


## A Reflection on the Heritability of Human Behavioral Traits: An Interdisciplinary Qur’anic Study

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Article Info	Abstract
<p><b>Article type:</b> Research Article</p> <p><b>Article history:</b>  <b>Received</b> 14 September 2024  <b>Received in revised from</b> 28 September 2024  <b>Accepted</b> 16 October 2024  <b>Published</b> online 28 January 2025</p> <p><b>Keywords:</b> Qur’an and science, scientific exegesis, heredity, genetics.</p>	<p>The Holy Qur’an, the sacred scripture of Muslims, is the primary source of Islamic teachings and a comprehensive guide for human life. It has consistently shaped worldviews, doctrinal principles, and moral outlooks, addressing fundamental questions that concern humans across multiple domains. Since antiquity, the transmission of traits from one generation to the next has been an important subject in both scientific and religious discourse. In the sciences—especially genetics—research has empirically documented the inheritance of physical characteristics and certain behavioral tendencies via genes. By contrast, the transmission of spiritual traits and religious beliefs is more complex than the inheritance of purely biological attributes. This study investigates the heritability of beliefs understood as traits intimately connected to the human soul and psyche. Although the Qur’an does not explicitly discuss modern genetics, several of its central concepts—particularly those concerning creation and the transmission of characteristics—can be read in ways that resonate with contemporary hereditary theory. Notable Qur’anic passages that offer insight in this regard include Sūrat Nūḥ (71:27), Sūrat Zukhruf (43:28), and Sūrat al-Baqarah (2:124); these verses are examined in greater depth in the present study. It may therefore be argued that the Qur’an contains implicit references to the intergenerational transmission of religious disposition, references that could provide a hermeneutical basis for interdisciplinary research by scholars in theology, philosophy, and the empirical sciences.</p>
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## **Introduction**

An examination of Qur'anic teachings reveals that the Holy Qur'an has addressed the concept of heredity. Numerous verses highlight the role of parents and family in the religious upbringing and guidance of children. For instance, narratives such as that of Prophet Nuh (PBUH) and his disbelieving son, or the children of Prophet Ibrahim (PBUH), who were people of faith, may provide clues regarding the heritability of beliefs. The question arises: Do these narratives suggest the existence of a form of spiritual and doctrinal heredity, or do they merely emphasize the importance of parental guidance and religious upbringing?

This study aims to explore the Qur'anic perspective on the heritability of beliefs by analyzing and interpreting various Qur'anic verses, as well as the viewpoints of Islamic exegetes. Additionally, it investigates other factors that may influence the formation of beliefs in individuals, such as parental upbringing, environmental and social influences, and individual free will. In this context, relevant Qur'anic verses are examined, and diverse exegetical opinions on the role of heredity and other factors in shaping beliefs are analyzed. The ultimate objective of this study is to answer the question of whether beliefs as spiritual and doctrinal traits—are transmitted to subsequent generations through heredity, or whether this concept is entirely dependent on individual choices and the educational environment. In other words, does a person born into a believing or disbelieving family inherit faith or disbelief by virtue of heredity, or are faith and disbelief solely the result of individual and free choices? If the latter is true, what influence can such heredity have on the religious beliefs and inclinations of individuals?

The Holy Qur'an, as a divine guide, has consistently emphasized the role of free will and individual choice in the acceptance or rejection of faith. While certain personality traits may be inherited, faith and disbelief—as spiritual and doctrinal concepts—are more profoundly influenced by upbringing and environment. Through a meticulous examination of Qur'anic verses and an analysis of exegetical perspectives, this study seeks to provide a comprehensive answer to this question.

This research pursues several key objectives: (1) investigating and elucidating the Qur'anic perspective on the heritability of beliefs, (2) exploring the role of the family in shaping the religious beliefs of children, (3) analyzing Qur'anic verses and exegeses related to parental influence, and (4) examining the hereditary, educational, and environmental impacts on the formation of faith and disbelief from both Qur'anic and contemporary scientific viewpoints. The heritability of beliefs and values is a complex, multifaceted subject situated at the intersection of genetics, psychology, and social sciences. In recent years, new research has emerged in this field, some of which explores the role of genetics in the formation of beliefs.

## **1. Background and Literature Review**

In recent decades, advances in psychology, sociology, and genetics have led to numerous studies examining the influence of heredity, upbringing, and environment on the formation of religious

and spiritual beliefs. Many of these studies suggest that beliefs, like other personality and behavioral traits, are shaped by a combination of genetic, educational, and environmental factors. For instance, psychological research has demonstrated that certain personality traits—such as trust in others, sensitivity to moral issues, and inclination toward spirituality—can be influenced by heredity. These traits may indirectly affect an individual’s religious and spiritual inclinations. However, these studies emphasize that heredity is only one of many factors shaping religious beliefs, with familial upbringing, social environment, and personal experiences playing equally crucial roles.

Similarly, sociological research has highlighted the significant role of culture and upbringing in shaping religious beliefs. These studies indicate that children raised in environments where religion and faith are central cultural values are more likely to embrace faith, whereas those in predominantly secular or non-religious settings are more inclined toward disbelief or irreligion.

Hamidreza Basiri and Maryam Gohari (2013)<sup>1</sup> in their article *"The Role of Heredity in Human Destiny from the Perspective of the Qur'an and Hadith"* argue that heredity is an undeniable factor in human destiny and that moral traits, like physical characteristics, are transmitted from parents to children through genes. They contend that inherited belief traits serve as a foundation that can either be strengthened or weakened by environmental factors, including upbringing, while acknowledging that personal will also plays a role in shaping one’s destiny.

Hamidreza Basiri et al. (2015)<sup>2</sup> in another study titled *"Individual Differences Arising from Genetic Factors from the Perspective of the Qur'an and the Narrations of the Infallibles (PBUH)"* examine the role of genetics and environment in creating differences among individuals. They argue that, based on Qur’anic verses and hadiths acknowledging genetic similarities and differences, Islam accepts the concept of individual differences, which serve divine purposes such as the division of labor, human testing, and the attainment of divine knowledge. From an Islamic perspective, individual differences can be analyzed along two axes: physical and ethical distinctions.

Hossein Shahsavand Hassani and Mahdiah Salarpour (2012)<sup>3</sup> in their article *"An Introduction to Chromosome Engineering and Genetic Engineering in the Light of the Qur'an"* assert that the similarities and differences in living organisms—which preoccupied Mendel’s mind—led to the discovery of fundamental genetic laws. While scientific advancements in genetics accelerate annually, the authors argue that the core principles of genetic engineering have been

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<sup>1</sup> Hamidreza Basiri and Mohammadreza Gowhari, “The Role of Heredity in Human Destiny from the Perspective of the Qur’an and Hadith,” *Seraj Monir*, 2013.

<sup>2</sup> Hamidreza Basiri et al., “Individual Differences Resulting from Genetic Factors from the Viewpoint of the Qur’an and the Infallible Imams (A),” *Qur’anic Theological Interpretation Research Journal*, 2015.

<sup>3</sup> Hossein Shahsavand Hassani and Mahdiah Salarpour, *An Introduction to Chromosome Engineering and Genetic Engineering in the Light of the Qur’an*, 2012.

articulated in over 43 Qur'anic verses with profound wisdom. Their study explores mitotic and meiotic creation as depicted in the Qur'an.

Fatemeh Maghsoudi and Hossein Moradi (2021)<sup>1</sup> in their research *"Investigating the Innateness of the Inclination Toward God and the Role of Genetics in Religious Tendencies"* distinguish *fitrah* (innate disposition) as a metaphysical concept separate from genetic traits. They argue that God has provided both inner guidance (intellect) and outer guidance (prophets) for human direction. Drawing from various articles and hadiths, the study posits that humans are born with an innate inclination toward God, though environmental factors, family spirituality, and religious exposure also play significant roles.

Mohammad Hassan Fayyaz (2020)<sup>2</sup> in his article *"The Nature of the Qur'an's Interaction with Modern Sciences"* contends that the Qur'an does not explicitly detail all human sciences with their specific formulas but offers tangential references to some scientific concepts. He categorizes the Qur'an's engagement with science into four modes: rejection (of erroneous past assumptions), correction (of flawed contemporary knowledge), endorsement (of established truths), and establishment (of new scientific principles based on human necessity).

Evan Charney, in his article *"Genes, Behavior, and Behavioral Genetics,"* asserts that all human behavioral traits are heritable according to the first law of behavioral genetics. Applying statistical methods, researchers in psychology, sociology, political science, economics, and business claim to have demonstrated that all studied behaviors—regardless of cultural specificity—are hereditary. Moreover, they often identify specific genes associated with these behaviors.

Based on examinations of belief heritability in Islamic sources and scientific studies, it can be concluded that the Qur'an does not directly address the genetic inheritance of faith or disbelief. Instead, it emphasizes the role of upbringing, education, and environment in shaping religious beliefs. From the perspective of exegetes, genetic heredity cannot directly transmit faith or disbelief, though certain personality and behavioral traits influencing these beliefs may be inherited. Contemporary research similarly indicates that faith and disbelief, like other personality and behavioral traits, are influenced by a combination of hereditary, educational, and environmental factors. Nevertheless, free will and individual choice remain the most decisive factors in accepting or rejecting faith.

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<sup>1</sup> Fatemeh Maqsoudi and Hossein Moradi, "Investigating the Innate Tendency Toward God and the Role of Genetics in Religious Inclinations from the Perspective of the Qur'an," in *National Conference on Interdisciplinary Qur'anic Research and Biological Sciences*, 2021, 406–413.

<sup>2</sup> Mohammad Hasan Fayyaz, "How the Qur'an Interacts with Modern Sciences," *Professional (Scientific-Promotional) Journal of Pejouhan*, 2020, 95–110.

## 2. Examination of Three Categories of Qur'anic Verses

In this study, it was essential to first extract key concepts related to the research topic. To identify these concepts, 254 verses from the Qur'an that explicitly or implicitly relate to heritability and the transmission of traits were extracted through text analysis and verse tagging. Among these, the following verses were selected for more detailed analysis due to their clearer relevance: Verse 27 of Surah Nuh (PBUH), Verse 28 of Surah Zukhruf, and Verse 124 of Surah Al-Baqarah.

Verse 124 of Surah Al-Baqarah: Prophet Ibrahim (PBUH) and His Role as a Father

One of the most notable uses of the term "أب" (father) in the Qur'an pertains to Prophet Ibrahim (PBUH), who holds a significant role as the spiritual father of nations. In Verse 124 of Surah Al-Baqarah, Allah addresses Prophet Ibrahim (PBUH) as a father and leader of nations. Tabatabai interprets the term "ذُرِّيَّةً" (offspring) in this verse as referring to the descendants of Prophet Ibrahim (PBUH). He writes:

This verse concerns the granting of Imamate (spiritual leadership) to Prophet Ibrahim (PBUH). It should be noted that this event occurred late in his life, after the birth of both Prophet Isma'il (PBUH) and Prophet Ishaq (PBUH), when Isma'il (PBUH) and his mother had settled in Makkah. The phrase 'وَمِنْ ذُرِّيَّتِي' (and from my offspring) indicates that Prophet Ibrahim (PBUH) also requested this station of Imamate for his descendants.<sup>1</sup>

Similarly, Tafsir al-Namuna explains that the position of Imamate is reserved for the pure servants of God, meaning it would only be granted to the righteous descendants of Ibrahim (PBUH)<sup>2</sup> Taleqani further elaborates:

It appears that in this request, Prophet Ibrahim (PBUH) was mindful of both intellectual and bloodline inheritance. However, while heredity may play a role, it alone is insufficient for attaining the station of Imamate.<sup>3</sup>

Verse 28 of Surah Zukhruf: The Concept of "عقب" (Progeny) and the Perpetuation of Monotheism

The term "عقب" (progeny) refers to descendants and future generations. From a scientific and historical perspective, the cultural and ideological influence an individual exerts on subsequent generations can shape civilizations and major religions—exemplified by Prophet Ibrahim (PBUH) and his lineage.

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<sup>1</sup> Mohammad Hossein Tabatabaei, *Al-Mizan fi Tafsir al-Qur'an*, trans. Seyyed Mohammad Baqer Mousavi Hamedani (Qom: Islamic Publications Office, 2003). P. 367

<sup>2</sup> Hossein Shahsavand Hassani and Mahdiah Salarpour, *An Introduction to Chromosome Engineering and Genetic Engineering in the Light of the Qur'an*, 2012. P. 311.

<sup>3</sup> Tabatabaei, *Al-Mizan fi Tafsir al-Qur'an*, P. 292

In Verse 28 of Surah Zukhruf, Allah highlights one of Prophet Ibrahim's (PBUH) enduring achievements:

And he left it (the message of Tawhid) as a lasting word among his descendants, so that they might return [to it].

This verse demonstrates that the monotheistic message preached by Ibrahim (PBUH) became a foundational principle of faith, perpetuated through his descendants and remaining a core tenet among his followers. The term "بَاقِيَةً" (lasting) refers to the legacy of Tawhid (monotheism), which Ibrahim (PBUH) transmitted as a spiritual inheritance. This message endures to this day in the Abrahamic religions (Islam, Judaism, and Christianity) as a fundamental doctrine.

The concluding phrase, "لَعَلَّهُمْ يَرْجِعُونَ" ("so that they might return"), reflects divine hope that people would revert to this message, abandoning misguided paths and returning to the worship of the One God.

From a socio-scientific standpoint, this verse illustrates how beliefs and ideologies are transmitted across generations—particularly when foundational values, like Tawhid, are established by influential figures such as Prophet Ibrahim (PBUH). Such transmission typically occurs through social mechanisms like education, upbringing, and cultural reinforcement.

Thus, this verse underscores the enduring power of monotheism as a legacy passed down through generations. It aligns with sociological phenomena demonstrating how beliefs can persist as cultural and spiritual inheritances, profoundly impacting future societies.

Verse 27 of Surah Nuh (PBUH): The Consequences of Moral and Ideological Corruption

In this verse, Prophet Nuh (PBUH) addresses Allah, lamenting the rebellion and corruption of his people. He warns that if these misguided individuals persist, they will not only deviate themselves but also lead future generations into corruption, perpetuating a lineage of immoral and disbelieving descendants.

Prophet Nuh's (PBUH) concern extends to the long-term societal and moral impact of his people's misguidance. The terms "فَاجِرًا" (wicked in action) and "كَفَّارًا" (disbelieving in creed) describe a state where individuals become so entrenched in corruption that they leave no room for self-reformation.

From a scientific and social perspective, this verse highlights critical issues related to:

- **Behavioral Heredity:** The potential transmission of deviant traits (e.g., rebellion, moral decay) through both genetic and environmental factors.
- **Social Learning:** The role of upbringing and cultural norms in perpetuating ideological corruption across generations.

Through lexical examination and exegetical insights into these three categories of verses, it becomes evident that behavioral and ideological traits are not only transmitted through environmental and educational means but may also have a heritable component tied to human biology, including genetics. While the Qur'an emphasizes free will and the role of upbringing,

it also acknowledges the complex interplay of inherited predispositions and social influences in shaping belief systems.

### **3. Heritability of Behavioral Traits in Recent Scientific Findings**

The science of genetics examines the process of transmitting biological information from one individual to another, or more precisely, from parents to offspring and future generations. A key focus in genetics is the concept of heritability, which holds particular importance as it specifically investigates the role and influence of genes on trait transmission. In nature, biological information flows from DNA to RNA and then to proteins, with hundreds of proteins and enzymes involved in these interactions. The translation of RNA into proteins is one of the most critical stages in expressing genetic information, a process that can be influenced by the cellular environment, thereby altering protein activity within cells. These changes ultimately lead to variations in physical appearance or other human traits—differences that can even manifest between identical twins.<sup>1</sup>

The presence of a specific set of genes in cells and their expression results in the differentiation of brain, blood, or liver cells. Thus, the expression and activity of genes across various tissues demonstrate that the patterns of gene expression in the body are expandable, enabling a single gene to exert multiple effects. Diverse environmental mechanisms can also influence gene expression, modifying their functional outcomes in the organism.

One of the most significant and surprising discoveries in genetics in recent years has been the identification of the number of genes in human cells, estimated at approximately 25,000. Given the complexity of human anatomy particularly the brain this relatively small number prompted scientists to explore mechanisms that could account for it. The solution, uncovered in recent years, lies in the ability of a single gene to produce multiple transcript variants for translation. Emerging research in biological sciences suggests that RNA molecules play a pivotal role in regulating the production of diverse proteins.<sup>2</sup>

These discoveries reveal that numerous genes contribute to each human trait, and every behavioral or personality characteristic is influenced by a multitude of genes. This underscores the brain's central role in generating behavior and its impact on behavioral, ethical, and even psychological traits in humans.

### **4. Heredity in Genetics**

The study of heredity has ancient roots and has perpetually captivated human curiosity. Its significance is amplified by the attention it has received across diverse societies and religions. Historical studies of ancient Iranian social life indicate that our ancestors had partial awareness

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<sup>1</sup> S. R. Eddy, "Non-Coding RNA Genes and the Modern RNA World," *Nature Reviews Genetics* 2, no. 12 (2001): 919–929.

<sup>2</sup> Ibid.

of the equal contribution of male and female sexes in reproduction and trait transmission to offspring. Similarly, the Qur'an, the holy book of Muslims, while not explicitly addressing heredity, contains implicit references to concepts of inheritance, environment, their interplay, and behavioral formation.

Modern genetic research has established that genes influence not only physical traits but also behavioral tendencies such as impulsivity, sudden excitability, risk-taking, sensation-seeking, novelty-seeking, and psychiatric conditions like schizophrenia, bipolar disorder, and autism. Recent interdisciplinary studies in social sciences, psychology, and philosophy have critically examined the role of genes in shaping human personality, behavior, mental constitution, and brain function the central processing unit for all human activities.

For instance, addictive personalities are observed in many individuals. Substance addictions to drugs, alcohol, cigarettes, or even chocolate often serve as coping mechanisms for negative emotions. Studies confirm that while all brains are susceptible to addiction, some are genetically predisposed to higher vulnerability. Extensive research on traits like aggression, shyness, and social anxiety consistently affirms genetics as a determinant of the intensity and manifestation of these behavioral and personality characteristics. The genetic basis of mental illnesses has been investigated through diverse methodologies over decades.

From a scientific perspective, behavioral genetics demonstrates that certain psychological and behavioral traits—such as intelligence, anxiety, and aspects of personality—can be genetically inherited. However, the intersection between behaviorism and genetics lies in the principle of behavioral conditioning: while personality and behavioral traits may be influenced by genetic predispositions, they remain potentially malleable through environmental interaction. This behavioral plasticity, therefore, depends on appropriate conditioning and environmental stimuli.

Epigenetic modifications—heritable changes in gene expression that do not alter the underlying DNA sequence—have been extensively investigated. Epigenomic studies have identified multiple loci exhibiting DNA methylation changes in genes associated with brain development and neurotransmitter pathways, linking these molecular alterations to various psychiatric disorders. Consequently, elucidating the mechanisms that govern the initiation, maintenance, and transmission of epigenetic states has become a crucial focus of contemporary biological research, particularly within studies of human learning, memory, emotion, and social behavior.

## **5. Latest Scientific Findings**

From a scientific perspective, a comprehensive explanation of the evolution of beliefs and convictions requires further evidence. Undoubtedly, religious beliefs have profound roots within human beings so profound that they cannot be fully explained by social or educational influences alone. It is likely that religion itself did not evolve directly but rather emerged through our cognitive processes, shaped by accepted structures or cognitive frameworks such as social

constructs. This example may reflect genuine information compared to fabricated alternatives. Although secularization is widely recognized in modern industrial societies today, religious beliefs (religiosity) are far from complete extinction. Studies indicate that between 20% to over 50% of religious attitudes and behaviors have a genetic basis. While the precise genetic foundation of religious beliefs remains undiscovered, existing research confirms that religiosity is not tied to a single "religious gene" but, like other complex traits, has a polygenic basis. This aligns with the hypothesis that the evolution of religious beliefs stems from the cognitive capacity for complex thought. Furthermore, since religious beliefs are partially heritable, in most cultures, religious individuals tend to have more offspring than non-religious ones, contributing to the developmental emergence of religious beliefs. Despite theories predicting a decline in religious adherence, we can anticipate an increase in the global number of religious individuals over the next 50 years.<sup>1</sup>

Today, more than ever, information about genetic contributions to psychological development is available, raising questions about how individuals perceive and utilize this knowledge to inform their judgments and behaviors. Strong evidence suggests that genetic explanations foster genetic essentialism—a psychological tendency to view traits as inherently and immutably determined by genes. This study aims to better understand how genetic information and beliefs about the heritability of piety influence individuals' perceptions of piety. Research on genetic reports related to piety may lead people to view piety as less of a malleable skill, potentially creating negative implications for parenting and moral development. Our investigations explore these possibilities to generate new insights into the complex interplay between genetic data, public beliefs, and human flourishing.<sup>2</sup>

Another study examines the genetic contribution to fundamental cognitive changes and factors influencing future-oriented beliefs. Individual variability in these processes can be partially explained by genetics, with genetic influence ranging between 13% to 39%. These results provide fresh insights into the heritability of basic mental processes and offer clues about the potential heritability of more complex psychological traits. By quantifying cognitive and emotional mechanisms at lower levels, broader conclusions can be drawn about the heritability of a wide range of behaviors and traits, identifying key contributing factors. Such knowledge can guide efforts to modify phenotypes, as interventions based on underlying processes tend to be more successful in sensitive fields like genetics.<sup>3</sup>

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<sup>1</sup> M. Fieder and S. Huber, "The Evolutionary Biology of Religious Behavior," *Interdisciplinary Journal for Religion and Transformation in Contemporary Society* 7, no. 1 (2021): 303–334

<sup>2</sup> M. Vess, R. J. Brooker, M. Stichter, and J. M. Neiderhiser, "Genes and Virtue: Exploring How Heritability Beliefs Shape Conceptions of Virtue and Its Development," *Behavior Genetics* 49 (2019)

<sup>3</sup> V. Vellani, N. Garrett, A. Gaule, K. R. Patil, and T. Sharot, "Quantifying the Heritability of Belief Formation," *Scientific Reports* 12, no. 1 (2022).

## Conclusion

Although the Qur'an does not explicitly address modern genetics in technical terms, several verses discuss themes related to creation, heredity, and human diversity that indirectly correspond with genetic concepts. These include references to embryonic development, human variation, and creation from sperm and clay—concepts that may enrich our understanding of biological processes and genetic influences. Some verses further highlight aspects of human nature, hereditary effects, and the roles of upbringing and environment in shaping behavior. Key genetic concepts—such as heredity, environmental influences on behavior, and the role of free will in human actions—are reflected in the Qur'an in ways that mirror the complexity of human behavior and the dynamic interplay between genetic and environmental factors. Importantly, the Qur'an and Islamic doctrine emphasize that despite genetic and environmental variations, humans possess free will and are accountable for their choices.

Behavioral genetics in the Qur'an can be interpreted through concepts such as *fitrah* (innate disposition), the influence of upbringing and environment, and individual responsibility. The Qur'an identifies inherent human tendencies—such as greed, haste, and weakness—that may correspond to genetic predispositions, yet it underscores that these traits are shaped and moderated through environmental interaction and education. Moreover, the Qur'an's emphasis on free will and moral accountability demonstrates that, despite genetic and environmental influences, humans ultimately remain responsible for their actions.

In this study, 254 Qur'anic verses containing explicit or implicit references to heredity and trait transmission were analyzed. Among these, *Surah Nuh* (71:27), *Surah Zukhruf* (43:28), and *Surah al-Baqarah* (2:124) provide particularly significant insights into the heritability of beliefs.

The heritability of beliefs and values is a complex and multifaceted subject situated at the intersection of genetics, psychology, and the social sciences. Recent research in this area has begun to clarify the role of genetics in belief formation. Given humanity's enduring concern with survival and progeny, the key to this puzzle lies in genetic inheritance. Since DNA fundamentally transmits genetic codes from parents to offspring, the inheritance of physical traits is inevitable—a concept acknowledged even in ancient civilizations such as Persia, where parental contributions to heredity were recognized.

However, the assertion that all behavioral traits are heritable requires careful consideration. Among approximately twenty thousand human genes, the expression of any given gene depends on environmental triggers. For example, a genetic predisposition toward spirituality may manifest as faith, but without a conducive environment, it may remain dormant. This study indicates that contemporary genetic research supports the possibility that behavioral—and even ideological—traits can be influenced or transmitted through genetic mechanisms. Ultimately, while the Qur'an outlines the overarching principles of human creation and divine order, the scientific interpretation of the underlying mechanisms, such as genetics, has evolved over time in light of advancing human knowledge.

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