it also reveals the limits of our knowledge, leaving space for the lasting questions that religion aims to tackle. Science and religion continue to engage in ongoing discussions, each shaping and testing the other's ideas. This back-and-forth helps us grasp more about the universe and our role in it.

Chapter 3

Myths, Narratives and the Evolution of Belief

Yale University started the Terry Lectures in 1905 with a donation from Dwight H. Terry, who specified that the funds should not be used for research but rather to continuously adapt Christian theology in response to emerging academic knowledge (Yale University):

> the object of this foundation is not the promotion of scientific investigation and discovery, but rather the assimilation and interpretation of that which has been or shall be hereafter discovered, and its application to human welfare, especially by the building of the truths of science and philosophy into the structure of a broadened and purified religion. The founder believes that such a religion will greatly stimulate intelligent efforts for the improvement of human conditions and the advancement of the race in strength and excellence of character. To this end it is desired that a series of lectures be given by men eminent in their respective departments, on ethics, the history of civilization and religion, biblical research, all sciences and branches of knowledge that have an important bearing on the subject, all the great laws of nature, especially of evolution . . . also such interpretations of literature and sociology as are in accord with the spirit of this foundation, to the end that the Christian spirit may be nurtured in the fullest light of the world's knowledge and that mankind may be helped to attain its highest possible welfare and happiness upon this earth.

One of the significant challenges society must confront is ignorance. The solution lies in instructing and deliberating upon religion and science in educational institutions and public platforms (Thomson 2009: 2—14). Extreme and combative voices have dominated discussions on science and religion, receiving extensive media attention. On one side, vitriolic atheists express disdain and on the other, religious extremists assert their agendas forcefully. This hostile climate fosters both those who vehemently reject spirituality and those who pose a threat to essential freedoms (Sacks 2014: 294). Recognising this issue, Terry advocated for a more respectful and empathetic approach where all viewpoints are considered and ideas

are exchanged without resorting to hostility or aggression.

This balanced perspective is crucial, as throughout history, humanity has consistently ventured into realms beyond the limits of our sensory perceptions. These explorations include the intangible realms of hopes, dreams, instincts, intuition, reflections on life after death, the elusive nature of spirituality and the workings of the human mind. Yet, a clear understanding of these matters remains elusive due to the human need to anchor certainty to sensory experiences (Menzies 2015: 2).

In those rare instances when an individual believes they have achieved the pinnacle of certainty, constructing a rational narrative of existence, such confidence is delicate and vulnerable to collapse with the slightest change in circumstances. Imagine a village convinced that sacrificing their children will appease the gods and ward off enemies – only to witness a tragedy unfold as invaders breach the walls, conquer and leave the population bewildered by the gods' supposed anger (Menzies 2015: 2). Hence, the perennial question persists: How does one derive meaning from their existence?

Perhaps, amidst the mystery of life, one could gain insight by considering myth as a template for comprehending the essence of one’s being. In this context, a myth is a narrative, possibly rooted in reality or symbolism, featuring primary characters that can be divine, human, or even animal. Such tales profoundly impact the believers, contributing to the significance and meaning of life, just as life lends meaning to the myth (Menzies 2015: 2—5).

The mythological cosmos and religions, both integral frameworks in shaping human understanding, share a common purpose in providing individuals with a cohesive narrative that combines elements of faith, imagination, reason and experience to navigate the complexities of daily life. A robust mythology, characterised by diverse characters and symbolic narratives, fosters a personal connection to the primal world within a community. Similarly, religion, as a system separate from other cultural institutions, focuses on belief in spiritual beings. It creates a deep link between people and the fundamental conditions of their existence. Myth and religion work

together to give life meaning and importance. They offer ways to understand both practical aspects of human life and matters beyond everyday experience. This helps people grasp the world more fully through spiritual practices and a sense of connection to the divine (Menzies 2015: 2—5).

Historian of religion Mircea Eliade asserted that our understanding, particularly religious experiences in this context, hinges upon the scale at which they are examined. In science, this principle highlights the importance of considering the scale or size of objects or processes when studying them. For example, could someone who studied elephants only under a microscope think they knew enough about elephants? (Eliade 1958: xi)

This aligns with Eliade's anti-reductionist stance, wherein he resists the inclination to simplify or dissect the minuscule elements within the physical realm, individual psychology and broader societal context. Within this framework, there exists no space for the conceptualisation of God because scholars deem it excessively abstract and impractical for empirical scrutiny. Consequently, the paradigm shifts from ubiquitously recognising God's presence to acknowledging God's absence. This philosophical standpoint transcends into social and political discourse, advocating for a perspective devoid of divinity for logical coherence (Eliade 1958: xi; Lombaard et al. 2019: 9).

In the context of religion, Eliade argues against reducing religious experiences to purely physiological (related to the body), psychological (related to the mind), or sociological (related to society) phenomena. Instead, he suggests that understanding religion requires looking at it in a broader, holistic way. For example, a religious ritual might have physiological aspects (like physical movements or sensations), psychological aspects (emotional and mental experiences) and sociological aspects (social interactions and community involvement). He calls for a more inclusive approach to studying religious experiences, recognising that they involve varied interactions, from individual experiences to societal practices (Eliade 1958: xi—xii).

In studying religion, scholars encounter many aspects such as rites, myths, divine

forms, sacred objects, symbols, cosmologies, theologoumena, consecrated individuals, animals, plants and holy places. Each of these is equally crucial for comprehending the religious phenomenon. All the definitions of the religious phenomenona Eliade considered have one thing in common: each has its way of showing that the sacred and the religious life are the opposite of the profane and the secular life (Eliade 1958: xi—xii).

This understanding is always intertwined with historical context. Every encounter with the sacred, or hierophany, is also a historical event. Even intensely personal and transcendent mystical experiences are influenced by the era in which they occur. For instance, the experiences of Jewish prophets were shaped by historical events and the religious history of Israel, providing a context to interpret their revelations (Eliade 1958: 3).

Though linked to historical and cultural contexts, revelations of the sacred often share a core meaning or importance that people can relate to. Some divine manifestations fulfil local needs, while others achieve global relevance. Eliade illustrates this concept through the transition from Semitic worship of Ba'al and Belit, deities of fertility, to the predominant veneration of Yahweh. The latter attained worldwide religious significance through Christianity (Eliade 1958: 4).

A shared characteristic among various world myths and religions is their foundational basis in a creation narrative. Some creation stories and theories are discussed below.

3.1. Creation Myths: From Chaos to Cosmos

Myths are stories or beliefs containing symbolic or metaphorical truths seen as untrue or fantastical. They are passed down through generations orally or in sacred texts and are essential to various cultures and religions, including Christianity, Judaism, Islam, Hinduism, Buddhism and animist traditions. The perception of whether a story is a myth or truth depends on one's cultural background. People from different religious backgrounds may regard each other's sacred stories as

myths. For example, Christians may see Native American or African stories as myths, just as animist or Hindu believers may view Christian stories, like the resurrection of Christ, as myths (Leeming 2010: xvii—xviiI).

Myths hold significance because they shape cultures and societies, often defining their identity and values. Some people take myths literally, while others interpret them as metaphorical or symbolic expressions of more profound truths about human psychology and culture. They may have originated as explanations for natural phenomena but hold psychological and metaphorical value to help us grapple with life's mysteries and meaning, serving as a way to express the inexplicable in symbolic forms (Leeming 2010: xvii—xviiI).

Cultural Contexts and Archetypal Patterns

Although myths are culturally specific, they share common themes and motifs when compared across different mythologies. These patterns, or archetypes, reveal shared human psychological tendencies. For example, the concept of resurrection in the story of Jesus can be seen as a familiar archetype, similar to other resurrection stories like Osiris or Persephone. Archetypes gain meaning through their cultural context and particulars. In essence, myths are stories with cultural and symbolic significance, providing insights into human psychology and how different cultures interpret and understand the world (Leeming 2010: xvii—xviiI).

Creation myths serve as cultural narratives that provide meaning and answers to fundamental questions about the world and humanity's place in it. They are shaped by specific societies' unique characteristics, experiences and values, making them essential tools for understanding the cultural, environmental and historical contexts in which they originate. For example, a society heavily reliant on agriculture might have creation myths that involve gods or beings related to the cycles of planting and harvest, cultures living in harsh desert regions may have creation myths that emphasise the struggle for survival in such conditions, a maritime culture might have creation myths that involve sea gods or sea creatures, reflecting their dependence on fishing and marine trade. Similarly, a society engaged in hunting and gathering may have myths featuring hunter deities or animal spirits. As societies advance

technologically, their creation myths may evolve to incorporate or explain these advancements. For instance, a culture that develops advanced metallurgy may include tales of celestial blacksmiths or forge-centric gods, such as Thor's legendary hammer, into its mythology (Leeming 2010: xix—xx).

Ex Nihilo Creation and the Eternal Creator

A recurring theme in creation myths centres on awakening consciousness and identifying primal ancestors and origins. As no one witnessed the initial moments of existence, narratives, metaphors and symbolic stories are used, drawing inspiration from real-life experiences such as birth, death, family and human imperfections. These creation myths are shaped by the cultural contexts from which they emerge, yet common patterns and motifs become apparent when they are compared across different cultures. One prominent motif, for instance, is the transformation from chaos to order, with creation symbolising the shift from disorder to a structured cosmos (Leeming 2010: 9—10).

The term ‘cosmogony’ aptly describes creation myths as narratives detailing the emergence of order from chaos. Within these myths is a category known as *ex nihilo* creation, characterised by a supreme deity existing within a void who consciously brings the universe into being. This concept is prevalent in monotheistic religions such as Judaism and Christianity but is not exclusive to them and can be found in other cultures (Leeming 2010: 9—10).

The concept of the *ex nihilo* creator may be traced back to ancient sky gods and natural elements associated with the heavens. These creators embody immense power, symbolising aspects like the sun and fertility. In the beginning stages of the *ex nihilo* myth, the creator is introduced in a precreative state, sometimes composed of multiple parts but always without a companion. For instance, the creator of the Mariana Islands, Na Arean, existed alone as a cloud in vast emptiness. Similarly, the Tahitian creator, Taaroa, akin to the Indian Purusha of the Rig Veda, was the universe itself from the outset. In Christian theology, the beginning was marked by

the Word, the Logos[26], representing the essence of a three-part God (Leeming 2010: 9—10). The ancient Egyptian god Ptah, dating back to 2700 BC, engaged in creation through the power of thought and naming, analogous to the concept of Logos. The Wapangwa community in Tanzania depicted the sky as vast and exceptionally transparent. The invisible force known as the Word could facilitate the genesis of one entity from another and control the atmosphere, the wind, trees and ants (Penprase 2017: 146).

The human mind inevitably fails in its attempt to imagine pre-existence. In the recurring myth of the *ex nihilo* creator, the creator has always existed, untouched by time constraints or any prior creation. As the Tierra del Fuego people put it, this creator eternally exists. Those who acknowledge this creator perceive it as the ultimate reality, with the potential for material creation residing within this eternal being, waiting to emerge (Leeming 2010: 2—3).

Material creation can manifest in various ways, from the spoken word to thought. Regardless of the method, these creation myths illustrate the emergence of order from chaos and the inherent creative potential of the *ex nihilo* creator. The concept of the *ex nihilo* creator persists as a representation of an eternal and timeless force from which all creation springs forth (Leeming 2010: 2—5).

False Dilemmas and Pseudoscience in Creationism

Although some people find emotional comfort in their belief in deities, informed believers rarely rely solely on comfort or the need for spiritual fulfilment to justify their faith in a creator. Many feel compelled to provide reasoned explanations that can withstand scrutiny from modern science for their beliefs. Consequently, they strive to find more acceptable justifications grounded in logic, rationality and empirical evidence. Still, these attempts often need to meet the rigorous standards of scientific inquiry and are susceptible to various fallacies (Singham 2019: 215).

Although scientific evidence supports the theory of evolution, many Christians

[26] John 1:1: 'In the beginning was the Word, and the Word was with God, and the Word was God' (Holy Bible translation 2011: 860).

interpret the traditional creation story in the book of Genesis literally. Arguments supporting creationism and opposing evolution are often filled with logical fallacies. Some proponents of creationism oversimplify the debate, presenting it as a choice between evolution and Intelligent Design. They mistakenly believe that highlighting weaknesses in evolution automatically validates Intelligent Design. This oversimplified view misrepresents the essence of science, which is not limited to just two theories and demands substantial evidence rather than mere criticism of alternatives. This perspective creates a false dilemma that excludes other valid theories or combinations of alternatives (Singham 2019: 164).

The primary cause behind the poor epistemic credibility of Intelligent Design creationism is its manifestation of key characteristics commonly associated with pseudoscience. Intelligent Design proponents fail to elaborate on their design hypothesis and employ convenient defences that shield the theory from criticism (Boudry 2013: 86).

The terminology Intelligent Design advocates use is marked by ambiguities, making their central argument elusive. The theory lacks the necessary precision to make specific predictions and achieve genuine explanatory unity. Those supporting Intelligent Design avoid delving into the specifics of the designer's mechanisms and methods. Most Intelligent Design literature mainly comprises arguments against evolution, designed to distort scientific understanding and foster scepticism (Boudry 2013: 86).

One can subject claims from astrology, parapsychology and young earth creationism to empirical testing. However, these tests do not elevate creationism to the status of a legitimate science for a straightforward reason: one must either acknowledge that the assertion has been conclusively disproven or resort to invoking the actions, means and intentions of a creator God, which are inscrutable and untestable. When faced with geological evidence supporting an ancient earth, young earth creationists often present responses that may seem logically sound to them but ultimately showcase why creationism is considered pseudoscience. They contend that the methods used to date rocks are flawed (without providing explanatory evidence for these alleged flaws), suggest that the laws of physics have changed over time

(although there is no supporting evidence), or propose that God deliberately created a world that appears old to test our faith (Pigliucci 2013: 16).

Another fallacy to be aware of when discussing Intelligent Design creationism is the burden of proof. The person proposing a theory bears the responsibility of providing proof for it. Arguing that God exists because unbelievers cannot prove His nonexistence shifts the burden of proof to the opposing side. Although it is impossible to prove that God does not exist, it is not logical to conclude that it is, therefore, reasonable to believe in God (Singham 2019: 51).

In the Kitzmiller v. Dover Area School District[27] case, the judge emphasised that the lack of a comprehensive explanation for every aspect of the theory of evolution cannot be used as a pretext to introduce untestable religious-based alternative hypotheses such as creationism or Intelligent Design. This relates to the 'God of the gaps' theory, an example of the fallacy of an appeal to ignorance. It suggests that gaps in our scientific knowledge can be considered evidence for God's existence and intervention (Albright 2013: 955).

The term 'God of the Gaps' is often used pejoratively to refer to the use of a *deus ex machina*, a theatrical device from ancient Greece in which an actor portraying a deity was brought onto the stage to resolve plot challenges. The machine was either a crane for lowering actors from above or a lift for elevating them through a trapdoor (Albright 2013: 955). The Scottish evangelist Drummond is credited with originating the term. In 1894, he wrote (Drummond 2017: 138):

> There are reverent minds who ceaselessly scan the fields of Nature and the books of Science in search of gaps – gaps which they will fill up with God. As if God lived in the gaps? What view of Nature or of Truth is theirs whose interest in Science is not in what it can explain but in what it cannot, whose quest is ignorance not knowledge, whose daily dread is that the cloud may lift, and who, as darkness melts from this field or from that, begin to tremble for the place of His abode? What needs altering in such finely jealous souls is at once their

[27] Kitzmiller v. Dover Area School District, 400 F. Supp. 2d 707 (M.D. Pa. 2005)

view of Nature and of God. Nature is God’s writing, and can only tell the truth; God is light, and in Him is no darkness at all.

3.2. From Chaos to Cosmos: Natural Laws and Divine Causality

> It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; Inheritance, which is almost implied by reproduction; Variability, from the indirect and direct action of the external conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.
>
> (Darwin 1859: 450)

Charles Darwin's eloquent description of life's evolution does not directly address the concept of first cause. Nevertheless, evolutionary theory often becomes a focal point in religious disputes, countering the Christian creation narrative. This tension arises from the fundamental differences between scientific and religious approaches to explaining the origin and diversity of life.

The Contingent Nature of Evolution

Evolution is a contingent natural process influenced by various factors, including environmental changes and genetic mutations. Evolution is not a predetermined or predestined process; it occurs due to these contingencies and the interaction of different elements in the natural world. Although acknowledging the profound elegance and intricacy in life's evolution, as eloquently articulated by Darwin above, evolutionary science does not proclaim with absolute certainty that the initial living organism spontaneously arose from non-living matter. Similarly, no scientific evidence exists either affirming or disproving the occurrence of supernatural events after this initial creation (Thomson 2009: 11).

This scientific understanding of evolution has significant implications for religious beliefs, particularly when considering the roles of deism and theism. The critical distinction between deism and theism is the level of God's involvement in the world. Deists believe in a distant and non-intervening Creator, while theists believe in a personal God who actively engages with the world and its inhabitants. A deist can logically embrace the principles and explanations of evolutionary biology while upholding a belief in God without encountering inherent contradictions. A deist can recognise that evolution proceeds through natural and material laws while maintaining that God was the original creative force (Thomson 2009: 11).

In contrast, a theist believes God created the universe and actively sustains and interacts with it. Many theists believe in a teleological view of creation, which means they see a purpose or design behind the universe and life. They may think that a Creator intentionally designed and directed the course of evolution. On the other hand, contingent evolution suggests that the development of life is not necessarily guided by a specific purpose or design but is contingent on various factors, such as genetic mutations and environmental conditions. This apparent lack of direction can be challenging for theists who view evolution as evidence of God's purposeful creation (Thomson 2009: 11).

The International Theological Commission, comprising thirty theologians who offer guidance to the magisterium of the Catholic Church, released a statement relevant

to the ongoing debate surrounding religion and science that reflects the Church's theist views. It states (International Theological Commission 2004):

> The current scientific debate about the mechanisms at work in evolution requires theological comment as it sometimes implies a misunderstanding of the nature of divine causality. Many neo-Darwinian scientists, as well as some of their critics, have concluded that, if evolution is a radically contingent materialistic process driven by natural selection and random genetic variation, then there can be no place in it for divine providential causality. A growing body of scientific critics of neo-Darwinism point to evidence of design (e.g., biological structures that exhibit specified complexity) that, in their view, cannot be explained in terms of a purely contingent process and that neo-Darwinians have ignored or misinterpreted. The nub of this currently lively disagreement involves scientific observation and generalization concerning whether the available data support inferences of design or chance and cannot be settled by theology. But it is important to note that, according to the Catholic understanding of divine causality, true contingency in the created order is not incompatible with a purposeful divine providence. Divine causality and created causality radically differ in kind and not only in degree. Thus, even the outcome of a truly contingent natural process can nonetheless fall within God's providential plan for creation.
>
> … In the Catholic perspective, neo-Darwinians who adduce random genetic variation and natural selection as evidence that the process of evolution is absolutely unguided are straying beyond what can be demonstrated by science. Divine causality can be active in a process that is both contingent and guided. Any evolutionary mechanism that is contingent can only be contingent because God made it so. An unguided evolutionary process – one that falls outside the bounds of divine providence – simply cannot exist because "the causality of God, Who is the first agent, extends to all being, not only as to constituent principles of species, but also as to the individualizing principles.... It necessarily follows that all things, inasmuch as they participate in existence,

must likewise be subject to divine providence[28]."

This Catholic perspective exemplifies a broader theistic approach to reconciling evolutionary theory with religious belief. It demonstrates how some religious traditions have adapted their understanding of divine creation to accommodate scientific discoveries while maintaining their core theological principles.

Nevertheless, this reconciliation is not without its challenges. A significant point of contention arises from the theist doctrine of creation, particularly the notion that God created humans in His image to form rational, morally conscious beings capable of recognising and loving Him. Suppose we accept that God fashioned humans in His likeness. In that case, it suggests His deliberate intention to bring about a particular type of creature and His active involvement in ensuring their existence. This concept, while seemingly at odds with evolutionary theory, can be aligned with various scientific theories, such as an ancient Earth and the progression of evolution.

The Tension Between Randomness and Divine Guidance

The concept of theistic evolution, which posits that a divine being guides evolutionary processes, faces significant philosophical objections, particularly regarding the compatibility of divine guidance with the randomness inherent in evolutionary theory. Philosophers such as Philip Kitcher argue that guided evolution fundamentally contradicts the core principles of Darwinian theory, which relies on random mutation and natural selection as undirected processes. Kitcher contends that the randomness of mutations, a key driver of evolutionary change, is incompatible with the idea of divine intervention, which implies a predetermined outcome. This randomness is not merely incidental but central to the mechanism of evolution, making any guidance seem superfluous or even contradictory (Kitcher 2009: 110—114).

In examining the philosophical underpinnings of intelligent design theory, one encounters a set of arguments that, although superficially compelling, reveal

[28] The passages quoted here are from The Summa Theologica of Thomas Aquinas, Part 1, Question 22, Article 2 (Aquinas 2018:116).

significant logical fallacies. The central tenet of intelligent design posits that certain biological phenomena exhibit a degree of complexity ostensibly beyond the scope of natural selection, thereby necessitating the involvement of an intelligent agent. This line of reasoning, however, is fraught with logical fallacies that undermine its validity as a scientific theory.

Foremost among these is the argument from ignorance, wherein proponents infer design from the perceived inadequacy of naturalistic explanations. This reasoning fallaciously equates the current limitations of scientific understanding with evidence for supernatural intervention. Such logic fails to acknowledge that the temporary absence of a comprehensive natural explanation does not constitute positive evidence for design (Kitcher 2009: 101).

Furthermore, the intelligent design argument often relies on circular reasoning, assuming the conclusion it aims to prove. It becomes self-referential and logically flawed by defining intelligence as the source of intricate, seemingly designed outcomes and then using those outcomes as proof of intelligence.

This flawed logic is further weakened by a false choice, presenting natural selection and intelligent design as the only possible explanations for developing biological forms. Such a binary view not only oversimplifies the reality of evolutionary processes but also precludes consideration of alternative explanations or the possibility of as-yet-undiscovered natural mechanisms.

Moreover, intelligent design arguments frequently mischaracterise the nature and capabilities of evolutionary processes. By underestimating the cumulative power of incremental changes over vast timescales, these arguments create a straw-man version of evolution that is more easily dismissed.

In essence, although intelligent design theory purports to offer a scientific alternative to evolutionary theory, its logical foundation is built upon a series of fallacies and misrepresentations. These shortcomings render it inadequate as a scientific explanation for biological complexity and diversity.

It is crucial to note, however, that even though these critiques effectively dismantle the logical structure of intelligent design arguments, they do not – and indeed cannot – disprove the existence of a designer. Instead, they demonstrate that the intelligent design framework, as currently formulated, fails to meet the rigorous standards of logical consistency and empirical testability required of scientific theories.

Accepting that God fashioned humans in His likeness implies His deliberate intention to create a specific type of being and His active involvement in ensuring their existence. This concept aligns with various scientific theories, including an ancient Earth and evolutionary progression. It is plausible that God could have guided the Darwinian process, perhaps even causing specific genetic mutations. From a scientific perspective, no evidence precludes this possibility. Some Christian scientists posit that God might have fine-tuned the cosmos to allow for life and evolution, directing mutations and selection to produce the organisms we observe. This view portrays evolutionary forces as another tool God wields (Plantinga 2009: 106; Teehan 2014: 171).

However, the tension between divine guidance and natural selection presents a significant challenge to the coherence of theistic evolution. What contradicts theist beliefs is the assertion that evolution occurred without guidance – that neither God nor any other entity played a role in shaping it. Many contemporary scientists and philosophers contend that the evolutionary process was unguided (Plantinga 2009: 107—108). Dawkins, for example, argues that diversity in life results from unguided natural selection, not divine intervention. Unlike a watchmaker who designs with foresight, natural selection operates blindly, lacking purpose, planning, or vision (Dawkins 2015: 9).

Dawkins did not successfully demonstrate that the evidence of evolution supports the idea of a universe devoid of intentional design. He asserted that since there are no conclusive objections to the possibility of life evolving through unguided evolution, we can infer that it indeed has. This fallacious argument from ignorance provides fuel to the ongoing debate about whether life, including humans, was designed by God and encourages the view that science and religion have conflicting views about evolution (Plantinga 2009: 107—108).

The reconciliation of divine guidance with natural selection often dilutes either the theological or scientific aspects of theistic evolution. Plantinga argues that divine action could work with evolutionary processes, suggesting that God's guidance is subtle and operates within the natural laws that govern evolution (Plantinga 2011: 55—56). However, this view potentially reduces the role of divine intervention to a form of deism, where God sets the process in motion but does not actively intervene, thus preserving the randomness of evolution but at the cost of robust theistic involvement. Conversely, if one emphasises divine guidance, it risks undermining the scientific validity of evolutionary theory by introducing supernatural elements that cannot be empirically tested or falsified.

In conclusion, the philosophical objections to theistic evolution hinge on the difficulty of reconciling the randomness central to evolutionary theory with the notion of a guided process. This tension challenges the coherence of theistic evolution, as it either diminishes the role of divine intervention or undermines the foundational principles of Darwinian evolution. Thus, although theistic evolution attempts to bridge the gap between science and religion, it often does so at the expense of compromising one or the other.

Ignorance of the principles of evolution also leads to conflict. In an argument against evolution, for example, the Minister of Education in India claimed that Darwin's theory is scientifically wrong because no one, including our ancestors, has ever reported witnessing an ape turning into a human (Devraj 2023), thereby using a straw man fallacy to portray evolutionary theory inaccurately. Evolutionary theory does not propose that humans evolved directly from monkeys, nor does it imply that the emergence of a new species necessarily leads to the extinction of others (Withey 2016: 183).

With this in mind, sociologists Ecklund and Scheitle conducted a comprehensive series of studies to explore how religious Americans perceive creation and evolution. Their research revealed that many religious Americans are open to various perspectives on the origins of life and the universe, including the theory of evolution. However, they remain committed to integrating a role for God in this process and

upholding the belief in humanity's unique and sacred nature. As a result, the concept of theistic evolution, where God guides the evolutionary process, resonates with and is readily accepted by many individuals of faith (Ecklund & Scheitle 2018: 4—5).

This hubris, rooted in the belief of humanity's central place in the universe and our perceived higher evolved status, has been humbled through scientific discovery. For example, Copernicus, Galileo and Newton revealed Earth's position as a tiny part of the cosmos; Darwin showed our connection to the animal world; psychology uncovered the unconscious mind; and geology and palaeontology revealed 'deep time', demonstrating that humans occupy only a brief moment in Earth's history. These discoveries challenge the idea of human progress and importance and emphasise that the notion of progress in evolution needs to be revised. Darwin's theory of natural selection does not imply overall advancement and evolution is not a linear progression towards some ultimate state of perfection. Instead, it is a dynamic and ongoing process that shapes life forms in response to their environments (Gould 2011: 17; 73).

The notion of progress in evolutionary theory often stems from bias and hope rather than robust data. Our inclination to perceive evolution as a trajectory of improvement is frequently shaped by cultural and historical influences. Gould asserts that it is essential not to confuse temporary dominance with inherent superiority. To truly understand evolution, he argues, one must transcend the concept of progress as a critical theme (Gould 2011: 73; 136).

This misinterpretation of evolutionary theory as a narrative of progress has led to broader concerns within the philosophy of science. Philosopher of science Michael Ruse critiques the transformation of Darwinian evolutionary theory into what he terms 'evolutionism', a secular belief system that, in his view, goes beyond the boundaries of scientific inquiry. Ruse argues that this overextension of the theory into a quasi-religious ideology hinders the effective teaching of evolutionary theory by framing it in a dogmatic manner that alienates those with differing worldviews (Ruse 2017: 82).

Those who use science as a weapon against faith often underestimate theologians’

depth of reflection on natural occurrences and divine intention. On the other side of the debate, the religious community frequently fails to acknowledge the inherently self-reflective nature of scientific inquiry and the widespread recognition among scientists of the inherent limitations within scientific exploration. Ultimately, both sides may realise, much as Darwin himself did, that there is indeed beauty, wonder and even grandeur in the evolutionary perspective on life (Miller 2009: 92).

Future advancements in science may offer greater insight into the origin and evolution of the universe. However, for the time being, as Darwin articulated in correspondence in 1860, the gaps in our knowledge leave us perplexed and unsatisfied (Darwin 2018: 54):

> With respect to the theological view of the question. This is always painful to me. I am bewildered. I had no intention to write atheistically. But I own that I cannot see as plainly as others do, and as I should wish to do, evidence of design and beneficence on all sides of us. ... Not believing this, I see no necessity in the belief that the eye was expressly designed. On the other hand, I cannot anyhow be contented to view this wonderful universe, and especially the nature of man, and to conclude that everything is the result of brute force. I am inclined to look at everything as resulting from designed laws, with the details, whether good or bad, left to the working out of what we may call chance. Not that this notion at all satisfies me. ... Let each man hope and believe what he can. ... I can see no reason why a man, or other animal, may not have been aboriginally produced by other laws, and that all these laws may have been expressly designed by an omniscient Creator, who foresaw every future event and consequence. But the more I think the more bewildered I become.

The Quest for Origins and the Limits of Understanding

Science and religion grapple with similar existential questions: our origin, destination and the extent of our knowledge. In the past century, physicists have made significant strides in addressing these inquiries, demonstrating that science remains a dynamic, ever-expanding field. As scientific knowledge accumulates, many religious narratives that once provided comfort and explanations are now verifiably

incorrect (Hossenfelder 2022: xv).

This growing body of knowledge has led to the development of scientific theories, which play a crucial role in reshaping our comprehension of the world by reducing complex phenomena to fundamental principles. For example, quantum theory enables precise calculations of chemical element properties that offer substantial explanations from minimal assumptions. On the other hand, the idea of an all-knowing creator fashioning chemical elements needs more quantitative explanatory power that renders it unscientific, though not necessarily incorrect (Hossenfelder 2022: 25).

The principles of physical cosmology can be viewed as modern interpretations of ancient myths, as scientists, like all individuals, draw inspiration from the quest to explain the origins of existence. Various physicists propose diverse origin scenarios, such as the universe's birth from a bang, bounce, bubbles, collision, timeless silence, superstring gas, a five-dimensional black hole, or a novel force of nature (Sutter 2022; Hossenfelder 2022: 26).

To comprehend the universe's complexity, we need a unifying framework or model that can integrate diverse observations and explain the underlying principles governing the cosmos. Scientists formulate hypotheses about the universe's origins and evolution through data collection, experiments and observations, striving for coherent, elegant explanations. Success depends on the alignment of these ideas with accumulated evidence. In physics, the widely accepted cosmological model, known as the concordance model, incorporates concepts such as the Big Bang theory, cosmic expansion, dark energy and dark matter to account for observed characteristics. This framework effectively explains numerous astronomical phenomena and is the cornerstone of contemporary cosmology (Hossenfelder 2022: 26).

Scientists face considerable challenges when investigating extreme scenarios such as the universe's inception. These conditions cannot be replicated in laboratory experiments or directly observed, with black hole interiors representing the closest analogues to such harsh environments. Studying the circumstances of the Big Bang

remains challenging due to its inaccessibility and the mathematical complexity involved in modelling these events. Although grounded in mathematical models and observational data, theories about the early universe still involve extrapolation and inference, they require ongoing empirical support and validation (Hossenfelder 2022: 36—37).

Obtaining conclusive evidence to confirm these theories presents significant challenges, yet cosmologists employ various tools and observations to test and refine their models. These include analysing the cosmic microwave background radiation, studying the universe's large-scale structure, examining light element abundances and detecting gravitational waves. Our knowledge of the universe continually evolves in response to new data and observations. This process may lead to refinements of the current concordance model or potentially give rise to more advanced theories that better explain the totality of cosmological phenomena (Hossenfelder 2022: 36—37).

The Development of the Big Bang Theory

The development of the Big Bang theory was a gradual process. In the early modern European scientific community, most scientists adhered to religious beliefs about the creation of the universe. However, evidence began to point toward a much older universe by the late nineteenth century. As the twentieth century began, it became widely accepted that the universe had always existed in a stable state. In 1927, Georges Lemaître, a Belgian Roman Catholic priest and physicist, introduced the concept of the universe originating from a primaeval atom – a compact and dense state that gradually expanded. Astronomer Fred Hoyle later coined the term Big Bang in 1949. Ironically, he was a staunch opponent of the theory and intended the term to be dismissive (Sutter 2022; Holder 2012: 112).

Many scientists had reservations about Lemaître's calculations of the expanding universe. His concept of a universe in expansion, hinting at a temporal origin, appeared questionable to a significant portion of the scientific community. At that stage, the concepts of the unchanging nature and predetermined order of the universe were widely agreed upon and held significance for them. Einstein remarked

that Lemaître's theory seemed to align with the theological concept of creation (Kragh 1996: 30—41).

Over time, empirical observations began to support Lemaître's theory. By the time cosmic microwave background radiation was detected in 1964, the consensus had shifted towards the idea of a Big Bang that was increasingly supported by scientific evidence (Kragh 1996: 30—41).

This groundbreaking theory posits that our universe is in a constant state of flux, evolving according to understandable laws of physics. Approximately 13.8 billion years ago, the entire observable cosmos existed as a condensed, intensely hot expanse in a fleeting moment. As the universe cooled and expanded, significant milestones emerged. After about 380,000 years, the first atoms formed, emitting radiation that still permeates the cosmos today. Intriguingly, tiny fluctuations within quantum fields during the universe's early moments laid the foundation for its large-scale structures (Sutter 2022).

The scientific validation of the universe's moment of creation led to profound philosophical and theological questions. As empirical evidence mounted in favour of the Big Bang theory, it inevitably sparked debates about the existence of a creator and the origins of the cosmos itself (Kragh 1996: 30—41).

Pope Pius XII attempted to make a theological argument based on these new scientific developments. Addressing the Pontifical Academy of Sciences in 1951, he said that (Pius XII 1951):

> Undeniably, a mind illuminated and enriched by modern scientific knowledge, which calmly evaluates this problem, is led to break the circle of a matter preconceived as wholly independent and autonomous – either because uncreated or self-created – and to acknowledge a Creative Spirit. With the same clear and critical gaze with which he examines and judges facts, he also catches sight of and recognises the work of the omnipotent Creator, Whose power, aroused by the mighty 'fiat' pronounced billions of years ago by the Creative Spirit, unfolded itself in the universe and, with a gesture of generous

love, called into existence matter, fraught with energy.

> Indeed, it seems that the science of today, by going back in one leap millions of centuries, has succeeded in being a witness to that primordial Fiat Lux when, out of nothing, there burst forth with matter a sea of light and radiation, while the particles of chemical elements split and reunited in millions of galaxies. Indeed, the facts verified up to now are not arguments of absolute proof of creation in time, as are those drawn from metaphysics and revelation, in so far as they concern creation in its broadest sense and from revelation alone in so far as they concern creation in time. The facts pertinent to natural sciences, to which we have referred, still wait for further investigation and confirmation, and theories founded upon them need new developments and proofs to offer a secure basis to a line of reasoning outside the sphere of the natural sciences. Notwithstanding this, it is worth noting that modern exponents of the natural sciences consider the idea of the creation of the universe entirely reconcilable with their scientific conception. Indeed, they are spontaneously brought to it by their research, though only a few decades ago, such a 'hypothesis' was rejected as absolutely irreconcilable with the present status of science… Creation, therefore, in time, and therefore, a Creator; and consequently, God.

Lemaître was concerned that the Pope's interpretation conflated theological concepts with scientific findings. He recognised that such a theological framing of the Big Bang could blur the lines between faith and empirical evidence, potentially leading to misconceptions about the nature of scientific inquiry. His theological training alerted him to the significant, long-standing distinction between creation and a beginning, for example, Aquinas entertained the possibility of a universe that was both eternal and created because 'created' in this context did not necessarily imply a starting point in time but rather a dependency on another for its existence (Aquinas 2018: 219). Creation, in essence, was a metaphysical concept, whereas the Primaeval Atom represented a physical theory (Kragh 1996: 258).

Lemaître intervened and tried to dissuade the pope from making further pronouncements on such matters, as they were theologically simplistic and scientifically unhelpful. He was successful, although papal restraint on such issues

did not prevent many believers from interpreting the Big Bang as evidence of God's existence, just as many non-believers saw the universe's apparent permanence as proof of God's nonexistence (Kragh 1996: 258).

The limitations of current scientific theories, mainly when applied to the extreme conditions of the early universe, have led to various speculative models that attempt to bridge the gaps in our comprehension. These speculations, ranging from cyclic universe models to higher-dimensional structures, emerge from recognising that existing frameworks may not fully capture the complexities of the universe's origin (Sutter 2022; Hossenfelder 2022: 135).

Although these models offer intriguing possibilities, they also highlight the challenges inherent in developing a comprehensive theory that can withstand empirical scrutiny. As such, they are a testament to the ongoing quest in the scientific community to push beyond the boundaries of established knowledge, even as definitive answers to questions like the ultimate origin of the universe remain elusive. In addressing these gaps in scientific understanding, belief is sometimes relied upon due to the lack of clear methods to distinguish between solutions rooted in a divine presence and those grounded in scientific principles (Sutter 2022; Hossenfelder 2022: 135).

Although there is no reason to assume that the universe was created exclusively for humanity or life in general, our current scientific theories lack the essential elements to explain how the laws of nature lead to complexity in our universe. Scientists may eventually have more comprehensive explanations, but no theory can currently address all questions exhaustively. Scientific theories are chosen based on their effectiveness in explaining observations but may inevitably defer some questions with the response 'because it explains what we observe' (Hossenfelder 2022: 42).

Throughout humanity's exploration of the universe's origins, humanity has encountered significant challenges, ranging from the mathematical complexities of describing the early cosmos to the experimental limitations imposed by the extreme conditions of the Big Bang. These challenges underscore the difficulty of testing and validating theories about events that lie so far back in time, beyond the reach of current observational capabilities. The narratives people have constructed, although

rooted in rigorous scientific inquiry, are ultimately constrained by the scarcity of empirical evidence, making it difficult to determine which, if any, accurately reflects the true beginnings of our universe. Perhaps the origin of our cosmos will remain hidden from us forever (Hossenfelder 2022: 26).

The Numinous and the Sacred: Mystical Experience in Christianity and Beyond

The uncertainty surrounding our grasp of cosmic origins echoes the enduring appeal of religious narratives, which often offer alternative explanations for the universe's genesis. Similarly, the notion of 'religious experience' holds profound significance in studying religion and its manifestations, affording a distinct perspective through which to contemplate existential questions. This contemplation of the mystical and the unknown often leads to a deeper exploration of humanity's spiritual nature.

The Search for Spiritual Fulfilment

One view from this exploration is that humans are inherently mystical beings with supra-rational religious and artistic roots. According to this perspective, once material needs are met, deeper spiritual needs assert themselves, leading to an intense sense of unease that only mysticism can assuage. Christianity, for instance, has oriental and mystical origins, much of which has been diluted over time. Today, many Christians encounter a shallow blend of consumerism, liberalism and Christian ideas that fail to quench their thirst for authentic mystical experience. The French Orthodox Catholic theologian Olivier Clément explains (Clément 1995: 7—26):

> That philosophical idol, the 'Good Lord' of a certain type of Christianity, or the 'supreme being' of spiritualism, has brought about simultaneously the 'death of God' and the loss of the mystery of Being. People never cease to project onto God their individual and collective obsessions, so that they can appropriate and make use of him. But they ought to understand that God cannot be apprehended from without, as if he were an object, for with him there is no outside; nor can the Creator be set side by side with the creature.

Clément illustrates a spirituality firmly rooted in the idea of resurrection – an

awakening of the spirit that unfolds in the present moment. In this context, resurrection signifies a life of profound abundance, with the capacity to absorb, reverse and surpass the inevitability of death. When asked, ‘Are there elements in the world worthy of our steadfast loyalty?’ his reply is measured: ‘Very few’. He proposes that our devotion should be directed towards immortality, which contains life’s fullest essence. Remaining loyal to immortality, in essence, means remaining loyal to Christ, whose significance transcends that of a mere historical figure (Clément 1995: 307).

Clément’s purpose in writing the book on the early Church Fathers was to satisfy the spiritual needs of Christians today by introducing them to the writings of authors such as Climacus (born in 579 AD), who wrote beautiful passages about his religious experiences, for example (Clément 1995: 23):

> Hunger makes itself felt only gradually and vaguely, but the raging of intense thirst is unmistakable and intolerable. No wonder the person who longs for God cries, ‘My soul thirsts for God, for the living God.’

Another example is Isaac of Nineveh (born 613 AD), who wrote about the sublime emotions that he experienced in spiritual contemplation (Clément 1995: 253):

> God’s love is by its nature warmth. When it lights on someone without any limit, it plunges the soul into ecstasy.

Mystical experiences, while controversial, play a significant role in shaping and reinforcing religious beliefs. Clément and the authors he cites draw spiritual sustenance from these encounters, strengthening their faith. Such deeply held convictions often influence others, creating a cascading impact within their communities. Consequently, these personal spiritual experiences and perceived supernatural encounters may contribute to the persistence of religious and spiritual practices in society, even in increasingly secular contexts.

The Role of Religious Experience in Modern Thought

In her book *Religious Experience Reconsidered*, Ann Taves, a contemporary Professor of Religious Studies, argues that the concept of a unique experiential essence – be it religious, mystical, or spiritual – has become deeply ingrained in modern Western religious studies as the common thread linking the world's faiths. This perspective posits that the core of religion lies in a distinctive form of experience, often associated with notions such as the sacred, the numinous, or divine power (Taves 2009: 3—5).

During the zenith of modernity, Western intellectuals across various disciplines became fascinated with the idea of experience. This interest permeated theology and the academic study of religion. Liberal and modernist thinkers, predominantly Protestant with some Catholic voices, turned to religious experience as a source of theological authority. This shift occurred as traditional sources – ecclesiastical, doctrinal and biblical – faced increasing scrutiny from historical critique (Taves 2009: 3—5).

Modernist theologians, inspired by the work of the nineteenth-century theologian Friedrich Schleiermacher, saw the self-authenticating individual experience as a promising avenue for religious renewal. They believe this approach is more resilient against historical-critical methods' corrosive effects. Consequently, they position the experience of the numinous, sacred, or holy at the heart of Christianity and, by extension, all other religions (Taves 2009: 3—5).

This trend was not confined to Western thinkers. Hindu and Buddhist modernisers, such as Sarvepalli Radhakrishnan and Daisetz Teitaro Suzuki, adopted similar strategies within their traditions. They employed the concept of experience to challenge traditional sources of authority and reinterpret established concepts. This occurred against the backdrop of colonialism, Westernisation and nationalist self-assertion. Maintaining the primacy of their respective traditions, these thinkers used experience to emphasise what they perceived as the essence of all religions (Taves 2009: 3—5).

In Christianity, the German theologian and historian of religions, Rudolph Otto, proposes characterising the holy through a nonrational element known as ‘the numinous’. This numinous element gives rise to a specific feeling or mental state, which Otto argues is ‘perfectly *sui generis* and irreducible to any other’. It could not be precisely defined or explained in terms of ordinary emotions. Otto believes that the only way to convey what it means is through discussions that compare it to other experiences until others begin to experience it themselves (Otto 1958: 7).

In ‘The Varieties of Religious Experience’, psychologist William James challenges the idea that religious emotions are fundamentally distinct from other emotional experiences. Although theologians like Otto argue for the existence of a unique religious emotion, James contends that no specific emotions are inherently exclusive to religious experiences. Instead, he suggests that what we often perceive as religious emotions are, in fact, composites of ordinary feelings that are imbued with religious significance through the application of associated religious concepts. For instance, the emotion of awe, which might be felt in response to a majestic natural scene, can be interpreted as a religious feeling when contextualised within a theological framework. Thus, for James, the distinction between religious and non-religious emotions lies not in the emotions themselves but in the conceptual lenses through which they are viewed (Taves 2009: 4—5; James 2002: 29—30).

James’s approach to exploring religion focuses on the individual’s experiences and feelings rather than religious doctrines, practices, or institutions. He defines religion as ‘the feelings, acts, and experiences of individual men in their solitude, as far as they apprehend themselves to stand in relation to whatever they may consider divine’. Although James played a pivotal role in emphasising religious experience within psychology and religious studies, he did not claim that these experiences were unique or beyond explanation in psychological or sociological terms. Instead, he prioritised individual, authenticating moments of experience, viewing them fundamental to the study of religion, but without suggesting that these experiences possessed any inherent or exclusive religious quality (Taves 2009: 4—5; James 2002: 29—30).

By framing religious emotions and experiences in this way, James shifts the focus

from the idea of a distinct religious essence to a view of religion as deeply embedded in ordinary human experience, shaped by individual and collective conceptual frameworks. This perspective encourages a broader, more inclusive view of religious life, recognising it as intertwined with individuals' everyday emotions and experiences.

Émile Durkheim, the French sociologist, builds upon this line of thinking in his seminal work, ‘The Elementary Forms of Religious Life’. Durkheim elaborates on the idea that what is considered sacred is not inherently different from the profane but is set apart by social constructs. He defines religion as ‘a unified system of beliefs and practices relative to sacred things, that is, things set apart and forbidden’. Durkheim's perspective highlights the relational nature of the sacred, arguing that it has no essential content of its own. In Durkheim’s view, the sacred is simply what a particular group deems sacred. This conceptualisation shifts the focus from an intrinsic quality of sacred objects or acts to the social processes that designate them as such (Taves 2009: 16—17; Durkheim 1915: 47).

William Paden, a contemporary scholar in the comparative study of religion, expands on this idea by emphasising that the sacred is a matter of social agreement. Paden asserts, ‘The sacred is simply what is deemed sacred by any group.’ This interpretation underscores the fluidity of the sacred and challenges the notion of an essential, unchanging religious experience or object. In this framework, the distinction between the sacred and the profane is upheld not by the inherent nature of the objects themselves but by a community's collective practices and beliefs (Paden 1994: 203; Taves 2009: 16).

Thus, these discussions encounter differing views on religious experience, emotions and the sacred. While Otto and other theologians might argue for the intrinsic nature of religious feelings and objects, James and Durkheim present a more deconstructed approach, wherein religious experiences and sacred objects are understood as products of social and conceptual processes rather than entities with inherent religious qualities.

Since 1990, there has been a notable surge in research exploring religion’s

neurological, cognitive and evolutionary aspects, spurred by rapid advancements in studying the brain and consciousness. Scholars engaged in the burgeoning subfield of CSR hail from diverse disciplines such as psychology, anthropology, religious studies and philosophy. Although many are well-versed in examining religious beliefs and practices (rituals), there has been a tendency to overlook religious experience, with only a few exceptions (Taves 2009: 9).

According to Taves, a cohort of scholars and researchers, including several self-proclaimed neurotheologians, often lacking formal training in theology or religious studies, has eagerly embraced the challenge of identifying the neural correlates of spiritual experience. Unfortunately, this enthusiasm has frequently bypassed critical engagement with the critiques of the concept they seek to explore. This oversight has left unaddressed reservations that led many established scholars of religion to abandon the study of religious experience, highlighting the need for a more comprehensive approach in this evolving field (Taves 2009: 9).

The concept of ‘religious experience’ has often been treated as a monolithic category within the study of religion. However, rather than abandoning the study of experience, Taves suggests disaggregating this concept and examining the vast array of experiences to which religious significance has been attributed. Doing so makes it possible to move beyond the assumption that a singular, universal ‘religious experience’ exists, focusing instead on how various experiences are interpreted and labelled as religious, magical, mystical, or spiritual (Taves 2009: 8—9).

To comprehend how experiences become religious, scholars must focus on the mechanisms through which people ascribe special characteristics to particular experiences. These characteristics are those typically associated with terms such as religious, magical, mystical and spiritual. Breaking down religious experience into its individual components allows for a more detailed examination of the connection between psychobiological, social and cultural-linguistic processes. This approach acknowledges that experiences considered religious are not merely natural phenomena but are shaped by a wide range of factors, including biological responses, social influences and the linguistic frameworks through which individuals interpret their experiences (Taves 2009: 8—9).

Furthermore, it becomes possible to build methodological bridges between the humanities and the sciences by adopting this disaggregated approach. The study of religious experience has traditionally been situated within the humanities, often focusing on the phenomenological aspects of these experiences. However, scholars can develop a more holistic perspective by integrating insights from the sciences, particularly in grasping the psychobiological underpinnings of experience. This interdisciplinary methodology allows for a richer exploration of how religious significance is constructed and offers the potential for new theoretical and methodological advancements in the study of religion (Taves 2009: 8—9).

The assumption that humans are inherently reflexively conscious biological animals is central to Taves' approach. This implies not only conscious awareness but also awareness of being aware. Consequently, she advocates for studying our experiences as both a biological phenomenon from the scientific standpoint and a subjective phenomenon from the humanistic perspective (Taves 2009: xiv).

In line with this perspective, she argues that scholars can contextualise what individuals label as religious, spiritual, mystical, magical, or superstitious within broader processes of meaning-making and valuation. This involves identifying markers of specialness, considering ideal and strange entities and comprehending how simple attributions of specialness evolve into more complex formations. Such distinctions provide a foundation for precisely designed research projects exploring competing schemes of valuation and singularisation in diverse social contexts (Taves 2009: 12).

Taves provided an illustrative instance of her methodology, wherein scholars meticulously examined the self-reported emotions of the subject, Bradley, throughout a religious encounter (Taves 2009: 107—109):

Bradley remained unaffected by a frightening sermon on hell and felt indifferent to religious matters. Suddenly, his heart started beating rapidly, making him consider illness, though he felt no pain. He felt a surge of happiness, humility and unworthiness, even as his heartbeat quickened. These emotions were connected to

the heightened heart rate, which he attributed to the Holy Spirit. During an interaction with the unseen agent (Lord), a breath-like sensation filled Bradley, described as the Holy Spirit taking possession of his soul with love and grace – this experience aligned with the Methodist belief in the 'witness of the Spirit', signifying salvation (Taves 2009: 107—109).

In summary, Bradley's journey involved triggering ideas of being unsaved, leading to a physical response of an increased heart rate. Initially considering illness, he questioned it due to the absence of pain. Exploring a supernatural explanation triggered culturally fitting feelings, identified as 'fruits of the Spirit'. The increased heart rate was then consciously attributed to the Holy Spirit. This attribution prompted Bradley to address the Lord, triggering a sensation of the Holy Spirit entering him. The vision of a biblical passage confirmed this experience as a sign of conversion (Taves 2009: 107—109).

This study shows a case seen by Taves as a straightforward conscious attribution process, where Bradley linked an increased heart rate to the Holy Spirit rather than illness. The process involved conscious and unspoken thoughts leading to physiological sensations and feelings explained through cultural scripts. The cultural explanation triggered a role, causing a physiological response, a vision, an answer and subsequent thoughts. The narrative was crafted for an audience, emphasising attributing the experience to the Holy Spirit for maximum persuasiveness (Taves 2009: 107—109).

The terms roles, scripts and cues are borrowed from social cognition research, which explores interactions among thoughts, feelings and physiological symptoms. When thoughts lead to feelings and physiological symptoms or when thoughts and emotions affect perceptions, psychologists call it 'top-down' processing. Conversely, if physiological processes or perceptions lead to thoughts and feelings, it is termed 'bottom-up' processing. As many of these interactions occur below conscious awareness, researchers use priming experiments and hypnotic suggestions to investigate how unspoken thoughts and feelings shape perceptions and behaviours and trigger physiological symptoms (Taves 2009: 107—109).

Although Taves adopts an analytical 'building-block' approach, she maintains that fostering specific experiences often regarded as religious or spiritual can boost both personal and collective well-being, enhancing our ability to navigate and flourish in the world (Taves 2009: 104).

In the case of Bradley's experience, Taves' hypothesis aligns with philosopher Wesley R. Wells's conclusion that mystics bring their theological beliefs to the mystical experience rather than deriving them from it. The mystic's worship, aiming for union with God, faces scepticism in the presence of accepted scientific methods, which presume against the belief's truth. According to Wells, the mystic is susceptible to the fallacy of false attribution, locating the source of the experience 'within' rather than 'without'. This experience is deemed a form of emotionalism, which involves visceral reverberations tied to specific organism responses (Wells 2017: 659).

Wells suggests that a broad metaphysical mysticism could still offer valuable insight, even in the face of potential refutations. With its allure, such mysticism captivates reflective individuals and continues attracting weary souls seeking Nirvana's promised rest and peace. The metaphysical mysticism Wells alludes to affirms the unity, timelessness, immediacy and ineffableness of reality while denying reality to the phenomenal world (Wells 2017: 659).

Examining the concept of religious experience reveals that there is no single, universal essence to what is often labelled as mystical, spiritual, or sacred. Scholars like James and Durkheim argue that what people perceive as religious emotions or sacred objects are deeply intertwined with individual and collective conceptual frameworks shaped by social and cultural processes. This challenges traditional notions of religious experience as inherently distinct or *sui generis*.

Taves' approach to disaggregating religious experience offers a valuable framework for appreciating how specific experiences are imbued with religious significance. It emphasises the links between psychobiological, social and cultural-linguistic factors. This perspective integrates insights from the humanities and the sciences, aiding our comprehension of how religious meaning is constructed.

Ultimately, the study of religious experience must move beyond monolithic categories to appreciate the diversity and complexity inherent in how individuals and communities ascribe specialness to particular experiences. This deepens our comprehension of religious phenomena and bridges disciplinary divides, enriching the broader field of religious studies.

Conclusion

Evolutionary theorists propose that our inclination to attribute purpose to events and our inherent capacity to effortlessly engage in discussions about spirits, deities, or God may be inadvertent outcomes stemming from other cognitive functions. However, given their profound impact on the human experience, disregarding religious beliefs or categorising them as inconsequential might oversimplify the matter. Religious inclinations form an integral facet of human identity, akin in importance to other defining characteristics such as ethnicity and gender. Although the outward expressions of religion may not always align with theological frameworks, dismissing them as mere deviations overlooks the pervasive influence religion holds across humanity. Neglecting the role of religion in public life is not a viable stance; it necessitates careful consideration and inclusion in the broader discourse of public reason (Barrett & Trigg 2014: 9—12).

Religion includes diverse beliefs and practices rooted in fundamental human reactions to the world. Trigg argues that although discussing the myriad forms of religious expression is natural, an excessive fixation on these debates can potentially distract from a fundamental truth. At its core, the guiding principle here is that if there is a human inclination towards something, there is intrinsic value in granting the freedom to pursue it – assuming no compelling reasons exist to hinder those pursuits (Trigg 2015: 220—222).

The default position should prioritise affording individuals the liberty to pursue their desires. This approach is grounded in the view that enabling such freedom respects autonomy and acknowledges the inherent value of pursuing one's aspirations. Careful consideration of any limitations is essential. Policies should lean towards

fostering an environment where individuals can strive for their desires, recognising that such freedom contributes to preserving personal autonomy (Trigg 2015: 220—222).

Barrett and Trigg believe it is imperative to acknowledge that relegating religion to individual belief systems is untenable and carries consequences for public life. The natural intertwining of religious thought and practice with human modes of thought, action and social organisation necessitates its inclusion in public discourse. The more religion is marginalised and considered beyond the realm of rational discussion, the more it lingers beneath the surface, manifesting in unpredictable and undesirable ways. It is essential to recognise that religious tendencies are an integral aspect of human identity and dismissing them as inconsequential undermines the essence of humanity, risking the neglect of a fundamental part of collective identity (Barrett & Trigg 2014: 9—12).

Although popular expressions of religion may not always align with sophisticated theological accounts, dismissing them as mere deviations overlooks the pervasive force religion exerts across humanity. Religion shapes a person's view of the world and influences actions. Therefore, it is important to confront and engage with religious perspectives in the public sphere, acknowledging their impact on human behaviour and societal dynamics. Ignoring religion in public life is not a tenable option; it demands thoughtful consideration and inclusion in the broader discourse of public reason. Like other aspects of human identity, religious tendencies demand attention in public discourse. Ignoring religion in public life and relegating it to the private sphere risks fostering unpredictable and undesirable outcomes (Barrett & Trigg 2014: 9—12).

The resilience of religion, as explored through myths, narratives and the deeply ingrained human inclination toward spiritual reflection, reflects a fundamental aspect of our collective identity. However, this intrinsic aspect of humanity is not without its tensions, particularly when confronted with the rise of scientific explanations that challenge traditional religious views. In the following section, the focus moves to the connection between scientific inquiry and religious faith, considering how these two spheres – frequently seen as at odds – handle the divide between observable facts

and matters of spiritual conviction. This friction, stemming from distinct approaches and aims, sheds light on the evolving landscape of human thought, where the quest for knowledge and the pursuit of purpose persistently meet and separate.

Chapter 4

The Interaction Between Scientific and Religious Thought

Religions are cultural and social structures that have played a significant role in the evolution of culture. For a long time, they have been identified with the exercise of power and with public affairs. They offered a global framework for thinking about reality, including questions like the universe’s origin. When humanity found better ways of dealing with these questions, such as secular democracy and science, some adherents of religion were unsettled by their consequent loss of relevance (Rovelli 2022: 126—127).

The science-religion debate is fuelled by the compelling change wherein science has begun to provide credible explanations for the origin and workings of the cosmos, a domain under the exclusive purview of religious beliefs for centuries (Du Toit 2011: 2).

Various perspectives exist concerning the compatibility or divergence of religion and science. A predominant view posits a clear delineation of their respective domains. This conceptualisation characterises science as devoted to investigating tangible aspects of the physical world, focusing on empirically observable phenomena. Conversely, religion is conceived as oriented towards subjective realms, encompassing the supernatural, ideological constructs and fundamental questions about existential meaning.

Some scholars argue for these domains' mutual exclusivity and complementarity; others identify potential friction or contradiction areas. The discourse remains ongoing, with diverse intellectual perspectives offering varying analyses regarding the modes of interaction and intersection between these spheres of human inquiry.

A prevailing notion is that a well-defined boundary should exist, allowing for a dedicated space where science refrains from encroaching into the realm of supernatural speculation and simultaneously, religion abstains from interfering with the scientific method. This separation is seen as a means to preserve the integrity

of both disciplines, acknowledging their distinct focuses and methods of inquiry. Various perspectives on the matter are explored in the following discussion.

4.1. A History of Tension: Science and Religion

Plato and Aristotle: Shaping Early Thought

> If your belief conflicts with empirically confirmed knowledge, then you are not seeking meaning; you are delusional.
>
> (Hossenfelder 2022: xvii)

A change occurred in human thought over two millennia following the peak of Greek science and culture in the fifth and fourth centuries BC. Although early Greek philosophy was deeply rooted in the concrete sensory aspects of the physical world, Plato challenged this interconnected view of matter and mind. He introduced the notion of an abstract alternative reality, which significantly departed from earlier thinking (Heisenberg 1958: 76).

Plato’s allegory of the cave symbolised the pursuit of truth beyond the sensory world. Philosophers focused on the links between the human soul and God, ethical dilemmas and the interpretation of revelations rather than investigating the external world (Heisenberg 1958: 76).

Building on Plato's ideas, Aristotle developed a philosophy grounded in teleology – the belief that everything has a specific purpose or end goal. His teleological perspective shaped scientific knowledge, emphasising the importance of understanding natural phenomena in terms of their 'why' and 'whereto'. Knowledge was deemed accurate when it unveiled the essence and causes of things (Fourie 2020: 38).

Similarly, early religious thinkers, such as Augustine, recognised the limits of using sacred texts to guide understanding of the physical world. Augustine writes (Augustine 1982: 42):

> Even a non-Christian possesses knowledge about the earth, the heavens, various life forms, plants, minerals, and more, based on reason and experience. It is both disgraceful and perilous for a non-believer to hear a Christian espouse nonsense on these subjects while presumably interpreting Holy Scripture. We must strive to avert such awkward situations, where ignorance in a Christian is exposed and mocked.

This passage highlights the shared ability of both believers and nonbelievers to observe and understand the natural world. Therefore, it is unwise for people of faith to treat the Bible as a source of scientific knowledge, especially when its claims contradict direct empirical findings. Augustine recognises the distinction between scripture and empirical science. He warns against using the Bible as a guide to geology, astronomy, or biology, stressing that such an approach invites ridicule and refutation. Augustine believes presenting the Bible as a scientific text undermines its eternal spiritual truths. Furthermore, attributing unexplained phenomena to God as a convenient explanation reduces God to a symbol of ignorance. If we seek to encounter God, it must be through the revelations we uncover about the world, not the gaps in our understanding (Davies 1983: 209; Miller 2009: 88).

The Black Death, or bubonic plague, wreaked havoc from 1346 to 1353 AD and elicited two distinct responses within the community. One group sought solace by turning to supernatural forces in a world that seemed increasingly hostile to humanity, while another faction aimed to confront the earthly terror by understanding natural processes.

The former response led to a religious faith emphasising the world's need for redemption and the latter paved the way for scientific exploration. The former sees the material world as an adversary and the latter views it as a morally neutral matter upon which human will can be imposed. The former relies on prayer, miracles and magic for comfort and the latter depends on technical solutions (Raymo 1998: 128).

This divergence in responses to the Black Death, between a focus on redemption and a pursuit of scientific understanding, set the stage for the Renaissance. During

this period, a renewed curiosity about the natural world emerged, driven by the same spirit of inquiry that had begun to challenge traditional religious views.

The Renaissance and the Rise of Empiricism

The Renaissance ignited a renewed curiosity about the natural world from the fourteenth to the seventeenth century in Europe. The advancements in science in this period coincided with the development of philosophical ideas closely aligned with the foundations of science. Descartes was a pivotal figure in this transition. He doubted everything that could be questioned, including the existence of the external world, other people and God. Through his systematic method of doubt, Descartes reached his renowned conclusion: *Cogito, ergo sum*. He argues that although we can doubt everything, including the existence of the external world or God, we cannot doubt the existence of ourselves as thinking beings (Heisenberg 1958: 78).

This became the foundational point upon which he built his philosophical system. He aimed to establish a new philosophical system grounded in scepticism and logical reasoning, moving away from reliance on sensory perception or religious revelations. Descartes focused on a fundamental division between God, the world and the self, leading to a division between matter, mind, soul and body (Heisenberg 1958: 78).

Descartes' separation of matter, mind, soul and body profoundly influenced the trajectory of philosophical and scientific thought. This new dualism stood in stark contrast to the Middle Ages, where symbolic meaning was often considered the primary reality, deeply entwined with the spiritual and the divine. The authority of experience and empirical facts emerged, independent of the Christian religion, philosophy and the Church. This coincided with a new interest in experimentation to understand the true nature of things (Heisenberg 1958: 195).

This change opened vast possibilities for human exploration but was viewed with apprehension by the Catholic Church. The trial of Galileo Galilei about his support for the Copernican system marked the beginning of a struggle that continues to this day. In this dispute, proponents of natural science argue that experience provided undeniable truths and that the determination of what occurred in nature should not

be left to human authority but should instead be discerned from nature itself or, in a broader sense, from God. Conversely, advocates of traditional religion contended that an excessive focus on the material world and sensory perception severed the connection with the essential spiritual aspects of human life – those elements of reality that transcended the material world. These two arguments were incompatible, preventing any resolution through agreement or decree (Heisenberg 1958: 196).

The seventeenth-century astronomer Johannes Kepler inaugurated a revolution in the natural sciences with his groundbreaking contributions. He emphasises empirical observation and precise measurement as the fundamental underpinnings of theories about the natural world. This approach elevated natural science to par with theology and metaphysics. Despite religious opposition, Kepler's decision to embrace the Copernican model was influential. He posits that scientific and theological knowledge should be regarded with equal respect, challenging the traditional supremacy of theology. However, he still saw them as interconnected facets of ontological unity (Fourie 2020: 38).

Kepler's contributions were crucial in gradually separating theological and scientific paths. This divergence continued into the Enlightenment, where new ideas about reason and rationality began to shape society, often in opposition to the influence of organised religion. The concept of God became less relevant in explaining the universe’s workings and a mechanistic worldview gradually emerged (Fourie 2020: 38).

This new approach was initially seen as a complementary perspective rather than a departure from traditional Christian beliefs. Two forms of God's revelation were recognised: one in the Bible and the other in the Book of Nature. Although the Holy Scripture was authored by humans and thus subject to error, nature was seen as the direct expression of God's intentions (Heisenberg 1958: 195).

For centuries, scholars have disagreed on whether religion will endure or disappear. Since the seventeenth century, philosophers and scientists have discussed and distributed their ideas on the function of society. During the seventeenth and eighteenth centuries, an intellectual movement that espoused the principles of

reason and rational thought became dominant in Europe. The term Enlightenment (Lumières in French and Aufklärung in German) came to stand for ‘Reason’ as the only true measure of the social goals of knowledge, freedom and happiness. Rational thought became the ideal that they hoped would replace religion as the dominant force in society (Zuckerman & Shook 2017: 75).

Enlightenment ideas suggested a new way of life in which organised religion's beliefs, traditions, rituals and authority did not affect public society. In these secular societies, you can engage fully in politics and economics without ever encountering references to God (Taylor 2007: 1—3).

George Holyoake was a nineteenth-century British social reformer credited with coining the term 'secularism'. Holyoake advocated social and political change, promoting free thought, education and secularism. He believed that public life and governance should be based on secular values such as rationality, ethics and social justice, allowing individuals to practise religion privately without interfering in public affairs (Argyle 2021: 116).

Holyoake's concept of secularism is not merely concerned with the separation of church and state but also proposes a broader cultural shift. Yet, as secularism and science gained prominence, questions arose about the limitations of a purely scientific worldview, particularly in addressing the more profound aspects of human experience. Although Holyoake envisioned secularism as an alternative to Christianity, he recognised that it would never eliminate the remnants of the Christian era. He believed the two could coexist, with religion remaining a freely chosen aspect of private life (Argyle 2021: 116).

Holyoake advocated for a secular public sphere free from religious influence, encompassing education, science, government and the economy. His ideas contributed significantly to the secular movement, advocating for a society where religious influence on public affairs was minimised (Argyle 2021: 116).

Simultaneously, scientists established a solid framework for natural science, shaping both the scientific field and the worldview of much of the public. Natural science

advanced in understanding the material world, composed of objects existing within space and time. Causality was employed to explain how events were influenced by the interaction between matter and the forces acting upon it. Only phenomena that could be perceived by the senses or observed through the precise instruments of technical science were deemed legitimate (Heisenberg 1958: 197).

However, although robust in many domains, the rigid framework of natural science proved too narrow and inflexible to fully accommodate concepts intrinsic to human experience and traditional belief systems. Notions such as the mind, the human soul and the essence of life resisted easy categorisation within this mechanistic worldview (Heisenberg 1958: 197).

The concept of mind, for instance, could only be incorporated as a mere reflection or epiphenomenon of the material world. When scientists turned their attention to psychology, they often examined its mechanical aspects – the observable and measurable components of human behaviour and mental processes. This included studying reflexes, reaction times and primary stimulus-response patterns. In contrast, the field's cognitive properties – higher-level mental processes like memory, problem-solving and perception – initially received less attention due to their less tangible nature (Heisenberg 1958: 197).

Even life itself was reinterpreted as a series of physical and chemical processes governed by natural laws and cause-and-effect patterns. Darwin's theory of evolution offers strong evidence for this view, providing a natural explanation for the diversity and adaptations of living organisms without invoking supernatural forces (Heisenberg 1958: 197).

Within this scientific framework, finding a place for aspects of reality that had long been the focus of traditional religion and philosophy became increasingly challenging. Concepts like the soul, divine purpose, or transcendent meaning seemed to exist only as imaginative constructs or cultural artefacts, rather than objectively verifiable phenomena (Heisenberg 1958: 197).

This friction between the scientific worldview and traditional belief systems has

sparked ongoing debates about the nature of consciousness, the boundaries of scientific enquiry and the connection between empirical knowledge and human values (Heisenberg 1958: 197).

The concept of a 'God-shaped hole' in human existence, proposed by physicist and Anglican priest John Polkinghorne, suggests an innate spiritual yearning. However, this metaphor presupposes a definition of God that harmonises with both scientific understanding of the universe and the human quest for meaning (Raymo 1998: 1).

As the twenty-first century began, many well-educated people in Western societies found themselves in a spiritual quandary. Although scientific progress had fostered a more secular outlook, a lingering desire for traditional religious belief persisted. These individuals grappled with a deep-rooted conundrum: they could neither wholly adopt a perspective based on divine intervention and supernatural occurrences nor entirely discard the notion of a higher power (Raymo 1998: 1).

This tension reflects a broader cultural struggle to reconcile scientific knowledge with spiritual inclination. The 'God-shaped hole' may represent not just a void to be filled, but an intersection of intellectual inquiry, emotional need and existential questioning. It challenges us to consider how our understanding of spirituality and divinity might evolve in an age of scientific enlightenment, without dismissing the deep-seated human desire for transcendence and purpose (Raymo 1998: 1).

The next shift in people’s attitude toward nature was from contemplation to pragmatism. The question became less about understanding nature as it is and more about what could be done with it. Consequently, natural science transitioned into technical science, with each advancement in knowledge accompanied by considering practical applications. This movement was not limited to physics; chemistry and biology followed similar trajectories and the success of new methods in medicine and agriculture furthered these tendencies (Heisenberg 1958: 197).

In Europe, where these ideas were taken to their logical conclusions, an open antagonism between science and religion emerged. As science and rational thinking gained prominence, traditional religious and spiritual safeguards were replaced by

confidence in scientific methods and logical thought. In traditional religious and philosophical systems, moral and ethical guidelines often help individuals make decisions, govern their behaviour and provide a moral compass that goes beyond what can be derived from purely scientific or rational thinking. The ongoing conflict between science and religion evolved over the centuries in this manner, primarily due to shifts towards empirical experience and simplifying complicated ideas (Heisenberg 1958: 197).

4.2. Empirical Inquiry into the Supernatural

> And let us have truth, even if the truth be the awful denial of the good God. We must face the light and not bury our heads in the earth. I am hopeful that scientific investigation, pushed on and on, will reveal new ways in which God works, and bring to us deeper revelations of the wholly unknown. The physical and the spiritual seem to be, at present, separated by an impassable gulf; but at any moment that gulf may be overleaped – possibly a new revelation may come… Every formula which expresses a law of nature is a hymn of praise to God.
>
> (Mitchell 1896: 152)

This tension between scientific inquiry and religious belief is a longstanding one. Some proponents of faith contend that science is inherently ill-equipped to scrutinise matters of religion. Theological perspectives consistently underscore the idea that God exists beyond the material realm in a manner so distinct from our intellectual grasp that fully understanding or articulating God becomes an imposing challenge. It is comparable to asserting that God transcends the boundaries of human comprehension (Robinson 2011: 14).

A widely embraced theological explanation posits that God lacks a physical body and is not confined to any specific spatiotemporal location. This distinctive characteristic sets God apart, considering God as a tangible entity, in contrast to abstract concepts lacking spatial and temporal attributes. Consequently, it can be argued that God lies beyond the scope of scientific investigation, given its

unobservability and immeasurability (Fales 2013: 254).

Reconciling Science and Theology: Historical Attempts and Challenges

Historical attempts to reconcile scientific findings with religious beliefs offer additional insight into this debate. Some religious scientists tried to argue that the new scientific findings do not prove the Bible wrong by reconciling the biblical account of Genesis with the scientific findings of geology.

Benjamin Silliman, for example, was a science lecturer and founder of the American Journal of Science. In 1833, he attempted to find common ground between the geological evidence of Earth's history and the biblical narrative of a six-day creation and a worldwide flood during Noah's time. He concluded that the geological formations did align with the Genesis story, but they required more time for the events of creation than the conventional interpretation of ‘days’ allowed. He argued that the Bible's historical accuracy could be maintained, but its interpretation must be consistent with the Bible and the scientific facts (Numbers 2009: 18).

Silliman's attempt at reconciliation faced criticism from various quarters: biblical literalists who argued he had taken excessive liberties with the Scriptures; literal readers who feared that accepting geological history would undermine the authority of Genesis; secular scientists who maintained that religious texts had no place in scientific discourse; and experts in biblical studies who asserted that geologists should focus on their own field and avoid encroaching on other disciplines (Numbers 2009: 18).

Silliman was not alone in his struggle. Moses Stuart, a contemporary of Silliman's, was a respected linguist. His command of German enabled him to study the early works of higher criticism, which approached the Bible more as a historical and literary text than as God's literal words. When Silliman suggested to Stuart that the modern geological findings necessitated interpreting the 'days' of Genesis as extended periods, Stuart, who had invested considerable effort in mastering ancient languages, was offended by his presumption in interpreting ancient texts (Numbers 2009: 22—23).

Stuart expressed his resentment, stating that he could not see how the revelations of modern science and recent data could dictate the meaning of Moses' writings. He asserted that it was beyond doubt that the sacred authors did not compose their texts with contemporary science in mind and that the Bible was not intended to instruct the Hebrews in astronomy or geology. Consequently, Stuart argued, a 'day' presumably denoted a twenty-four-hour span rather than an extensive geological era for Moses. He accepted that Moses appeared to contradict the findings of geology. However, Stuart maintained that distorting the principles of exegesis to align with a geological theory deviated from the core tenets of scriptural hermeneutics (Numbers 2009: 23).

This debate between Silliman and Stuart reflects a broader tension in religious studies. Eliade argues that religious phenomena cannot be fully understood if they are examined solely through the lens of conventional scientific or historical methods, which often reduce these phenomena to mere objects or events. Religious rituals and beliefs embody a sacredness that transcends ordinary interpretation. Eliade insists that to grasp the essence of religious phenomena, they must be studied as inherently religious, acknowledging their unique significance within the framework of faith. Only by approaching these phenomena with an understanding of their sacred dimension can we appreciate their true meaning and importance to those who hold them dear (Eliade 1958: xi—xii).

The Cognitive Boundaries of the Supernatural

Similarly, one of the perspectives on human perception and experience is that it encompasses dimensions beyond the scope of conventional scientific understanding. Although individuals interpret the world through various modes of awareness, including diverse religious experiences, these perceptions often transcend scientific boundaries. This recognition does not imply an inherent mystery but acknowledges that our biological nature and cognitive processes mediate our experiences.

The qualitative dimensions of consciousness are deeply personal and subjective and

cannot be fully explained through biological factors or brain science alone. Each individual's inner life is rich and complex, with thoughts, feelings and derived meanings that extend beyond mere neurological activity. This underscores the importance of understanding how humans relate to the world around them and emphasises that our experiences, whether mundane or divine, cannot be entirely captured or evaluated through scientific measures. Interpreting the full spectrum of human thought, action and experience requires a broader perspective that recognises the limitations of purely biological explanations (Cottingham 2019: 366).

Although some claim to have had personal experiences or direct encounters with God, these subjective incidents cannot be validated or regarded as scientific evidence. Advocates of this viewpoint propose that science should confine itself to examining and elucidating the actions of entities within the constraints of space and time, relying on the attributes and characteristics of other objects situated in similar spatiotemporal contexts (Fales 2013: 254—255).

Pascal made a similar point about natural theology. He argues that if God has left signs of himself in creation, they reside within the human heart, mind and imagination rather than material objects. Pascal emphasises that nature, at best, offered partial and ambiguous knowledge of the divine. Revelatory experience, he believes, is a better guide to God (Pascal 2013: 39; 68).

On the other hand, as discussed in Chapter 1, neuroscience research has revealed that our biology, including differences in brain structure, natural brain chemicals and hormone levels, dramatically affects how we understand and recall our experiences. Each person's brain is unique, leading to individual ways of experiencing and interpreting events, dreams and memories. Attaching too much importance to these mental experiences might be misguided, as ordinary brain functions or other natural biological processes could often explain them (McNamara & Butler 2013: 221—226; Van Cappellen et al. 2016: 1580).

Contemporary philosopher Barbara Forrest argues that how our minds acquire knowledge plays a crucial role in shaping the limits of what humans can understand about the world. We cannot claim to know anything beyond the boundaries of our

cognitive abilities. Our creative thinking is restricted by the sensory inputs and experiences available to us, which limit what we can imagine or understand. Certain metaphysical ideas might be beyond our reach through empirical investigation, prompting people to turn to faith, religious texts, or religious authorities for answers. Forrest contends that the divide between the naturalism of science and the supernaturalism of religion directly results from the limits of human cognition and the types of knowledge we can access. Recognising this boundary, she argues, is essential for a clear understanding of science (Forrest 2013: 263—264).

Forrest further argues that although our cognitive abilities are limited, they enable us to form various concepts, including supernatural entities like God, through natural mental processes. We cannot, however, reach definitive conclusions about the existence of a supernatural creator because we lack direct experience and knowledge of divine attributes. Even religious believers, including those who adhere to creationist beliefs, find themselves in a paradoxical situation. They must rely on their natural cognitive abilities when presenting supernatural explanations. In the ongoing challenge of identifying specific mental faculties for the supernatural, supernatural explanations fall outside the scope of a practical and widely accepted scientific framework, which relies on testable and empirical evidence. Therefore, there may not be a single definition of science, but it is generally understood that science does not encompass supernatural explanations (Forrest 2013: 264).

This principle was underscored in the Kitzmiller v. Dover Area School District[29] case, where the judge cited the National Academy of Sciences perspective, which asserts that science is confined to empirical, observable and ultimately verifiable data. In science, interpretations are restricted to those deduced from demonstrable evidence – the outcomes derived from observations and experiments that other scientists can substantiate. Anything that can be observed or quantified is susceptible to scientific investigation. Explanations that lack a foundation in empirical evidence are not considered part of the scientific domain. ‘Attributing unsolved problems about nature to causes and forces outside the natural world is a science stopper’ because once an untestable supernatural force is attributed as the cause, there is no longer a

[29] Kitzmiller v. Dover Area School District, 400 F. Supp. 2d 707 (M.D. Pa. 2005)

rationale for pursuing natural explanations because the answer has purportedly been found.

The argument, often presented by theists, that is put forth to support the idea that acts attributed to God are beyond the scope of scientific scrutiny is that science is ill-equipped to comprehend divine intervention and miracles, as they are inherently unique and non-reproducible. As previously discussed, the notion that science must be falsifiable (repeatable) is no longer widely accepted and it is more pertinent to focus on two critical aspects of a robust scientific theory: it is definite and empirical. With this refined understanding of the scientific method, there is no justification for excluding the supernatural from scientific inquiry. Science may still provide explanations by understanding the natural laws that miracles seem to challenge (Fales 2013: 249—250).

The field of cognitive sciences claims to lay the empirical foundation for understanding the genesis of religions. Initially, when evolutionary biology proposed God's role in orchestrating the world's creation, it did not significantly impact theological discourse. However, the emergence of evolutionary psychology subjected the human mind to analysis, bringing belief systems within the scope of scientific inquiry (Teehan 2014: 173—174).

As cognitive sciences advance our understanding of religious beliefs, the necessity of empirical evidence becomes even more critical for substantiating supernatural phenomena. Empirical evidence is needed to substantiate supernatural phenomena, transforming them from speculation into firmly established realities. This transformative process highlights that supernatural events were once natural incidents awaiting scientific validation, seamlessly integrating into the fabric of the natural world. Take Newton's initial scepticism about objects affecting each other at a distance, for example. He found the idea of objects influencing each other from a distance highly unlikely and suggested that God might be the catalyst for initiating gravitational interactions. Nevertheless, as time passed, the law of gravity gained credibility through theoretical understanding and experimental proof, ultimately securing its position as a fundamental principle in physics (Boudry et al. 2010: 231; Chomsky 2010: 6—13).

The credibility of religious and spiritual experiences diminishes when they predominantly occur in naturalistic circumstances capable of independently inducing them, regardless of God's existence. Attributing significance to these experiences may be misguided if they can be readily explained by brain activity or other natural factors (Thurow 2014: 201—202).

Belgian philosopher Maarten Boudry challenges the notion that scientists should remain neutral on religion. He contends that limiting scientific inquiry to the natural realm is inadequate for addressing Intelligent Design and creationist arguments. Boudry argues that if supernatural forces genuinely influence the observable world, scientists should investigate these effects empirically. He encourages prioritising evidence-based research over dismissing supernatural claims as beyond the scope of scientific inquiry (Boudry et al. 2010: 228—242).

Our conventional understanding of causality has already undergone significant revision to accommodate phenomena such as action at a distance and quantum processes and there is no reason not to contemplate the possibility of causes originating beyond the bounds of space and time. If the concepts of non-spatial and non-temporal causes are not intrinsically contradictory, there is no compelling reason to restrict the idea of causation. By remaining open to this possibility, it logically follows that science should not limit its scope to exclude occurrences that can only be elucidated by invoking supernatural agents (Fales 2013: 254—255).

Scientists are, by nature, driven to unravel mysteries rather than avoid them. In the sense of promissory materialism, they view these mysteries as temporary phases, hoping they can eventually be resolved. The notion that certain inquiries are eternally beyond the purview of investigation contradicts the scientific ethos, as nothing is deemed off-limits for study. Consequently, the tally of mysteries has consistently dwindled over time (Singham 2019: 201).

Roger Trigg is a British philosopher widely recognised for his contributions to the philosophy of religion, metaphysics and the connection between science and religion. He posits that if science could explain every facet of existence, it would

stand unassailable, requiring no external justification. Alternative modes of reasoning would then be rendered invalid, with all aspects of knowledge compelled to align with the rigorous standards of scientific evidence and proof. Metaphysics would be dismissed as meaningless speculation[30] (Trigg 2015: ix).

Although Trigg is committed to championing science and its universal truth claims, he harbours reservations about unwarranted attempts to confine all reasoning within the confines of scientific capabilities. Acknowledging science as a human endeavour necessitating justification, he contends that it must draw upon a broader understanding of reason to establish a rational foundation for confidence in its pursuit of truth (Trigg 2015: xi).

Contrary to the assertion that science requires nothing beyond its inherent resources, Trigg counters that it relies on a metaphysical framework. In formulating and executing research, science operates on untested assumptions and implicit presuppositions about the nature of the world under scrutiny. These foundational conjectures, though unproven, constitute the first step that renders scientific inquiry feasible. Therefore, the efficacy and achievements of science hinge on the formidable capacity of human reason to fathom the intricacies of a world not fashioned by human hands (Trigg 2015: 3). He writes:

> Metaphysics without science may not have its feet on the ground [and] … science without metaphysics flounders as if lost in a vast and featureless ocean. It loses all sense of direction or purpose.

The ongoing discourse on the boundaries between the empirical and the supernatural underscores the complexity of reconciling scientific inquiry with religious belief. As science seeks to elucidate the natural world through observable and verifiable data, the question remains whether it can – or should – venture into realms traditionally governed by faith.

It could be argued that science should adopt a broad approach to investigating

[30] In this argument, metaphysics is defined as areas beyond the purview of science, such as philosophy and theology (Trigg 2015: ix).

reality, including phenomena traditionally labelled as supernatural and the complexities of human consciousness. Limiting the scope of scientific inquiry based on current understandings or perceived limitations would mean underestimating the potential of scientific discovery. History has shown that many concepts, once considered beyond the reach of science, such as the nature of the atom (Helrich 2021: 1—40) or the workings of the human brain, eventually yielded to systematic investigation. By applying rigorous, empirically grounded methods, science can extend its reach into these areas, offering insights that may, in the future, bridge the gaps between the known and the unknown.

Scientists should recognise the limits of science, particularly in areas like ethics, aesthetics and metaphysics. By acknowledging these boundaries, science can collaborate with other disciplines to better understand the human experience. Finally, science must remain open to future discoveries, accepting that what is currently unknown or unexplained may become accessible as methodologies and technologies advance. This openness ensures that science continues to evolve, pushing the boundaries of knowledge and understanding, even into realms that currently elude our grasp.

The divergent perspectives within the scientific community underscore the ongoing tension surrounding the boundaries between empirical investigation and the supernatural. Even among physicists, whose work often examines the most fundamental aspects of reality, there is no consensus on where the lines between science and religion should be drawn. This debate is vividly illustrated by the discussions at the Solvay Conferences, where some of the most brilliant minds in physics have grappled with unresolved questions that challenge the very foundations of both disciplines.

Divergence at the Solvay Conferences

The Solvay Conferences focus on prominent unresolved issues in physics and chemistry. Originating with the 1911 Solvay Conference on Physics, an invitation-only event that marked a pivotal moment in the realm of physics, these conferences

continue to this day[31].

One of the most renowned gatherings was the fifth Solvay Conference on Physics in 1927, where leading physicists convened to explore the recently developed quantum theory. Among the 29 participants, 17 went on to receive or had already been awarded the Nobel Prize, including prominent figures such as Marie Curie, the pioneering physicist and chemist known for her research on radioactivity; Max Planck, the originator of quantum theory; Albert Einstein, whose theory of relativity revolutionised our understanding of space and time; Niels Bohr, who made foundational contributions to understanding atomic structure and quantum mechanics; Werner Heisenberg, best known for the formulation of the uncertainty principle; Wolfgang Pauli, noted for his exclusion principle in quantum physics; and Erwin Schrödinger, who developed the wave theory of quantum mechanics (Rare Historical Photos 2022).

One evening during the 1927 conference, Werner Heisenberg, Wolfgang Pauli and Paul Dirac, three of the most influential physicists of the twentieth century, engaged in a casual conversation. During this exchange, one remarked that Planck does not seem to see a contradiction between religion and science. Heisenberg recalled his discussions with Planck and said that Planck asserts the compatibility of religion and science, delineating their distinct roles in understanding reality. Planck, often regarded as the father of quantum theory, contends that science is dedicated to the objective, tangible world, prompting accurate descriptions and comprehension of its interconnectedness. In contrast, religion explores the realm of values, contemplating what ought to be or how one should act, rather than focusing on what simply exists. The dichotomy is evident: science pursues truth or falsehood, while religion concerns itself with the domains of good or evil, noble or base, forming the foundation for ethics (Heisenberg 1972: 82—83).

The historical conflict between these two spheres, dating back to the eighteenth century, is, in Planck's view, rooted in a misunderstanding, specifically a confusion

[31] The Solvay Institutes are committed to fostering and advancing curiosity-driven research in physics, chemistry, and related fields, aiming to ‘expand and deepen the understanding of natural phenomena’ (International Solvay Institutes).

between the metaphorical and allegorical language of religion and the precise statements of science. This misinterpretation renders the discord nonsensical. Planck links science to the objective aspects of the world and religion to the subjective facets (Heisenberg 1972: 82—83).

In this schema, science actively engages and debates the objective side of reality, focusing on empirical observations and verifiable facts. On the other hand, religious faith embodies the expression of subjective choices, guiding us in adopting standards for our actions and way of life. These decisions are undoubtedly influenced by societal, educational and environmental factors, but ultimately, they are subjective and transcend the 'true or false' criterion. The subjective nature of religious decisions stems from individual and collective choices, often shaped by familial, national, or cultural affiliations. When understood in their respective roles, science and religion coexist harmoniously, contributing to a more comprehensive understanding of existence (Heisenberg 1972: 82—83).

Heisenberg, who is also celebrated for his role in the development of quantum mechanics, added (Heisenberg 1972: 82—83):

> As far as he [Plank] is concerned, therefore, the two realms – the objective and the subjective facets of the world – are quite separate, but I must confess that I myself do not feel altogether happy about this separation. I doubt whether human societies can live with so sharp a distinction between knowledge and faith.

Pauli, a theoretical physicist renowned for the Pauli exclusion principle, remarked that his perspectives align with Einstein's, who believed that God is somehow intertwined with the unchanging laws of nature. Einstein, widely regarded as one of the greatest physicists of all time, had an appreciation for the inherent order in the universe, perceiving it in the simplicity of natural laws. His profound sense of this simplicity was particularly evident during his formulation of the theory of relativity. Einstein was not religious and did not accept the notion of a personal God. He saw no inherent division between science and religion; the central order is perceived as part of both subjective and objective realms (Heisenberg 1972: 83—84).

Pauli further observed that advancements in science, such as relativity and quantum physics, challenge the rigid, mechanistic worldview. Quantum theory, for instance, introduces the concept of complementarity, suggesting that an object can exhibit different characteristics depending on the observer's perspective. This represents a shift from the traditional view that objects exist independently of our observations. As science examines these emerging ideas, the connection between science and religion may continue to evolve. A science that adopts this way of thinking could become more open to various religious expressions and, with a broader perspective, might contribute to the realm of beliefs and morals (Heisenberg 1972: 83—84).

Dirac, another prominent physicist and one of the founders of quantum mechanics, voiced his objection to engaging in discussions about religion, asserting that honest scientists should acknowledge religion as a collection of unfounded assertions divorced from reality. According to him, the concept of God is a creation of the human imagination, a phenomenon understandable in primitive societies facing the formidable forces of nature. In the present era, with our comprehensive understanding of natural processes, such anthropomorphic explanations are deemed unnecessary. Furthermore, Dirac contends that positing an Almighty God offers no practical benefits. Instead, it leads to unproductive inquiries into the reasons for suffering, injustice and the disparities between the rich and the poor – issues that a benevolent deity might have prevented. According to Dirac, the persistence of religious teachings is not a testament to their convincing nature but rather a tool to appease the lower classes. His aversion to religious myths stems from their inherent contradiction across various belief systems (Heisenberg 1972: 85—87).

He emphasised that random events, for example, his birth in Europe rather than in Asia, should not be the basis for establishing truth or influencing his convictions. Faith in God promotes the notion that we should yield to a higher power, sustaining social structures that may have been effective in the past but are no longer suitable for the contemporary world. Drawing an analogy between life and science, Dirac likened both to a series of challenges that must be individually addressed. He dismissed the broader context mentioned by his colleagues as a mental construct

that is added a posteriori, emphasising the necessity of solving difficulties one at a time rather than relying on overarching narratives (Heisenberg 1972: 85—87).

Bohr, a key figure in the development of quantum mechanics and the concept of complementarity, later acknowledged that the idea of a personal God felt unfamiliar to him. Nevertheless, he emphasised the distinction between the language used in religion and that of science. According to Bohr, religion employs a form of expression more akin to poetry than to the precise language of science. Science generally deals with objective facts, while poetry explores subjective feelings. Consequently, when someone claims that religion addresses objective truths, it should adhere to the same standards of truth as science (Heisenberg 1972: 87—90).

Bohr challenged the notion of a strict division between the objective and subjective aspects of the world. He considered this division arbitrary and too simplistic. He pointed out that religions, throughout history, have utilised images, parables and paradoxes to convey their insights, indicating that these unconventional forms are necessary to comprehend the profound reality they attempt to describe. In Bohr's view, such symbolic expressions do not negate the authenticity of the reality they represent and trying to separate it into objective and subjective facets does little to enhance our understanding (Heisenberg 1972: 87—90).

Bohr added that religion addresses the aspects of our being, life and death. Its pledges are designed to guide our behaviours, influencing our existence, albeit indirectly. We cannot simply observe these commitments dispassionately from an external standpoint. Furthermore, our stance on religious matters is linked to our perspective on society. Although religion may have initially emerged as the spiritual foundation of a specific human community, there is debate about whether it has consistently been the predominant force shaping societies throughout history or if, once established, societies evolve and create new spiritual frameworks aligned with their evolving knowledge (Heisenberg 1972: 87—90).

In conclusion, the discussions at the Solvay Conferences reveal the evolving relationship between science and religion, as viewed by some of the most prominent physicists of the twentieth century. Figures like Planck and Einstein sought harmony

between these two realms, while others like Dirac rejected any overlap, viewing religion as a relic of a less scientifically informed past. Bohr's reflections, however, suggest that the boundaries between objective scientific truth and the subjective truths of religion are not as clear-cut as they might seem. As science continues to explore the mysteries of the universe, the dialogue between these two spheres will likely remain dynamic, each contributing to a broader understanding of human existence.

Chapter 5
Beyond Conflict: Harmony Between Faith and Reason

The tension between faith and reason has long influenced human intellectual and spiritual endeavours. This chapter examines the connection between science and religion, considering how these two areas of knowledge can coexist, clash, or complement one another. By analysing different approaches to aligning scientific inquiry with religious belief, valuable insights are gained into religion's resilience in the face of advancing scientific knowledge.

The chapter commences with a historical overview of the dialogue between science and religion, emphasising ongoing efforts to address fundamental questions about existence and the nature of the universe. It discusses several frameworks for understanding their relationship, including Non-Overlapping Magisteria, methodological naturalism[32] and Einstein's redefinition of religion.

The discourse extends to specific challenges faced by materialist perspectives in science, as articulated by Beauregard, contrasting this with Lemaître's advocacy for a clear separation between scientific inquiry and matters of faith. Nietzsche's critique of science offers valuable insights into the limitations of purely rational approaches to understanding human experience. His argument highlights the importance of considering multiple perspectives when grappling with questions of meaning and purpose.

In conclusion, this discussion highlights the complexity of the connection between science and religion, calling for a thorough understanding that recognises the conflicts and the synergies that can emerge when these two influential domains meet.

[32] Methodological naturalism restricts science to studying observable, testable phenomena in the natural world, excluding supernatural or metaphysical questions. This demarcation allows science and religion to coexist by focusing on distinct domains: the natural world for science and broader metaphysical concerns for religion and philosophy (Boudry 2013: 83—86).

5.1. Bridging Scientific and Religious Perspectives

Throughout history, humans have sought to understand and find their place within the world around them. This quest has given rise to both religious and scientific endeavours, each attempting to address fundamental questions about our existence and the nature of the universe.

All supernatural belief systems have catered to two central needs: a rational understanding of the surrounding world and emotional security within it. A robust religious faith typically comprises three essential elements: a shared cosmology (a narrative detailing the universe and our place within it), spirituality (an individual's response to the world's mysteries) and liturgy (public expressions of awe and gratitude, encompassing rites of passage) (Humphrey 1996: 10).

Historically, humans have answered cosmological questions through tribal myths, scriptures and religious traditions. Drawing from fundamental experiences of creation, these stories have offered enduring wisdom. However, for many, these traditional narratives have been supplanted in the public domain by the scientific story of the universe (Raymo 1998: 2).

The perceived conflict between science and religion predominantly revolves around cosmological inquiries: What is the nature of the universe? What is its origin and ultimate destination? What defines the human self and where do we belong? What awaits us in the future? This clash is fuelled by our simultaneous quests for a secular grace derived from comprehending the material world and for divine inspiration, offering glimpses into the transcendent and mysterious (Lightman 2014: 38; Wuthnow 2009: 165; Thomson 2009: 14).

Some scientists who lean towards atheism have used science to discredit beliefs, implying that anything beyond the realm of scientific inquiry is unimportant and superstitious. Extremists with strong opinions often dominate the conversation. Although many highlight conflicts, people today view science as a dependable method for understanding the natural world while recognising that it does not cover all aspects of human curiosity (Collins 2010). There is room for religion, faith,

theology, philosophy and science to coexist.

In contrast to more rigid viewpoints, some belief systems seamlessly accommodate the understanding that the physical history of the universe is not clarified by merely consulting religious texts or unquestioningly trusting handed-down traditions. They readily embrace the secular nature of public life, appreciate diverse opinions, genuinely tolerate differences and acknowledge that no individual holds absolute truths.

Examples of this harmony can be found in some Anglican churches and certain branches of Buddhism. These religions recognise that their true realm of knowledge pertains to our inner lives – the significance we ascribe to our existence – rather than the external world, the regulations governing public affairs, or our comprehension of the physical universe (Rovelli 2022: 127—128).

The challenge lies in integrating scientific advancements into a framework that imparts meaning and purpose to human existence. This necessitates a more comprehensive understanding beyond simplistic dichotomies, compelling us to reassess our worldview. The goal is to harmonise spiritual and moral necessities with scientific and intellectual capabilities, highlighting the interconnectedness of spirit and nature and surpassing the limitations of strict laboratory tests in exploring life and biology (Heisenberg 1972: 249—257).

Physicist Chet Raymo's experience exemplifies some individuals' journey reconciling scientific and religious perspectives. He writes that although he recognised the inability of science as a vessel too shallow to contain the profound mysteries of existence, the captivating cosmological perspective in science reshaped his understanding of the world. Although notions of immortality and a personal God responding to prayers seemed rooted in outdated views, he also unearthed meaningful mystical and liturgical practices within the Judeo-Christian tradition that enriched his pursuit of a profound connection with the Absolute (Raymo 1998: 8).

The ongoing dialogue between science and religion will likely endure, given that both

are dynamic and evolving. They each strive to establish themselves as valid approaches to addressing significant issues, vying for recognition as legitimate contenders for social resources.

At the heart of these intellectual skirmishes is genuine disagreement over the meaning of sacred texts, the boundaries of science and the implications of science for morality and worldviews (Numbers 2009: 50). Some intellectuals reconcile science and religion, often by formulating their own definitions or criteria. Below are a few examples of this approach.

5.2. Non-Overlapping Magisteria: A Simplistic Resolution?

The palaeontologist Stephen Jay Gould proposes a seemingly harmonious coexistence between science and religion through his Non-Overlapping Magisteria (NOMA) concept. According to Gould, these magisteria – the domains of science and religion – should respect each other's boundaries to avoid conflict. Focusing on the empirical realm, science seeks to understand the natural world, while religion addresses human purposes, meanings and values (Gould 2002: 4—9).

Gould emphasises that the rules, questions and criteria governing science and religion differ significantly and should remain distinct. He advocates for a respectful separation of these domains, arguing that, given the limitations of human knowledge, open-minded scepticism is a rational approach (Gould 2002: 4—9). This principled separation is intended to promote dialogue and coexistence rather than strict separation

However, Gould's NOMA concept oversimplifies the complex relationship between science and religion. Although the distinction between non-overlapping magisteria may apply in some contexts, the human experience reveals significant overlaps between the two domains. As material and spiritual beings, humans navigate both the measurable realm of science and the intangible concepts of religion, such as meaning, purpose and transcendence. This suggests that individuals do not always compartmentalise their understanding of the world as neatly as Gould's model

implies.

Gould's proposal, often termed the ‘Solomonic solution’, seeks to reconcile the perceived conflict between Darwinian and religious fundamentalists. However, this model encounters significant challenges when applied to historical contexts where science and religion have been entwined rather than separated. Scriptures, filled with references to spirits, dreams and divine interventions, defy the neat separation suggested by NOMA. The Hebrew Bible, for instance, was never intended to serve as a scientific manual; instead, it is a compilation of narratives addressing significant themes in a manner comprehensible to its contemporary audience. These texts draw upon the prevailing ideas of their era to weave compelling stories about life and the divine, employing familiar concepts to convey profound messages about existence and God (Pigliucci 2018: 26—27; 148)

Science and religion, Gould contends, serve distinct purposes: religion offers meaning and purpose, while science explains the workings of the natural world. However, NOMA's fundamental flaw becomes apparent when considering that many religions include creation stories as core tenets, which often clash with scientific understanding. Young Earth creationists, for instance, interpret the Bible literally and reject evolutionary theory, fuelling an ongoing cultural conflict between science and religion (Pigliucci 2018: 148). It is worth noting that many religious adherents interpret these narratives metaphorically, potentially alleviating some of this tension.

Moreover, NOMA’s inadequacy is further highlighted by the fact that science can investigate religion as a cultural and historical phenomenon. As scientists scrutinise religious belief and faith, the neat divide between the magisteria weakens, challenging the viability of Gould's model. Additionally, Gould’s conceptualisation of religion as the exclusive domain for dealing with matters of value overlooks philosophy's significant role in these discussions. Philosophy often bridges the gap between science and religion by exploring ethical implications and the nature of existence, which are not strictly confined to either domain (Pigliucci 2018: 148).

In conclusion, Gould’s NOMA attempts to resolve the science-religion conflict, but it ultimately presents an overly simplistic understanding of both domains. The real-

world interactions between science and religion are far more multifaceted, transcending the constraints of Gould's proposed model (Pigliucci 2018: 148). The complex entanglement of the magisteria within human culture and experience suggests that a more integrated approach may be necessary to fully grasp the interaction between science and religion.

5.3. Methodological Naturalism: Scientific Boundaries

In the philosophy of science, a significant debate centres on whether scientific inquiry should remain within the boundaries of methodological naturalism or expand to include investigations of supernatural claims. Although both NOMA and methodological naturalism set boundaries between science and other forms of inquiry, NOMA separates the domains of science and religion. In contrast, methodological naturalism focuses on the internal criteria of science, excluding supernatural explanations from scientific inquiry.

Methodological naturalism holds that science is concerned only with natural phenomena, providing a clear demarcation between science and other inquiry (Barker & Kitcher 2014: 67—70; Boudry 2013: 83—86). However, as scientific advancements challenge the limits of naturalism, some scholars question whether science should re-evaluate its methodological restrictions.

The distinction between the natural and the supernatural confines science to deal only with phenomena that can be observed and tested in the natural world, such as plants, animals and weather. Matters involving the supernatural – such as the role of God or questions concerning the purpose of life – are regarded as beyond the scope of scientific inquiry. These questions are instead relegated to the domains of philosophy and religion (Boudry 2013: 83—86).

This separation allows for the coexistence of science and religion by preserving a space for supernatural speculation where science does not intrude. Thus, science focuses on understanding the natural world, while religion is left to address broader, metaphysical concerns without interference from scientific inquiry (Boudry 2013:

83—86).

Proponents of methodological naturalism argue that supernatural claims, by definition, cannot be subjected to the empirical scrutiny required in scientific inquiry. Science draws conclusions from falsifiable hypotheses, repeatable experiments and observable phenomena. Supernatural claims, which often invoke entities or forces beyond nature, resist such analysis (Pennock 2011: 289—291). The concern is that allowing supernatural explanations into science would undermine the rigour and reliability of scientific methodologies.

Some philosophers of science argue that strict adherence to methodological naturalism might limit scientific exploration. They suggest that science should not automatically dismiss supernatural claims without evaluating whether they can be studied under empirical conditions (Boudry 2013: 92—93).

Supernatural hypotheses could, in principle, be subjected to scientific investigation if they make claims about the natural world that can be observed and tested. For example, claims of miraculous healings or apparitions that allegedly affect the physical world could be examined for evidence (Barker & Kitcher 2014: 67—70).

The demarcation between natural and supernatural is not always clear. Some previously thought supernatural phenomena were eventually understood through natural explanations as scientific knowledge advanced. Contemporary philosophers of science Gillian Barker and Philip Kitcher advocate for an open-minded yet cautious approach in which scientists remain willing to investigate claims traditionally associated with the supernatural if they can be empirically examined (Barker & Kitcher 2014: 67—70)

Neuroscience and cognitive science developments have begun to blur the lines between scientific and supernatural claims. Research into consciousness, near-death experiences and altered states of mind – traditionally areas reserved for philosophical and religious inquiry – are now being examined through scientific methodologies (Churchland 2013: 13—20). These developments raise questions about whether science can offer natural explanations for phenomena once attributed

to supernatural forces.

The approach of methodological naturalism in distinguishing science from non-science faces several challenges. Firstly, it risks undermining both science and philosophy by assuming that only science holds epistemic authority, dismissing metaphysical questions as mere speculation. Secondly, establishing a clear boundary between natural and supernatural phenomena is difficult without presupposing what constitutes science and non-science. Lastly, labelling certain phenomena as supernatural to exclude them from scientific inquiry overlooks key issues, such as a lack of specificity, vague concepts and an emphasis on criticism without offering constructive explanations (Boudry 2013: 83—86).

Methodological naturalism has underpinned much scientific progress, but there are growing calls to reconsider whether it imposes unnecessary constraints on scientific inquiry. As science continues to explore the boundaries of human knowledge, the tension between these perspectives will likely persist as an ongoing philosophical challenge.

Rather than relying solely on demarcation criteria, it may be more productive to critically examine claims based on their empirical support and logical coherence, regardless of their purported natural or supernatural origin. Engaging with these claims provides valuable insights into the limitations of evidence for supernatural phenomena and highlights the enduring psychological inclination towards supernatural explanations (Boudry 2013: 83—86).

Methodological naturalism, therefore, must be applied with caution, ensuring that it does not prematurely dismiss potentially significant inquiries but instead maintains the rigour of scientific investigation while remaining open to expanding our understanding of the world (Boudry 2013: 83—86; Barker & Kitcher 2014: 67—70).

5.4. Deism, Intervention and Immutable Laws

Physicist Alan Lightman addresses the challenge of reconciling the conflicting

worldviews of religion and science by proposing criteria for religious belief that would align with, rather than contradict, scientific principles (Lightman 2014: 40—41):

> I would not pretend to know the nature of God, if God does indeed exist, but for the purposes of this discussion, and in agreement with almost all religions, I think we can safely say that God is understood to be a Being not restricted by the laws that govern matter and energy in the physical universe. In other words, God exists outside matter and energy. In most religions, this Being acts with purpose and will, sometimes violating existing physical law (that is, performing miracles), and has additional qualities such as intelligence, compassion, and omniscience. Starting with these axioms, we can say that science and God are compatible as long as the latter is content to stand on the sidelines once the universe has begun. A God that intervenes after the cosmic pendulum has been set into motion, violating the physical laws, would clearly upend the central doctrine of science. Of course, the physical laws could have been created by God before the beginning of time. But once created, according to the central doctrine, the laws are immutable and cannot be violated from one moment to the next.

Lightman examines various perspectives on the connection between God and the universe, focusing on how these views align with or contradict scientific principles. He explores beliefs ranging from atheism, which denies the existence of God, to deism, where God creates the universe but refrains from further involvement. Lightman also discusses views akin to immanentism, where God sets the universe in motion and operates within the unchanging laws of nature and interventionism, where God not only creates the universe but occasionally intervenes, performing acts that could be perceived as miracles (Lightman 2014: 41—42).

Although Lightman does not present these views as being neatly categorised, he highlights how each varies in its compatibility with the principles of science. For instance, a deistic view, in which God assumes a passive role after creating the universe, aligns more readily with scientific inquiry than an interventionist view, where divine actions would disrupt the predictability of natural laws. This perspective allows for a more harmonious coexistence between scientific understanding and

religious belief, acknowledging both the orderly processes that govern the universe and the possibility of a divine creator. He suggests that, despite their differences, spiritual and scientific perspectives can both foster a shared sense of wonder about the universe (Lightman 2014: 41—42; 64—65).

Many major religions, including Christianity, Judaism and Hinduism, adhere to an interventionist perspective, which appears to conflict with the principles of science, as science relies on the consistency and predictability of natural laws. From Lightman's analysis, it follows that, except for a deistic God who assumes a passive role after the universe's inception, all other conceptions of deity potentially conflict with the foundational assumptions of scientific inquiry.

This approach recognises the potential conflicts between certain religious beliefs and scientific principles while acknowledging the possibility of coexistence and complementarity between spiritual and scientific perspectives. It emphasises the complexity of the relationship between faith and reason, suggesting that a comprehensive understanding of reality may require an appreciation of both viewpoints.

5.5. Redefining Religion

Albert Einstein grappled with defining religion and acknowledged the difficulty of finding a universally satisfying answer. He suggested shifting the focus from questioning the essence of religion to examining the goals and desires of individuals exhibiting religious tendencies. According to him, spiritually enlightened individuals strive to free themselves from personal desires, directing their attention towards profound thoughts, emotions and aspirations that transcend the individual self (Einstein 1967: 28—29).

Importantly, this concentrated focus does not necessarily need to be rational or tied to a supernatural entity, allowing figures such as Buddha and Spinoza to be included in the category of religious individuals. From Einstein's perspective, religion represents humanity's effort to attain a clear and comprehensive awareness of these

values and objectives, continuously strengthening and expanding their influence (Einstein 1967: 28—29).

In this definition, the apparent conflict between science and religion diminishes. Science can establish what is factual but not what ought to be, leaving room for value judgements beyond its scope. Conversely, religion exclusively deals with evaluating human thought and action, lacking the ability to make factual claims or describe relationships between observable facts (Einstein 1967: 28—29).

Tensions arise when a religious community staunchly asserts the absolute truth of all statements in religious texts, such as the Bible. At the same time, scientists focus on value judgements rooted in the scientific method. Einstein's perspective promotes harmonious coexistence, acknowledging the distinct domains of science and religion and appreciating their complementary roles in understanding the complexities of human existence (Einstein 1967: 28—29).

In summary, methodological naturalism discussed above maintains a strict boundary between science and religion, while both Einstein and Lightman propose ways for them to coexist – Einstein redefining religion and Lightman acknowledging the limits of science and the value of spiritual experiences.

5.6. A Neuroscientific Perspective on Spirituality

Mario Beauregard is a neuroscientist who challenges the materialist view that everything – thoughts, emotions and spiritual experiences – can be explained solely by physical processes in the brain. Materialists often dismiss spiritual experiences as illusions, similar to how Scrooge in A Christmas Carol attributes Marley's ghost to indigestion. In contrast, Beauregard believes these experiences hint at deeper, non-physical aspects of reality (Beauregard & O'Leary 2007: ix; Dickens 1843: 20).

His research on Carmelite nuns experiencing *unio mystica*, or mystical union with God, utilises brain imaging tools like functional magnetic resonance imaging. He found that multiple brain areas, such as the temporal lobes and the limbic system,

are involved in these spiritual experiences, though they do not cause them.

Beauregard critiques molecular biologist Dean Hamer's idea of a ‘God gene’ that hardwires spirituality into our genetics. He acknowledges that genetics may play a role but argues that spiritual experiences are not reducible to a single gene or brain region. Instead, such experiences arise from interactions among various brain areas (Beauregard & O'Leary 2007: xiv—35).

In contrast to Beauregard's belief in the significance of spiritual experiences, twentieth-century philosopher Bertrand Russell suggests that science reveals a meaningless and purposeless world where human lives and achievements result from random events without any grand plan. He posits that nothing can prevent death and all accomplishments will eventually be lost when the universe falls apart. Russell believes that philosophies that ignore these harsh truths are unlikely to succeed and that we must accept this bleak reality as the foundation for understanding life (Russell 1993: 66—67).

This nihilistic view sharply contrasts with Beauregard's perspective on spirituality and the meaning of existence. Russell's outlook emphasises despair and the inevitability of oblivion and Beauregard argues for the significance of spiritual experiences, suggesting they may reveal deeper dimensions of existence. The former sees science as leading to a bleak understanding and Beauregard uses scientific methods to explore spiritual experiences, advocating for synthesising scientific insight and spirituality (Beauregard & O'Leary 2007: xiv—35).

Beauregard contends that if Russell is correct in asserting that humanity lacks a specific purpose, it logically follows that there may be no spiritual dimension to human existence. Given this perspective, embracing material naturalism – which maintains confidence that our understanding will evolve and improve – becomes a rational course of action (Beauregard & O'Leary 2007: xiv—35).

The idea that a lack of specific purpose negates the existence of spirituality is debatable. Spirituality can be independent of a defined purpose and can exist in various forms, such as personal meaning, connection to others, or experiences

beyond the physical realm.

In this discussion, it is pertinent to consider Peter Berger's insights as a sociologist of religion. He contends that attempts to incorporate secular (non-religious) elements into religious practices have not proven successful over time. Conversely, religious groups that emphasise supernatural beliefs, which may appear incongruous in academic settings, have attracted adherents. Even non-materialistic spiritual forms of religion have endured amidst modern shifts. A significant factor contributing to the persistence of these religious expressions is the reported frequency of religious, spiritual and mystical experiences. Although scientists have proposed materialist theories, they have not yet provided satisfactory explanations for these phenomena (Berger 1999: 4; Beauregard & O'Leary 2007: 188).

In light of these observations, Beauregard suggests that spiritual traditions may offer valuable insights into the mind, consciousness, reality and the meaning of life through intuitive and experiential knowledge. He argues that developing a scientific framework could be essential for examining potential evidence that aligns with this viewpoint. Such a framework might recognise the limitations of strictly materialistic perspectives in science and advocate for a more inclusive approach that considers both subjective and objective experiences and inner and outer realities (Beauregard & O'Leary 2007: 294—295).

He further posits that this scientific approach should promote investigation into the neural, physiological, psychological and social factors influencing religious, spiritual and mystical experiences. Moreover, it should explore the observable effects of these experiences and spiritual practices on health and overall well-being. Doing so may advance our scientific understanding of how spirituality interacts with other facets of human existence (Beauregard & O'Leary 2007: 294—295).

In conclusion, Beauregard's research offers a compelling counter-narrative to the materialist perspective by suggesting that spiritual experiences are not mere illusions but phenomena that warrant further exploration. His approach challenges us to consider the relationship between neuroscience and spirituality, advocating for an understanding incorporating scientific inquiry and subjective experience.

5.7. Bridging Science and Faith Without Concordism

Beauregard's perspective emphasises the significance of studying spirituality's impact on human experience. A contrasting approach can be found in the work of priest and physicist Georges Lemaître. Although the development of Lemaître's ideas on the relationship between science and faith during the 1920s remains largely undocumented, a pivotal insight into his thoughts emerged in the early 1930s. The first comprehensive account of his views on this matter comes from an extensive interview published in *The New York Times* in 1933 (Aikman 1933; Felipe 2017).

In this notable interview, Lemaître articulated a clear stance against concordism – the attempt to reconcile scientific theories with religious beliefs – and rejected using scientific findings for religious apologetics. This position underscored Lemaître's commitment to maintaining a distinction between scientific inquiry and matters of faith, demonstrating a thoughtful understanding of the links between these two domains (De Felipe 2017).

Lemaître's approach represents a departure from attempts to use scientific discoveries as evidence for religious beliefs or to interpret religious texts through the lens of scientific theories. Instead, he advocated for a more compartmentalised view, where science and faith could coexist without necessarily intersecting or validating each other (Aikman 1933; De Felipe 2017).

A particularly striking exchange with the interviewer occurred when Lemaître stated (Aikman 1933; De Felipe 2017):

> Once you realise that the Bible does not purport to be a textbook of science, the old controversy between religion and science vanishes.

Beyond this 1933 interview, the most comprehensive source of insight into his views is his 1936 lecture on science and faith, delivered at the Sixth Catholic Congress of Malines. In this lecture, he argued that science and religion are both paths to truth

but seek different types. Science aims to understand the natural world, while religion addresses spiritual and salvific truths (De Felipe 2017).

He said that the conflict between science and religion does not arise from personal experiences or scientific discoveries but from how people interpret the Bible. According to Lemaître, when individuals interpret scripture based on personal beliefs, it inevitably leads to conflicting views – some consider it a flawless source of scientific truth. In contrast, others find it incompatible with modern science. He asserts that this ongoing conflict mainly involves those with limited understanding of either field. For those knowledgeable, the debate centres more on differing interpretations of others' beliefs (Aikman 1933).

Lemaître advocates deferring the interpretation of the Bible to the church, aligning with the principle of separating scientific inquiry from religious doctrine. He views this approach as a scientifically sound practice because the church consistently acknowledged the Bible's primary role in imparting teachings related to salvation rather than conveying scientific knowledge. Although the church's view on the boundary between science and religion has evolved, Lemaître firmly believes they remain fundamentally separate yet naturally compatible (Aikman 1933).

Lemaître’s optimism about the potential for human understanding is also a central theme. He believes that the universe is rational and that scientific problems are meant to be solved. He proposes that a Christian researcher may even have an edge over a non-believing colleague due to the belief that the universe was designed with an underlying logic. Although faith doesn’t provide new tools for scientific investigation, Lemaître argues that it offers a sustaining optimism rooted in the conviction that there is a solution to every enigma in nature. He maintains that this belief in the solvability of nature’s mysteries could motivate researchers to continue their pursuit of truth. However, this perspective can be contrasted with the experience of many believers, who often view certain aspects of life or the universe as divine mysteries beyond human comprehension (Tanzella-Nitti 2005: 245).

Some people of faith may regard certain questions as divine enigmas, not intended for complete human comprehension. This outlook often results in embracing the

unknown as an element of God's grand design. Conversely, researchers approach such puzzles with inquisitiveness and the conviction that human advancement may ultimately yield answers. They perceive the unknown as a hurdle that could potentially be overcome through persistent investigation and scientific breakthroughs.

This distinction underscores divergent attitudes towards the boundaries of human understanding. Those with religious beliefs are more inclined to accept that some aspects of existence might perpetually elude explanation. Meanwhile, scientists maintain hope that progress will eventually illuminate even the most baffling phenomena.

In conclusion, Lemaître's stance suggests that religious faith and scientific inquiry can coexist without conflict if their distinct purposes are respected. His view that a believer may have an advantage due to their faith may resonate with those who share his beliefs, others – both religious and non-religious – may find their motivation in the sheer curiosity and pursuit of knowledge that drives scientific discovery.

5.8. Balancing Rationality and Existential Fulfilment

Friedrich Nietzsche's critique of science challenges the optimistic belief that scientific progress inevitably brings humanity closer to truth and enlightenment. He is sceptical of the prevailing Enlightenment view that science naturally leads to truth and human progress. However, his criticism does not amount to a rejection of science itself.

Nietzsche recognises science's immense power in pursuing objective knowledge while cautioning against its limitations in addressing humanity's deeper existential and metaphysical needs. He writes (Nietzsche 1993: 85):

> The noblest manifestation of that other form of 'Greek cheerfulness', the Alexandrian, is the cheerfulness of the theoretical man. It exhibits the same characteristic symptoms that I have just deduced from the spirit of the un-Dionysian: it combats Dionysian wisdom and art, it seeks to dissolve myth, it

> substitutes for a metaphysical comfort an earthly consonance, in fact, a *deus ex machina* of its own, the god of machines and crucibles, that is, the powers of the spirits of nature recognized and employed in the service of a higher egoism; it believes that it can correct the world by knowledge, guiding life by science, and actually confine the individual within a limited sphere of solvable problems, from which he can cheerfully say to life: 'I desire you; you are worth knowing'.

Here, Nietzsche distinguishes two contrasting paths to finding meaning in life. The Dionysian way embraces chaos, emotion and the mysterious aspects of existence. In opposition, the Alexandrian way emphasises logic, science and the pursuit of knowledge. Scientific thinkers seek solace in rational understanding, believing knowledge can unravel life's mysteries and bring contentment. This perspective asserts that comprehending the world through scientific means can make life worthwhile and improvable (Nietzsche 1993: 85—89).

Nietzsche critiques this reliance on knowledge as a convenient solution to life's complexities. He employs the concept of *deus ex machina* to illustrate how scientific thinkers fabricate their own god through reason, akin to a deity magically resolving plot issues in a play. In Nietzsche's view, this approach oversimplifies existence by substituting deeper metaphysical comfort with the notion that scientific understanding can explain or rectify everything (Nietzsche 1993: 85—89).

Ultimately, Nietzsche views the scientific and rational approach as an artificial means of coping with life's inherent irrationality and chaos. He contrasts this sharply with the alternative perspective that embraces these fundamental aspects of existence, accepting life's mysteries and emotional depths rather than attempting to explain them away (Nietzsche 1993: 85—89).

He challenges the notion that scientific discoveries can provide the same sense of wonder, meaning and purpose once offered by religious and metaphysical beliefs. As scientific explanations become commonplace, Nietzsche fears a cultural disengagement, leading to the world's disenchantment (Nietzsche 1993: 85—89; Babich 2007: 206—237).

Nietzsche acknowledges science as a transformative cultural force, but argues that it fails to address the metaphysical dimensions of human life. As traditional sources of meaning – such as religion, metaphysics and art – are displaced or discredited by scientific progress, culture risks becoming hollow. This leaves individuals grappling with the potential despair of a seemingly meaningless existence (Nietzsche 1996: 199).

Nietzsche foresees that weakening religious and philosophical systems might lead to a cultural regression, where humanity must 'weave its tapestry' anew. He predicts that the disillusionment caused by the decline of traditional belief systems could spark a resurgence of irrational forces. These might manifest as myths, illusions, or dogmatic ideologies as individuals seek to fill the existential void that science's inability to provide deeper meaning creates (Nietzsche 1996: 199; Babich 1994: 146—147).

This resurgence of irrational beliefs could challenge the foundations of scientific inquiry and threaten intellectual progress. However, Nietzsche does not necessarily predict a complete regression of scientific thought. Instead, he warns of a cultural impoverishment that might lead to nihilistic despair or a reactionary embrace of outdated mythologies (Babich 2007: 208—209).

In essence, Nietzsche's critique highlights the tension between scientific progress and human needs for meaning and purpose. He challenges us to consider how society can balance the pursuit of objective knowledge with the preservation of cultural richness and existential fulfilment (Babich 2007: 206—237; Solomon & Higgins 2000: 96—98).

Nietzsche's scepticism towards science is linked to his broader philosophical concern with nihilism – a condition where life is perceived as devoid of meaning or value. This preoccupation is epitomised in his famous declaration that 'God is dead,' a phrase symbolising the decline of religious and metaphysical beliefs in the face of scientific rationalism (Nietzsche 2009: 79—80):

> God is dead. God remains dead. And we have killed him. How shall we comfort ourselves, the murderers of all murderers? What was holiest and mightiest of all that the world has yet owned has bled to death under our knives: who will wipe this blood off us? What water is there for us to clean ourselves? What festivals of atonement, what sacred games shall we have to invent? Is not the greatness of this deed too great for us? Must we ourselves not become gods simply to appear worthy of it?

Nietzsche proclaims the death of God as a consequence of the Enlightenment and the rise of scientific rationality, which have undermined traditional religious beliefs. He sees this as a challenge and an opportunity for humanity to create values and meaning. For Nietzsche, this has profound implications for culture and morality. As traditional sources of meaning erode, modern society faces the risk of nihilism. Without the metaphysical grounding that religion once provided, scientific rationalism could paradoxically lead to a resurgence of irrational forces or a pervasive sense of meaninglessness (Nietzsche 2009: 30; 42; 143—146; Solomon & Higgins 2000: 96—98).

Nietzsche's vision for the future is not a regression or abandonment of scientific thinking but rather a richer cultural landscape. He envisions a synthesis where scientific advancement continues to shape society while individuals and cultures simultaneously recognise its benefits and limitations (Solomon & Higgins 2000: 96—98).

To counter the potential cultural and intellectual impoverishment brought about by unchecked rationalism, Nietzsche advocates for a balance between rational and irrational forces in human life. He proposes a holistic approach to understanding, where science coexists with and is complemented by myths, passions and illusions. This balance, Nietzsche argues, allows individuals to harness the intellectual power of science while still finding existential fulfilment (Nietzsche 1996: 199; Solomon & Higgins 2000: 96—98).

Nietzsche's insights on this matter remain relevant today as societies navigate the implications of scientific advances. Cultural reactions vary from science denialism to

transhumanist optimism, yet scientific thinking relentlessly shapes the modern world. Nietzsche is not anti-science but deeply concerned with its limitations and the cultural consequences of taking it to extremes.

In conclusion, Nietzsche's critique of science and its limitations offers a significant perspective on religion's resilience in the modern world. He argues that despite its immense power, science cannot address humanity's deeper existential and metaphysical needs. This may explain why religious belief systems – or similar frameworks of meaning – persist as scientific knowledge advances. Nietzsche's prediction that the decline of traditional religious and metaphysical beliefs could lead to a resurgence of irrational forces reflects his belief in the human need for purpose, wonder and meaning.

Although this interpretation provides a philosophical foundation for understanding religion's persistence, it is not without critique. Many would argue that science and secular philosophies can fulfil these roles. Nonetheless, even if not everyone agrees with his conclusions, Nietzsche's insights contribute to the broader debate on how religion adapts and survives in response to modern intellectual and existential challenges.

Conclusion

This chapter examined the interaction between faith and reason, exploring various approaches to reconciling scientific inquiry with religious belief. These include redefining religion, proposing that science and religion represent two distinct domains, advocating for methodological naturalism and rejecting concordism.

The ongoing dialogue between science and religion reflects the persistent human desire to understand the physical world and our place within it. Scientific advancements have undoubtedly challenged many traditional religious beliefs, but they have also prompted new ways of thinking about existential questions and the nature of reality.

Although scientific rationalism has grown, religion continues to endure – perhaps

because, as Nietzsche observes, humanity's deeper needs for meaning, wonder and purpose remain unfulfilled by purely scientific explanations.

The persistence of religion in the modern world, as explored throughout this thesis, may be partly explained by its ability to adapt to changing cultural and intellectual landscapes. The perspectives examined in this chapter illustrate how religious thought has evolved in response to scientific challenges, finding new ways to articulate its ideas and maintain relevance in people's lives.

It is not the unwavering certainty of either science or religion that contributes to our understanding but rather an open-minded curiosity and willingness to engage with diverse viewpoints without claiming absolute knowledge.

Chapter 6
The Role of Education in Shaping Religious Belief

As the interaction between scientific advancement and religious belief continues to evolve, education emerges as a critical factor in shaping religious perspectives. This chapter explores how educational systems and practices influence the formation and transformation of religious beliefs in contemporary society. The dynamics between education, scientific literacy and religious adherence present challenges and opportunities for educators, policymakers and religious institutions.

The view that science education should maintain a clear separation from religious or supernatural concepts has strong advocates within the scientific and educational communities. Some argue that although questions of faith and the existence of paranormal entities remain essential to many individuals, they fall outside the purview of scientific inquiry and instruction (Boudry 2013: 84—85). This chapter examines the rationale behind such positions and their implications for academic settings.

Central to this discussion is the ongoing debate about the appropriate boundaries between scientific education and religious instruction. The tension between these domains is evident in educational institutions' and scientific bodies' guidelines and policies. For instance, the National Academy of Sciences in the United States provides specific directives for science teachers regarding supernatural, religious and creationist topics in the classroom and strongly advises scientists and teachers to avoid these topics (National Academy of Sciences 1998: 124):

> Science is a method of explaining the natural world. It assumes the universe operates according to regularities and that scientists can understand them through systematic investigation. The science methodology emphasises the logical testing of alternate explanations of natural phenomena against empirical data. Because science is limited to explaining the natural world using natural processes, it cannot use supernatural causation in its explanations. Similarly, science is precluded from making statements about supernatural forces

because these are outside its provenance.

These guidelines reflect the history of societal concerns about science and religious education. In 1925, Tennessee passed the Butler Act[33], which made teaching evolution in public schools illegal. The law expressly forbade the teaching of any theory that denied the Biblical account of divine creation. In what later became known as the Scopes Monkey Trial[34], a high school teacher, John T. Scopes, was accused of violating this law by teaching evolution in his classroom. The American Civil Liberties Union had sought a test case to challenge the constitutionality of the Butler Act and Scopes agreed to be the defendant. The jury found Scopes guilty in the Supreme Court and the law remained in effect until its repeal in 1967.

After the 1987 Louisiana Supreme Court[35] decision that the mandate for schools to allocate equal time to teaching creationism and evolution is unconstitutional, opponents of evolution have employed diverse strategies that have sparked public controversy and led to numerous legal disputes. One of these strategies is to promote the supposedly nontheistic concept of Intelligent Design instead of referring to creationism (Wexler 2019: 752—756).

Creationists sought to have their assertions regarding the age of the Earth, the global flood, the rapid appearance of fully formed life forms and other related beliefs considered accurate or at least valid options in science education. The defendants' strategy can be seen as a compromise between young-earth and old-earth creationists, uniting them under the guise of Intelligent Design to breach the separation between church and state by introducing their ‘theistic science’ into the realm of education (Pennock 2011: 178—179).

In what many observers characterised as a twenty-first-century reenactment of the Scopes Monkey trial, the Dover District Court ruled in 2005 that teaching Intelligent

[33] The Butler Act of 1925 (An Act prohibiting the teaching of the Evolution Theory in all the Universities and all other public schools of Tennessee, which are supported in whole or in part by the public school funds of the State) of the State of Tennessee in the United States of America.

[34] John Thomas Scopes v. State, 154 Tenn. 105, 289 S.W. 363 (Tenn. 1927).

[35] Edwin W. Edwards, Governor of Louisiana, et al., Appellants v. Don Aguillard et al.

Design in public school science classes was unconstitutional. This ruling followed the school district's policy of requiring students to be informed of perceived gaps in Darwin's theory of evolution. It introduced Intelligent Design as an alternative explanation for the origins of life[36].

The judge's ruling featured a well-considered discussion on Intelligent Design. He concluded that Intelligent Design does not qualify as a scientific concept and that it is impossible to separate it from its creationist religious origins. He admonished the defendants for resorting to deception to conceal the true intent behind implementing the Intelligent Design Policy in schools.

He expressed the opinion that although the theory of evolution has its limitations, the absence of a complete explanation for every aspect thereof should not be exploited as a justification for introducing an unverifiable religious-based alternative hypothesis into science education or to distort firmly established scientific principles. The theory of evolution is widely accepted as sound science and is in no way in opposition to, nor does it reject, the concept of a divine creator. Intelligent Design should remain a subject of ongoing study, debate and discourse, but it is unconstitutional to teach Intelligent Design as an alternative to evolution in a science classroom.

This conflict between religion and science in schools is also prevalent in other parts of the world. The government of India's decision to eliminate crucial sections of history and science from school textbooks in 2023 raised concerns among education experts and scientists. The ruling political party allegedly aims to exacerbate religious division and promote the idea of India as a Hindu nation. Some of the omissions in the new textbooks are sections about Mahatma Gandhi's efforts to foster Hindu-Muslim unity and the history of the predominantly Muslim Mughal Empire that ruled parts of India during the sixteenth to nineteenth centuries. Evolution and the periodic table will only be included in the syllabus for students who choose science as a subject during the last two years of high school. Thousands of scientists, professors and education policy experts have endorsed an appeal to

[36] Kitzmiller v. Dover Area School District, 400 F. Supp. 2d 707 (M.D. Pa. 2005).

reintroduce the removed content related to evolution. The appeal reads as follows (Mohan 2023):

> Evolutionary biology is an area of science with a significant impact on how we choose to deal with an array of problems we face as societies and nations, from medicine and drug discovery, epidemiology, ecology and environment to psychology, and it also addresses our understanding of humans and the place in the tapestry of life. That evolution is a law-governed process that does not require divine intervention is a cornerstone of rational thinking.

In 2017, the Turkish government removed references to evolution from its school textbooks. Simultaneously, it introduced a series of curriculum adjustments that emphasised the incorporation of Islamic principles while also expanding the number of religious schools. These changes were undertaken to foster a new generation of young Turks who strongly identify with Islamic values (Shaheen & Hatunoğlu 2017).

Evolutionary biologist and historian of science Keith Thomson proposes that ignorance is the true adversary and can only be addressed effectively through the separate and rigorous teaching of religion and science in schools and other educational settings. He writes that we must foster a culture where respectful disagreement is encouraged rather than attempts to discredit opposing viewpoints and their proponents. Scientists have a pivotal role in advocating for comprehensive, unbiased education, including a thorough understanding of religion for students. In turn, religious individuals may become more open to the transparent teaching of all scientific aspects (Thomson 2009: 14).

Although Thomson's call for schools to offer both scientific and religious instruction has merit, the argument could be made that religious concepts should not be presented as equivalent to or substitutes for scientific principles. The science classroom is not the appropriate place to compare science and religion.

The significant rise in establishing government-sponsored science ministries and the active participation of developing nations in international scientific organisations reflects the idea that adopting a modern, progressive identity necessitates at least a

symbolic commitment to science. Being considered an educated individual does not require comprehensive knowledge of religious matters, but it does involve completing science-related courses, passing examinations demonstrating scientific reasoning and showing respect for science in both professional and social contexts. This way, science shapes cultural values and standards (Wuthnow 2009: 162).

Beyond shaping societal norms, scientific discoveries also influence personal identity. For example, understanding evolution shapes perceptions of humanity's relationship to other living organisms, while knowledge of the universe fosters a sense of connection to the cosmos. These insights can lead to a profound and humbling awareness of our place in the world.

6.1. Promoting Critical Thinking and Science Literacy

Education shapes belief by providing individuals with the tools needed to navigate and understand the world, with science serving as a key framework that can transform cultural values and personal identity. However, education alone is not sufficient. Developing critical thinking skills is essential for engaging deeply with scientific reasoning and challenging long-standing, deeply rooted beliefs that may resist such transformation.

As discussed in the chapter on cognition, there is an argument that religion and superstition are inherent aspects of human nature, emerging from how humans process and understand their environment. These beliefs do not necessarily stem from metaphysical realities beyond the physical world but from cognitive processes such as intuitive thinking, mentalising and hyperactive agency detection. This perspective shifts the focus from external, divine forces towards the idea that humans generate religious and superstitious beliefs to impose meaning and order on the world's complexities (Du Toit 2011: 1—9).

The claim that a predisposition towards supernatural beliefs is an inherent and unchangeable aspect of human nature may be premature. Our understanding of human cognition, psychology and the cultural influences that shape belief systems

remains incomplete, calling for a more thoughtful exploration of this issue. The cognitive processes involved in belief formation, particularly those related to supernatural concepts, likely arise from a complicated interaction between genetics, neurology and the environment. Culture also plays a crucial role in shaping beliefs, as evidenced by the wide variation in supernatural concepts across different societies.

Furthermore, the limited global acceptance of well-established scientific theories highlights a troubling gap in scientific education, raising concerns about how effectively current educational systems promote critical thinking and scientific understanding. Evolution offers a clear example of this problem. Evolution forms a key part of modern biology, with overwhelming scientific evidence backing it up. Yet many people worldwide still dispute it. This controversy often stems from conflicts with religious or cultural beliefs, demonstrating the tension between scientific understanding and deeply held personal or societal convictions.

To illustrate this point, consider the following data from a 2023 survey conducted on behalf of the University of Birmingham, which examined beliefs about evolution and creationism/Intelligent Design across several countries. The percentage of participants who agreed with each statement was published as follows (The University of Birmingham 2023: 11):

Humans and other living things evolved as a result of natural selection, in which God played no part:
Argentina: 31%
Australia: 44%
Canada: 42%
Germany: 60%
Spain: 56%
UK: 46%
USA: 27%

Humans and other living things were created by God and have always existed in their current form, or they evolved over time in a process guided by God:

Argentina: 43%
Australia: 32%
Canada: 34%
Germany: 20%
Spain: 19%
UK: 34%
USA: 53%

This data highlights the varying acceptance levels of evolutionary theory across different countries and underscores the persistent influence of religious or supernatural explanations for human origins. Such findings emphasise the need for further research and educational efforts before confidently asserting that scientific knowledge and reasoning will inevitably surpass belief in the supernatural.

The link between cognitive styles, religious beliefs and susceptibility to conspiracy theories, pseudoscience and fake news underscores the need for interventions that promote critical thinking and scientific literacy. In today's society, where social media accelerates the spread of misinformation, logical thinking skills are increasingly vital (Swami et al. 2014: 572).

Acceptance of paranormal and pseudoscientific beliefs has societal consequences beyond personal ideologies. Those who subscribe to conspiracy theories often engage less in political processes, adopt unhealthy practices and harbour discriminatory views, which can escalate to political violence. Alternative medicine advocates may reject proven treatments and vaccines, posing significant risks to public health. Addressing these unfounded beliefs through critical thinking and scientific literacy interventions is crucial for maintaining societal stability and safeguarding public health (Wilson 2018: 184).

The proliferation of deceptive news stories on social media has raised concerns about public vulnerability to misinformation. Research indicates that individuals who endorse pseudoscience, hold supernatural beliefs, or adhere to dogmatic and fundamentalist views are more likely to believe fake news. Conversely, analytic thinking – characterised by exploring alternative explanations and deliberate thought

processes – serves as a defence against falsehoods (Bronstein et al. 2018: 108—109).

Human cognition is inherently prone to biases, often resulting in subjective and inaccurate perceptions of reality. Although certain beliefs may diverge from objective truth, they can serve an adaptive function, aiding survival or adjustment to specific circumstances. For instance, a comforting belief may reduce stress, even without factual accuracy.

However, recognising that beliefs can be both false and useful should not lead to epistemic relativism – the notion that all beliefs are equally valid. Critical thinking demands we differentiate between evidence-based beliefs and unfounded assertions. We must resist viewing all beliefs as equally valid personal opinions and carefully evaluate the supporting evidence for different claims.

MIT researchers Vosoughi, Roy and Aral found that false news travels much faster than accurate news across all types of information. False stories were often considered novel and provoked stronger emotional reactions – particularly fear, disgust and surprise. In contrast, true stories usually generate feelings of anticipation, sadness, joy and trust. Their findings showed that people are generally more inclined to spread false information (Vosoughi et al. 2018: 1146—1151).

A separate study presented at the 2017 International Conference on Computing, Networking and Communications provided further evidence that negative news circulates more actively on social media than positive news. Users were likelier to share news they perceived as bad and negative stories consistently received more attention (Fang & Ben-Miled 2017:793—797).

Social media platforms amplify this effect, accelerating the spread of misinformation. Platforms such as YouTube and Facebook provide financial incentives for views and clicks, making sharing fake stories and bad news more attractive (Ressa 2021).

In the era of print journalism, editing and fact-checking were vital components of the publishing process. Although errors occurred, the rigorous nature of these checks

helped maintain journalistic standards and reputational risks acted as a deterrent against publishing false information. Social media, however, functions under a different model. Platforms like Facebook and X (formerly Twitter) are not primarily news outlets; they allow users to create and share their own content. This makes applying the same editorial scrutiny seen in traditional journalism challenging. Although some platforms have introduced fact-checking and content-flagging measures, their attempts at ensuring accuracy remain insufficient (Harari 2024: 265; Ressa 2021).

One potential solution is for social media companies to establish dedicated journalism and research departments to curate stories spread via social media. This could involve partnerships with professional journalists, researchers and AI systems to verify facts and sources. Although costly, the growing influence of these platforms makes it harder to ignore their ethical and social obligations (Harari 2024: 265).

However, this raises concerns about the level of control these companies would wield over information distribution, potentially leading to bias if not carefully managed. Independent journalism has always faced challenges, especially when ownership of major media outlets is concentrated in the hands of wealthy individuals or corporations. This has historically affected editorial independence, as owners' political or financial interests have sometimes clashed with objective reporting. In a way, social media replicates this power dynamic on a larger scale. Tech giants like Facebook and Google hold enormous influence over information flow, but they lack the editorial oversight that once existed. These companies are not neutral; their algorithms are designed to maximise user engagement, not necessarily to promote the truth.

Just as social media has undermined traditional fact-checking, the digital age has similarly challenged the authority of established religious institutions. As individuals increasingly curate their own beliefs and information sources, religious ideas – whether grounded in tradition or emerging from new interpretations – may find a more receptive audience in this decentralised environment. Like viral content, the ability to adapt and spread quickly becomes a feature of religious ideas in this context. However, this analogy does have its limitations. Although religious ideas

and false news may share elements of novelty and emotional appeal, they are fundamentally different in several ways. Religious beliefs, especially those with deep historical roots, are often supported by centuries of tradition, community practices and spiritual experience. This depth and longevity contrast with the ephemeral nature of online misinformation, which is often designed for short-term impact rather than lasting significance. Religion tends to engage with more profound philosophical and existential questions, offering meaning beyond viral content's transient, attention-grabbing nature.

Given these issues with the proliferation of ideas, educating people in logical reasoning is more important than ever. Critical thinking and the scientific method serve as corrective mechanisms, guiding us towards more reliable beliefs by demanding rigorous evidence and systematic investigation. This process helps us counter our cognitive limitations and approach a more objective understanding of the world, even though the sheer volume of information makes it nearly impossible to evaluate everything independently (Teehan 2014: 181).

Fostering critical thinking skills allows individuals to navigate the world of beliefs by distinguishing between those that may be comforting or useful but potentially false and those that are grounded in empirical evidence. Critical thinking involves questioning assumptions, seeking evidence and evaluating information before accepting it as accurate. This process helps individuals identify beliefs that may be adaptive in some ways, such as providing emotional comfort but lacking factual support. At the same time, it encourages recognising beliefs supported by evidence and reason, enabling more informed and rational decision-making.

Moreover, intuitions should not be viewed as rigid outcomes of the mind's structure. They can be consciously reformed through intentional reflection and dedicated practice. Interventions promoting logical and actively open-minded thinking can reduce belief in fake news, pseudoscience and the supernatural (Attfield 2014: 75; Bronstein et al. 2018: 115).

The impact of education on belief systems is demonstrated in a study that measured changes in students' beliefs about paranormal and pseudoscientific topics after

completing an undergraduate Science and Critical Thinking course at the University of Nebraska at Omaha. Even without directly addressing religious beliefs, the course's focus on empirically driven thinking significantly reduced students' beliefs in the supernatural. This underscores the effectiveness of science education in challenging paranormal beliefs and suggests that critical thinking skills, when cultivated and practised, can influence a broad range of beliefs (Wilson 2018: 202).

Critical thinking equips individuals to scrutinise claims and align beliefs with factual evidence. By integrating critical thinking and the scientific method, educational approaches can teach people to debunk unsupported claims or those contradicting established natural laws. This can reduce the harmful social consequences of superstition, pseudoscience and certain religious beliefs (Wilson 2018: 206).

6.2. The Role of Logic Education in Combating Cognitive Bias

As outlined in previous chapters, understanding the cognitive foundations of belief systems underscores the necessity of logic education. Cognitive biases such as confirmation bias, appeal to authority, motivated reasoning and groupthink contribute to the persistence of erroneous beliefs, often reinforced by emotional appeal or cultural tradition. Logic education serves as a countermeasure to these biases, promoting rational thought and critical engagement with complex issues. By fostering skills that allow individuals to identify logical fallacies, such as circular reasoning, appeals to authority, or false dilemmas, individuals can navigate both personal and societal challenges with intellectual rigour.

Logic education also holds ethical significance. As discussed in this thesis, belief systems can be exploited for harmful ends, whether in the name of political extremism, religious dogma, or misleading media. Training individuals in logical reasoning equips them with the capacity to challenge manipulative rhetoric and promotes autonomy in decision-making.

In developing a methodology for teaching logic, both cognitive development and practical application must be considered. For current school systems, there is a well-

developed Philosophy for Children (P4C)[37] curriculum designed to foster critical thinking, reasoning and inquiry among students from a young age. It is grounded in the belief that children are capable of philosophical thought and should be encouraged to explore complicated questions through dialogue. Central to the P4C approach is the 'community of inquiry', where participants engage in collaborative discussions, guided by a facilitator, to explore various philosophical themes. The process is not focused on finding definitive answers but on developing the skills of questioning, reflection and critical engagement with ideas. Engaging children in philosophical inquiry aims to enhance their ability to reason logically, critically evaluate ideas and become more thoughtful and reflective (Gregory et al. 2017: xxi—xxii; xxvii—xxx).

This curriculum methodology has been widely adopted in schools, universities and informal learning environments. Its emphasis on dialogue and inquiry makes it particularly effective in promoting democratic participation and fostering intellectual autonomy. Teaching children to think critically and engage with different perspectives enhances cognitive skills and encourages ethical reasoning and social responsibility. Developing these skills is crucial in an era of widespread misinformation, enabling individuals to resist manipulation and make informed decisions. As such, the P4C curriculum offers a robust framework for nurturing intellectual and moral development, aligning closely with broader educational goals of fostering independent thinking and civic engagement (Gregory et al. 2017: xxi—xxii; xxvii—xxx).

By integrating these strategies into the existing education system, logic education can become an effective tool for equipping individuals to engage critically with the world around them. This approach enhances cognitive resilience, promotes ethical decision-making and fosters a deeper commitment to truth and intellectual integrity, ultimately contributing to a rational and evidence-based worldview.

Integrating artificial intelligence (AI) and immersive technologies is set to transform

[37] The Philosophy for Children (P4C) curriculum aims to help each child develop greater clarity, accuracy, consistency, and awareness of differing arguments and values before forming a conclusion: https://p4c.com/about-p4c/.

education in critical thinking, logic and bias identification. Immersive technologies blend the physical and digital worlds, creating more interactive and engaging user experiences. These include Virtual Reality, which fully immerses individuals in a computer-generated environment; Augmented Reality, which overlays digital elements onto the real world; and Mixed Reality, where physical and digital objects coexist and interact in real-time. These technologies are transforming fields such as healthcare and education in previously unimaginable ways.

Building on insights from the CSR, AI-driven immersive environments could expose cognitive biases in real-time. These simulations could engage in Socratic dialogue with individuals and teach them to assess information critically, resist intuitive reasoning and recognise ingrained cultural or cognitive biases. Learners could interact with AI characters presenting arguments rooted in traditional religious claims, enabling them to identify logical fallacies and confront cognitive biases.

AI simulations could replicate scenarios where learners experience pressure to conform to societal norms, helping them distinguish between popular opinion and sound reasoning. This approach would counter the widespread influence of ideologies that manipulate cultural identity for their persistence. By engaging in role-playing scenarios, learners would navigate societal pressures, religious dogma and the proliferation of misinformation, applying critical thinking skills in high-stakes environments.

Immersive AI training could expose learners to realistic fake news stories employing persuasive yet fallacious reasoning. Learners would deconstruct arguments presented by AI characters embodying charismatic figures who exploit appeals to emotion, authority, or fear. This process would reinforce the principles of sound reasoning and help internalise critical thinking skills across various contexts.

AI-driven training models could adapt to individual biases and weaknesses, providing personalised feedback. As learners engage with increasingly complex debates or propaganda, the system monitors responses and offers tailored guidance. This feedback loop would prove invaluable in reinforcing the principles of logical reasoning and ensuring their application in diverse situations.

Future developments may include AI-driven simulations for scenario analysis, virtual environments for engaging with diverse ideological perspectives and adaptive learning systems for targeted logical reasoning exercises. AI-powered fact-checking tools, interactive tutors and real-time feedback mechanisms could revolutionise teaching media literacy, logical fallacies and cognitive bias recognition.

AI simulations could incorporate gamification elements, allowing players of all ages to earn points or progress through levels as they successfully identify and counter logical fallacies. This motivational structure would make the learning process engaging and competitive, encouraging continuous improvement in critical thinking skills.

As AI becomes more integrated into education, new challenges will arise. These include the risk of overreliance on AI systems, potential biases within AI itself and the need to assess AI-generated content critically. Educators must ensure that students develop independent critical thinking skills while learning to engage responsibly with AI technologies.

In sum, integrating AI and immersive technologies into education presents unprecedented opportunities for creating personalised, engaging and practical learning experiences in critical thinking and logic. This approach can encourage a more rational and evidence-based worldview by addressing the cognitive and cultural factors that sustain deeply held beliefs, such as religious perspectives. However, these beliefs have provided meaning and comfort to many throughout history. Fostering independent critical thinking should involve respecting individuals' ideological frameworks and promoting thoughtful reflection and dialogue rather than confrontation. Leveraging these advanced technologies supports the development of critical thinkers capable of navigating the complexities of modern information landscapes while encouraging openness to new ideas that coexist alongside deeply rooted beliefs.

Ultimately, the insights from cognitive science can inform educational and communication strategies to foster a more productive connection between religion

and science. By recognising the deep-rooted cognitive foundations of human belief, educators and communicators can work to build bridges between these worldviews and promote a shared understanding of reality.

Conclusion

Summary of Key Findings

In an era marked by rapid scientific advancement and increasing secularisation, the endurance of religious beliefs presents a compelling enigma. This thesis addresses a fundamental question: Why do religious beliefs persist in the face of scientific progress and societal shifts towards secularism? Through a systematic literature review, this study reveals that the resilience of religious beliefs stems from a confluence of cognitive, cultural, psychological and social factors.

The research demonstrates that religious beliefs are not mere vestiges of pre-scientific thinking but instead continue to play vital roles in human cognition, social structures and the search for existential meaning. By synthesising insights from cognitive science, anthropology, sociology and religious studies, this work offers a multifaceted explanation for the tenacity of faith in an increasingly secular world.

The significance of this research extends beyond academic discourse. It provides insights that can inform policy decisions, shape educational approaches and foster meaningful dialogue in our diverse, globalised society.

This concluding chapter consolidates the key findings of the research, examines their implications, acknowledges the study's limitations and proposes avenues for future inquiry. In doing so, it underscores the ongoing relevance of understanding religious beliefs as we strive to comprehend the full spectrum of human experience and social organisation in the 21st century.

The analysis reveals three primary factors as crucial in explaining the persistence and prevalence of religious beliefs:

Cognitive Predispositions:
Evolutionary cognitive mechanisms, such as agency detection and anthropomorphism, create a natural inclination towards religious concepts in

humans. These innate tendencies form the foundation upon which religious beliefs are built and sustained.

Sociocultural Influences:
The power of cultural pressures and the innate desire for community belonging play a significant role in shaping and reinforcing religious beliefs. These external forces work with internal cognitive predispositions to create a robust foundation for religious thought and practice.

Existential Needs:
Religion addresses fundamental human needs for meaning and purpose beyond observable reality. This aspect of faith provides comfort and guidance in the face of life's uncertainties, offering explanations for existential questions that science alone cannot answer.

These factors work in concert, supporting the persistence of religious beliefs even as scientific knowledge advances and secularisation progresses in many societies.

Cognitive factors

Religious concepts have endured across cultures and generations, rooted in evolutionary cognitive predispositions. Fundamental cognitive mechanisms underpin this resilience, such as agency detection, anthropomorphism and teleological thinking – mental processes that initially evolved to aid survival. These mechanisms make religious ideas appear innate. For instance, attributing agency to natural events, like imagining a deity behind a storm, may have once been advantageous for survival. Today, these same tendencies make religious concepts accessible and appealing to the human mind.

Additionally, common but flawed reasoning patterns further support religious belief. Fallacies such as false dichotomy and the genetic fallacy often lead individuals to accept religious doctrines without critical examination. As illustrated by the fallacious appeal to authority, some people adhere to religious teachings simply because they are endorsed by respected figures or sacred texts, showing how social and cultural

factors can reinforce beliefs already supported by cognitive biases.

Cognitive scientists suggest that the human brain may be naturally inclined to believe in higher powers or unseen forces, possibly as an evolutionary adaptation that promoted social cohesion and cooperation in early human societies. This predisposition may help explain the persistence of religious belief throughout history.

Mental processes like intuitive thinking and hyperactive agency detection significantly shape and sustain religious and superstitious beliefs. These processes help individuals create meaning and impose order on the world's uncertainties, even though they may not reflect realities beyond the physical world.

The limited global acceptance of well-established scientific theories, such as evolution, points to deficiencies in the educational system. This suggests that current educational approaches may not sufficiently promote critical thinking, allowing superstitions to persist alongside – or instead of – scientific ones.

The cognitive perspective on religion offers a valuable framework for understanding how human mental faculties interact with cultural expressions of faith. Integrating perspectives from cognitive science, anthropology and religious studies deepen our understanding of how fundamental aspects of human cognition contribute to the endurance of religious concepts across diverse cultures and historical periods.

Social and cultural

Cognitive tendencies alone do not fully account for global religious expressions. Cultural contexts are a powerful force in shaping and reinforcing these innate predispositions. Religious beliefs and practices are deeply rooted in cultural narratives, symbols and traditions, which provide a framework for interpreting the world. This cultural context ensures the endurance of religious ideas, enabling their transmission across generations and adaptation to different societal circumstances.

The social aspect of religion plays a key role in its persistence. In an increasingly fragmented society, the communal aspects of religion are especially appealing.

Regular rituals and shared beliefs foster a sense of continuity and connection that many find absent in secular life.

Cultural and historical influences further bolster religion's durability. For many, religious identity is closely tied to cultural heritage and family traditions. The passing down of religious beliefs across generations creates continuity, even in the face of opposing scientific evidence. In some regions, religion remains linked to political and social systems, making it a central part of national or ethnic identity.

Deeply ingrained traditions and societal norms often resist change, even in the face of scientific education. This can be seen in the varying acceptance of evolutionary theory across countries, where religious or supernatural explanations for human origins continue to prevail in many societies.

Religious traditions act as vessels of cultural heritage and moral instruction. Many value the ethical teachings, rituals and traditions linked to their faith, seeing them as essential to their personal and cultural identity. These practices offer a sense of continuity with the past and a guide for navigating modern moral challenges.

Human needs

The enduring presence of religion in the modern world speaks to its profound ability to fulfil essential human needs. Scientific progress has undoubtedly challenged many traditional beliefs, but it has not extinguished the fundamental human yearning for transcendence and a shared cosmology that religion often provides.

Religion may address psychological needs that some individuals find unfulfilled by scientific explanations alone. Although scientific progress has expanded our understanding of the physical world, religion continues to engage with deeper questions of meaning, purpose and a sense of continuity beyond mortal existence. It offers a worldview that incorporates values, ethics and deeper meaning, which resonates with many individuals, even in increasingly secular societies.

The limitations of scientific knowledge may contribute to religion's endurance. Fields

like quantum mechanics have revealed fundamental uncertainties and mysteries at the heart of our understanding of the universe. These gaps in scientific knowledge can leave room for religious or spiritual interpretations of reality. Additionally, the complexity of scientific theories can be daunting for many people, making religious explanations more intuitive and appealing.

Religious beliefs may offer meaning beyond the transient nature of viral content or scientific facts. This depth and longevity of religious traditions arguably contribute to their enduring appeal.

In conclusion, the enduring prevalence of religious beliefs can be ascribed to a combination of cognitive predispositions, critical thinking, cultural influences, psychological benefits and inadequate scientific education. Although advancements in critical thinking and science education challenge religious beliefs, the deeply ingrained nature of these convictions and their capacity to offer meaning and comfort may ensure their continued presence in society.

Implications and Contribution

This research proposes a preliminary model for understanding religious resilience, drawing from cognitive, biological, psychological, cultural and social factors. By integrating insights from various disciplines – cognitive science, anthropology, sociology, psychology, philosophy, theology and religious studies – the study addresses a gap in the literature, offering a multifaceted explanation for the persistence of religious beliefs in an increasingly scientific and secular world.

The findings highlight how fundamental aspects of human mental architecture contribute to forming and maintaining religious concepts. This challenges the assumption that scientific advancement necessarily leads to religious decline, suggesting instead that religious beliefs can adapt and coexist with increasing scientific understanding.

The study identifies potential challenges in promoting scientific literacy and critical thinking when faced with deeply ingrained religious beliefs, indicating that

educational approaches may need adjustment. It also opens potential avenues for future research, particularly examining how religious beliefs might evolve in response to scientific discoveries and societal changes.

By exploring the cognitive and cultural factors contributing to the persistence of religious beliefs, this study aims to enhance our understanding of human nature in a world shaped by both scientific knowledge and religious belief. The insights gained may inform approaches to education, social policy and intercultural dialogue.

Limitations

Although this research offers valuable insights into the persistence of religious beliefs, it is crucial to recognise its constraints and consider their potential impact on interpreting the findings.

The synthesis of findings from multiple disciplines, including cognitive science, anthropology, psychology and religious studies, presents inherent challenges. Each field employs distinct methodologies and theoretical frameworks, which may not always align seamlessly. This integration challenge could result in oversimplifications or gaps in our analysis. For instance, cognitive explanations for individual belief formation might not fully account for cultural transmission processes studied in anthropology. Consequently, our conclusions may overemphasise certain aspects while underrepresenting others, potentially skewing the overall understanding of religious belief persistence.

The study's findings may not apply uniformly to all religious traditions. The cognitive mechanisms discussed, such as agency detection and anthropomorphism, might be more relevant to theistic religions, such as Christianity, than non-theistic or animistic traditions like Buddhism or Shintoism. This limitation could result in an interpretation favouring Western religious frameworks, potentially overlooking crucial factors in the persistence of other religious traditions.

As this thesis primarily builds upon existing research, it inherits any biases or limitations in the source material. New empirical studies or theoretical breakthroughs

could challenge or expand upon the findings. This reliance on current literature might lead to conclusions that, although valid within the existing body of knowledge, may require revision as new data emerges.

This study's lack of original empirical research means the conclusions are based on secondary analyses. This constraint could affect the interpretation of results by reducing the ability to control for specific variables or test hypotheses directly. It may also limit the applicability of the findings to contemporary contexts, as some of the source studies might not reflect the most current societal trends.

As with any qualitative analysis, there is a risk of researcher bias in selecting and interpreting sources. This could lead to an overemphasis on evidence that supports the thesis while underrepresenting contradictory findings. Readers should be aware of this potential bias when interpreting the results and conclusions.

These constraints underscore the need to interpret the study's findings carefully. Although the research offers valuable insights into the persistence of religious beliefs, it should be viewed as a starting point for further investigation rather than a definitive explanation. Future studies addressing these limitations could provide a more comprehensive understanding of this phenomenon.

Future Research Directions

This study on the resilience of religion has highlighted several promising avenues for future research. A primary area of interest is examining how religions adapt to and evolve alongside cultural shifts, scientific progress and technological advancements, thus contributing to their persistence in modern society.

Future research could explore how such cultural adaptations affect the core tenets of religions over time. The reconciliation of religious beliefs with scientific discoveries presents another fascinating area for investigation. Some traditions have reinterpreted ancient texts and doctrines in light of new knowledge, allowing adherents to maintain their faith while embracing modern scientific understanding. Researchers might investigate how different religions vary in their approaches to

scientific reconciliation, the long-term effects of such reconciliation on religious participation and belief intensity and how religious leaders and institutions address the discrepancies presented by scientific advancements that seem to contradict traditional teachings.

The rise of liberal and progressive interpretations of religious teachings has enabled many to find a middle ground between traditional beliefs and contemporary values. Future studies could examine the impact of progressive interpretations on religious community cohesion, how traditional and progressive factions within religions negotiate doctrinal differences and the role of generational differences in driving or resisting progressive religious interpretations.

In the digital age, the impact of modern technologies on religious belief and practice merits further investigation. Social media can simultaneously reinforce religious beliefs within echo chambers and expose individuals to diverse ideologies. Emerging technologies like artificial intelligence and virtual reality may reshape religious experiences. Research in this area could explore how social media affects religious community formation and maintenance, the impact of online exposure to diverse beliefs on individual faith, the potential for AI-driven religious counselling or virtual reality-based religious experiences and the ethical implications of using advanced technologies in religious contexts.

By pursuing these research directions, scholars can gain deeper insights into the ongoing evolution of religion in our rapidly changing world, enhancing our understanding of how ancient traditions maintain relevance in contemporary society. This knowledge will contribute to academic discourse and provide valuable insights for religious leaders, policymakers and individuals navigating the intersection of faith and modernity.

Practical or Policy Implications

This research has practical and policy implications for education systems. Although cultural and personal factors influence individual decision-making, it underscores the necessity of promoting critical thinking and scientific literacy in schools to counter

misinformation and unfounded beliefs. Educational policymakers could use these findings to inform curriculum development, prioritising teaching logical reasoning and scientific methods early on. Potential applications include implementing logical thinking programmes in schools, enhancing science curricula to focus solely on empirical evidence and the scientific method and developing media literacy initiatives to help students identify unreliable information and assess sources critically.

The study also points to applications in artificial intelligence and immersive technologies for education. AI-driven simulations could expose cognitive biases in real-time, allowing learners to hone their critical thinking skills in realistic scenarios. These technologies could transform the teaching of media literacy and logical reasoning, offering personalised feedback and adaptive learning experiences. By focusing on evidence-based education and critical analysis, schools can equip students with the tools to navigate an increasingly information-rich world.

Ultimately, it is hoped that this work may support the development of strategies for promoting dialogue, understanding and coexistence between different worldviews in our increasingly globalised society.

Final Reflection

At the start of this research, I expected that cultural factors would play the most significant role in religion's resilience. It was unexpected to find that scholars in the Cognitive Science of Religion have conducted extensive studies that highlight the influence that how people think about and approach problems have on their religiosity. Since this is a relatively new academic field, it will be interesting to observe future developments.

During this study, I gained the strong impression that the adaptability of religious traditions has contributed significantly to their endurance. Christianity, for example, seems to have shown notable flexibility in interpreting its teachings in light of new scientific discoveries and shifting social norms. This ability to evolve while maintaining core beliefs appears to have helped religions remain relevant amidst societal changes, although further research is needed to confirm this fully.

In conclusion, the persistence of religious beliefs in the face of scientific advancement and societal secularisation reveals the deep-rooted interplay of cognitive, cultural and existential factors that shape human thought and behaviour. This research has shown that religion continues to meet essential psychological and social needs, providing a framework for meaning, community and continuity amidst the uncertainties of modern life. This study highlights the need for future research to explore how faith evolves in response to scientific discoveries and cultural shifts. Ultimately, understanding the persistence of religion deepens our comprehension of human nature and informs critical discussions on education, policy and intercultural dialogue in an increasingly interconnected world.

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