E. Janet Warren

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"Generational Sin" and Epigenetics

E. Janet Warren

The concept of generational sin, that we inherit sins of our ancestors (based on Exodus 20:5), is popular in some contemporary Christian circles. Recently, the field of epigenetics, which examines the effects of environment on genetic expression, has been used to support this idea. This claim is evaluated by contextually examining relevant biblical passages and the broader theological concept of sin, concluding that there is insufficient biblical evidence to support the concept. Similarly, recent scientific research suggesting epigenetic transgenerational transmission of consequences of adverse experiences, though interesting and informative, does not prove that trauma effects in humans are caused by epigenetic changes. Inherent and experiential factors (nature and nurture) are intertwined and, ultimately, we are each responsible for our own thoughts and actions.

Keywords: original sin, genetics, intergenerational trauma

Introduction

In an expansion on the second of ten commandments given to Moses on Mount Sinai, Yahweh explains the reason why people should not bow down to idols: he is "a jealous God, punishing children for the iniquity of parents, to the third and the fourth generation of those who reject me" (Exod. 20:5).[1] This concept has become known as generational sin and has been expanded upon in some popular Christian literature. More recently, there are claims that the biological science of epigenetics supports this idea.

The concept of generational/ancestral sin or curses was associated with the eugenics movement of the 19th century,[2] but came to prominence with the inner healing movement in the 1980s and 1990s.[3] It has not disappeared. Proponents claim that unresolved issuses, weaknesses, or tendencies get passed down through generations, or through the bloodline, of a family.[4] Sin patterns get established, multiply, and can become a stumbling block for four generations of a family, with sinful behaviors repeating themselves. People can also be punished for sins committed by their ancestors. These sin cycles can be broken by Jesus, often requiring a special revelation and an elaborate cleansing ceremony. Proponents emphasize prayer, repentance (for oneself and on behalf of one's ancestors), breaking generational curses, and healing the family tree.[5]

Many authors and practitioners of inner healing associate generational sin with demonic bondage—the assumption that evil spirits, associated with particular sins and/or curses, can also be passed on to the next generation.[6] Families that are cursed may suffer from multiple, repetitive disasters. People affected by inherited demons, such as spirits of trauma, then require deliverance as part of the process of healing from the effects of generational sin.

Interestingly, the concept of ancestral sin and curses is found in other religions, literature, and folklore. Both Shakespeare's *Macbeth* and *Romeo and Juliet* refer to curses or plagues, the first being associated with so many accidents that it is often

E. Janet Warren *(BSc, MD, PhD) is an ASA fellow and former president of the CSCA who works as an independent scholar in theology and a part-time family physician. She has published four books and numerous articles, many related to science-faith integration.*

"protectively" referred to as "The Scottish Play." In contemporary culture, generational sin and generational trauma (such as that experienced by Holocaust survivors) have been associated.[7]

Naturally, these concepts have been critiqued for being unbiblical, simplistic, and absolving people of responsibility (akin to a prosperity gospel or "name it and claim it" approach).[8] From a secular perspective, Paul Lombardo likens contemporary teaching on generational sin to arguments used to support eugenics.[9] From Christian perspectives, David Powlison describes the generational transfer of demons as "occult theology,"[10] and Scott Osenbaugh calls generational curse teaching a pagan and false doctrine that denies the sufficiency of scripture and Christ.[11] To be fair, there are nuances in approaches and many authors acknowledge prayers around generational sin to be based more on anecdotal than biblical evidence, or related to the broader concept of "original" sin.[12] Also note that the ubiquity of sin in families and society is not disputed, only the specific notions of biological inheritance and culpability for the sins of one's ancestors.

More recently, at least in popular Christianity, this concept has been related to the scientific field of epigenetics, with the claim that biological science supports the notion of generational sin. Popular websites state, "we no longer have to be victims,"[13] and "perhaps the serious sins of the fathers have left an epigenetic 'mark' on the children that can last for generations."[14] This idea even appears on reputable science-faith websites: A pastor, writing on how he includes science in his sermons, claims that epigenetics provides a biological context for God's statement that sins of parents are passed on to their children; and a biochemist similarly, though more tentatively, suggests that epigenetic research "may provide a biological basis for passages like Exodus 20:5."[15]

The purpose of this investigation is to thoroughly examine the questions: Is there such a thing as generational sin? If so, can scientific findings inform us as to how to understand and approach it? Can sin be biologically inherited? As science and faith can be mutually edifying, examining biblical concepts and related psychological and biological evidence will allow us to address these questions from a more informed perspective.

Biblical Concepts

Recall that good biblical interpretation requires consideration of context—both biblical and cultural.[16] Therefore, before examining specific biblical passages, we will review the world of ancient Israel and examine the broader topic of sin.

Ancient cultures

In general, ancient Israel was more communally than individually oriented: Four generations typically lived together; families were members of clans and were united in tribes (e.g., Josh. 7:16–18).[17] Interestingly, the Hebrew term אָב (ʾāb), typically translated "father," can also mean ancestor, forefather, head of clan, producer, and protector.[18] Solidarity was such that Henry Wheeler Robinson famously claimed, "the people are their ancestors."[19]

There is fluidity in the biblical language when referencing groups versus individuals; Psalm 44 transitions between "I" and "we" apparently arbitrarily. Individuals often acted as representatives of a group. This occurred frequently during intercession: Moses asked forgiveness for all of Israel (Exod. 34:9), Nehemiah confessed his own sin as well as that of his family and all of Israel (Neh. 1:6; see also Neh. 9:2), and Daniel pleaded God's forgiveness on behalf of his disobedient people (Dan. 9:15–19). Individuals not only acted as mediators but also appeared to accept responsibility for the sin of others, including their ancestors. With respect to divine action, frequently a group receives favor because of an individual's behavior: Abraham's offspring are blessed because of his obedience (Gen. 12:2; 22:17,18), Jehu's "sons of the fourth generation shall sit on the throne of Israel" (2 Kings 10:30), and Isaiah prophesies God's "salvation to all generations" (Isa. 51:8). The converse is also true: When Achan steals treasures, he and his family are stoned to death, and the Israelites lose a battle (Josh. 7:1–26).

The concept of corporate culture is less evident in New Testament texts. When Ananias and Sapphira sin (Acts 5:1–11), they alone are punished, not their community. However, Jesus called both individuals (Luke 15:7) as well as groups to repentance (Matt. 11:20–24). Interestingly, the Philippian jailer is told that not only he, but also his household would be saved were he to "believe on the Lord Jesus" (Acts 16:31). Paul's metaphor of the body of Christ emphasizes unity over individuality (1 Cor. 12:13); in addition, he calls followers of Christ to function as a community, bearing one another's burdens (Gal. 6:2).

This brief overview of the cultural context of the Bible, being much more communally oriented than Western societies, will help in our understanding of biblical concepts such as generational sin. First, we consider sin more broadly.

Sin

Sin is ubiquitous: "All have sinned and fall short of the glory of God" (Rom. 3:23). It is both individual (e.g., David) and communal (e.g., the apostate people of Israel), an act and a nature, thought and deed, internal and external.[20] The English term does not do justice to the wide array of intertwined biblical metaphors: deceitfulness (Heb. 3:13), disobedience (2 Cor. 10:6), failure (James 4:17), idolatry (1 Sam. 15:23), impurity (Zech. 13:1), iniquity (Ps. 38:18), lawlessness (1 John 3:4), rebellion (Exod. 23:21), and wickedness (Gen. 6:5). At times, it is objectified as a snare (Prov. 5:22) or a weight (Isa. 1:4); it can enslave people (Rom. 7:14, 25), cause death (James 1:15), and can even affect the land (Lev. 18:25).[21] Sin is also associated with evil spirits (Lev. 16): sin makes one vulnerable to demonic influence (Eph. 4:26, 27; 1 Tim. 3:6), and evil spirits incite sin and prey upon it (Gen. 4:7; Acts 5:3; 1 Thess. 3:5).[22] Ultimately, all sin is directed against God (Ps. 51; 1 John 3:1–10).

The term used in Exodus 20 is עָוֹן (ʿāwōn), meaning iniquity, perversity, crime, guilt, or punishment (note the overlap between sin and its consequences). However, the more commonly used terms (Hebrew חַטָּאת [ḥaṭṭāʾt], Greek *ἁμαρτία* [hamartia]) are best understood as "missing the mark," failing to reach a standard.[23] Although sin as pride, domination, or rebellion has often been emphasized in Western theology, sin also involves sloth, self-abnegation, or despair.[24]

Clearly, sin is much more than simple bad behavior or breaking a law. The multiple metaphors have at their root rejection of God as God and of Christ as our Savior, and both punishment and reparations for sin vary according to intent and severity.[25] Furthermore, sin can be preconditioned by life experiences and context, and can grow to the point where our ability to choose is limited, as well stated by Paul: "I do not understand my own actions. For I do not do what I want, but I do the very thing I hate" (Rom. 7:15).[26]

The broad nature of sin has also been described in terms of systemic or corporate sin. Biblical descriptions point to sin as a superhuman power that grows exponentially (consider the "fall," the fratricide, and the flood in Genesis 3–6), kills innocent people (2 Kings 21:16), damages the land (Hosea 4:3), and taints social structures. This last is well illustrated in the elusive Pauline powers: "authorities," "rulers," "spiritual forces," and other terms that likely refer to both human institutions and evil cosmic entities.[27] Sin ruptures community. It is structurally embodied, and individual attitudes and actions intertwine with sinful societies.[28] Biblical scholar Mark Biddle defines sin as a "system of organically related phenomena, a nexus of cause-effect-cause," emphasizing its systemic and dynamic nature: It creates a "perverted condition that can twist the perceptions and decisions of subsequent generations"; "sin's afterlife vibrates throughout the system and … will continue to twist existence and limit freedom … until the eschaton."[29]

A final important theological concept is that of "original sin." This doctrine, based primarily on Paul's interpretation of Genesis 3 in Romans 5:12–21, was developed by Augustine and perpetuated in the Reformed tradition. The fourth/fifth-century African theologian emphasized a great fall from original perfection. He not only thought that humans are depraved (plagued by concupiscence and idolatry) and unable to not sin, but also—using judicial, forensic language—that we inherit Adam's guilt. He compared sin to a hereditary disease, suggesting that guilt is passed down from one generation to another.[30]

"Original sin" has received much critique.[31] Though none question the universality and inevitability of sin, the controversy concerns whether it is biologically inherited or not, especially the guilt component. The concept of original sin is not found in the Old Testament, being uniquely Pauline.[32] It is potentially fatalistic, absolving individuals of responsibility. It portrays humanity in a negative light, minimizing or denying any original goodness in beings created in God's image. It ignores socio-cultural influences on sin. Furthermore, it is difficult to believe that God ordained all death because of the disobedience of two people, or that all newborns are culpable by virtue of genetics. Finally, as this article will demonstrate, there is no scientific evidence of sin being biologically inherited.[33]

Many suggest that we avoid the term "original sin" with its unfounded assumptions of genetic inheritance and guilt, and instead view humans as having an innate tendency or propensity to sin, a sinful nature, or (my suggestion using mathematical language) a 100% pretest probability of sinning.[34] It is also important to recall the systemic/structural nature of sin, or its cultural transmission, as per the above discussion. This broad conclusion that sin is not genetically inherited partially negates the concept of "generational sin," but we still need to examine the specific texts that have been used to support this concept.

The context of Exodus 20:1–11

After delivering the Israelites from Egyptian captivity and leading them through the wilderness, God, through Moses, speaks to his people establishing the terms of their relationship. This divine revelation, comprising ten commands, is at the heart of Yahweh's covenant bond with Israel. It emphasizes the exclusivity of the relationship, defines sin as worshiping anything or anyone other than God (in contrast to the Egyptians and other pagan nations), and establishes parameters for communal relationships. Idolatry is identical to covenant violation.

This decalogue continues the covenant relationships of Noah and Abraham. This bond establishes Israel's identity (evident in the frequent refrain, "I am your God and you are my people": e.g., Ezek. 34:30–31; Jer. 30:22), instigates rituals (the Passover, Exod. 12:1–28), and provides boundary markers for covenant faithfulness. There are repeated pronouncements of blessings for obedience and curses for disobedience: for example, "Keep, then, this entire commandment … so that you may live long in the land that the Lord swore to your ancestors" (Deut. 11:8,9), and "Cursed be anyone who does not heed the words of this covenant, which I commanded your ancestors when I brought them out of the land of Egypt" (Jer. 11:3,4).[35] Paul quotes Deuteronomy 27:26, saying, "Cursed is everyone who does not continue to do everything written in the Book of the Law" (Gal. 3:10). It is clear that Yahweh is sovereign, the only true God worthy of worship.

However, many of these "blessings and curses" or "punishments" for disobedience do not necessarily reflect an authoritarian deity who micromanages his world, but can be understood as a natural moral order (similar to the order established in creation: for example, God "appoints the sun to shine by day" [Jer. 31:35, NIV]).[36] Actions have consequences and many statements are simply descriptions of cause and effect. These are often framed as "if-then" observations or "reaping and sowing: "If you pay attention to these laws and are careful to follow them, then the Lord your God will keep his covenant of love with you" (Deut. 7:12, NIV); "those who plough iniquity and sow trouble reap the same" (Job 4:8); "Whoever sows injustice will reap calamity" (Prov. 22:8). Statements relating to moral order continue in New Testament teaching: "If you live according to the flesh, you will die …" (Rom. 8:13); "If you hear my voice and open the door, I will come in to you and eat with you, and you with me" (Rev. 3:20); "the one who sows sparingly will also reap sparingly, and the one who sows bountifully will also reap bountifully" (2 Cor. 9:6); "sow to your own flesh … reap corruption; sow to the spirit … reap eternal life" (Gal. 6:8).

Biblical scholars note that the creational order requires reliable rules and regularities, such as consequences for deeds, in order for life to have meaning and purpose and for humans to have moral agency. Indeed, the world reverts to chaos when covenant disobedience dominates (Gen. 6:1–7; Isa. 24:1–13; Jer. 4:20–25).[37] Understanding both the primacy of the divine-human relationship, with requisite obedience to divine commands, and the natural moral, cause-effect order in the cosmos provides some background for understanding Exodus 20.

Examination of Exodus 20:5, 6[38]

Once God reminds his people of who he is and what he did, he repeats the prohibition against idolatry three times, and then, unique to the second command in verse five, he elaborates on his character.[39] He is a "jealous" God—the term is used only a few times and always relates to God's love for his people. He "visits" (פָּקַד, pāqad, meaning to attend to or be concerned with)[40] the "iniquity" (עָוֹן, ʿāwōn—recall the multifaceted understanding of this term, the intertwining of sin and consequences) of the "parents" (אָב, ʾāb—not necessarily biological parents as discussed above) on the "third" and "fourth" (generation is implied) of those who "reject" (שָׂנֵא, *sa.ne,*[41] meaning hate or despise) him. Note that biblical use of numbers is almost always symbolic; here "third or fourth" (one could ask what happened to the second) is likely a literary device, meaning an indefinite number or a final number, not actual great-grandchildren.[42] The point is that there is corporate responsibility; the disobedience of the few affects the many.[43] Also recall that family units in the ancient world were cohesive; sin would affect all those in close relationship with the individual who worships idols.[44] Furthermore, the "generations" need to be interpreted in light of "those who reject" God—it is possible that there is an implicit "if," meaning that only those who continue to sin as their parents did will also receive consequences. Generations that follow the "sinner" do not necessarily suffer passively and automatically.[45]

Verse six is sometimes neglected in discussions on generational sin. Astoundingly, divine mercy vastly outweighs divine justice: God shows "steadfast love" (חֶסֶד, *che.sed,*[46] meaning kindness, faithfulness, or covenant loyalty) to "thousands" (clearly symbolic, signifying an infinite number). This is echoed in Psalm 105:8: "He is mindful of his covenant forever … for a thousand generations." Interestingly, on the new tablets Moses

makes (Exod. 34:1–28), the order is reversed and God's loving nature is expanded upon: he is compassionate, gracious, slow to anger, abounding in *che.sed.* His justice in holding the guilty responsible seems almost an afterthought. Webb and Oeste point out the lopsided nature of God, with a ratio of six positive adjectives to one negative one, and the effects of his attributes having a ratio respectively of one thousand to four.[47] This adds a helpful perspective to our continuing interpretation of generational sin.

Biblical passages that appear to support or contradict "generational sin"

There are other texts that further our understanding of the concept of generational sin. As discussed above, it is clear that sin and its consequences are broad and systemic in nature, affecting entire communities and their land. However, this does not speak to biological inheritance. More specifically, in addressing Israel's covenantal disobedience, Yahweh proclaims, "those of you who survive [previous penalties] shall languish … because of their iniquities; also … because of the iniquities of their ancestors. But if they confess their iniquity and the iniquity of their ancestors" (Lev. 26:39, 40), then the Lord will remember his covenant and spare them. Later in the Pentateuch (Num. 14:17–19), Moses intercedes for Israel, reminding God of his loving character using the language of Exodus 34:6,7 ("slow to anger," "forgiving iniquity"). Although these verses have been interpreted as supporting the concept of generational sin, they better reflect the corporate mentality of ancient Israel and the lack of sharp distinctions between individuals and groups in the biblical world. They also emphasize divine mercy, although they include discipline for the purpose of restoration.[48]

The prophet Jeremiah also intercedes for Israel: "We acknowledge our wickedness, O LORD, the iniquity of our ancestors" (Jer. 14:20). He frequently states, "we have sinned against you (or the LORD)" (e.g., Jer. 3:25), and he comments on generational connections: "Our ancestors sinned; … we bear their iniquities" (Lam. 5:7). Again, these verses reflect the common practice of an individual interceding on behalf of a group; also note that, although people may suffer as a consequence of the sin of others, they do not bear responsibility.

Many biblical verses directly contradict any notion of individuals bearing consequences for the sin of their ancestors. In an expansion of laws given to Israel, it is clarified that "parents shall not be put to death for their children, nor shall children be put to death for their parents; only for their own crimes may persons be put to death" (Deut. 24:16). Jeremiah clarifies that people may suffer because their ancestors turned away from God, but also because they "behaved worse than [their] ancestors" (Jer. 16:10–12). In other words, consequences for sin are first and foremost applied to an individual.

Both Jeremiah and Ezekiel respond to a popular proverb of the day that claimed, "The parents have eaten sour grapes, and the children's teeth are set on edge" (Jer. 31:29; Ezek. 18:2). They refute this by insisting that "all shall die for their own sins" (Jer. 31:30), and "it is only the person who sins that shall die …" (Ezek. 18:4; in fact, the entire chapter emphasizes individual responsibility for actions). Although an individual's sin can affect future generations, everyone has an opportunity to repent; therefore, they cannot justify their actions by blaming ancestors.[49]

To consider the issue in a broader context, consider the Gospel's emphasis on love, mercy, forgiveness, and inclusion (Luke 13:1–5; 19:1–10; John 3:16; 8:11) with disproportionately few references to sin in the Synoptics.[50] Specific to generational sin, Jesus refutes the suggestion that a man's blindness is caused by his own sin or that of his parents (John 9:1–12).[51] Perhaps more importantly, he assures us that the Son sets us free (John 8:36). Paul somewhat similarly teaches that we are judged only by our own actions (Rom. 2:6; 2 Cor. 5:10). This is demonstrated in the story of Ananias and Sapphira, who alone are punished for their sin, not their community (Acts 5:1–11).

Paul also emphasizes mercy: "where sin increased, grace abounded …" (Rom. 5:10); there is "no condemnation for those who are in Christ Jesus" (Rom. 8:1).[52] Overall, the teaching of the Epistles is that we are redeemed from iniquity, not that we inherit it (Heb. 8:1–13; Tit. 2:14). Peter specifically notes that, through Christ's sacrifice, believers are "ransomed from the futile ways inherited from [their] ancestors" (1 Pet. 1:17–19).

In the New Testament, although sin is depicted as systemic, a cosmic force with wide effects, there is no suggestion of biological inheritance. Instead, we "inherit salvation" (Heb. 1:14) and are "joint heirs with Christ" (Rom. 8:17).[53] The body of Christ is to function as a community, bearing one another's burdens (Gal. 6:2), but not bearing another's consequences of sin.

Generational sin: summary

At this point, we can respond to the first research question, "Is there such a thing as generational sin?," in the negative. Although sin is ubiquitous, complex,

and communal, having effects on both current and future generations, there is no biblical evidence that it is biologically inherited. Specifically, by interpreting Exodus 20:5,6 in its immediate and broader context, we learn that ancient cultures blurred boundaries between individual and community, the terms translated "father/parent" and "generation" do not necessarily have biological meanings, and that exclusivity of worship and covenantal obedience are emphasized throughout scripture, as are natural moral order, personal responsibility, divine love, mercy, and forgiveness.

If generational sin is a dubious biblical concept, then scientific "proof" will not rehabilitate it theologically. However, given the continued popularity of the topic and claims that "science" proves sin is inherited, it is worth examining the relevant scientific concepts. Furthermore, since science at times can raise questions that prompt further biblical/theological exploration, examining some empirical studies may provide further insight into the nature of sin, especially its systemic or corporate dimension. This may also illuminate the broad observation of repeated sin patterns in families and societies. We begin with some relevant data and theories from the field of psychology.

Psychological Concepts

The concept of psychological trauma ("a disturbing experience that results in significant … disruptive feelings intense enough to have a long-lasting negative effect on a person's … functioning"[54]) and its broad effects have been increasingly understood in recent years. Even minor adverse experiences in childhood can have significant deleterious effects on a person's physical and mental health.[55] Although contemporary models for understanding psychological problems are still mostly medical (physical diseases with biological/organic causes, such as genetics and neurochemicals), there is increasing awareness of the effects of psychosocial factors such as gender, race, education, and socio-economic status on mental well-being.[56]

More specifically, the term intergenerational (transgenerational, historical, or multigenerational) trauma has been coined to describe "the transmission of trauma or its legacy, in the form of a psychological consequence of an injury or attack, poverty, and so forth, from the generation experiencing the trauma to subsequent generations."[57] This has obvious implications for the idea that parents' sins affect their children. Many scholars think that trauma is inherited epigenetically (discussed below). Although there is no doubt that children are affected by the behavior and mental-emotional state of their parents, contemporary psychological understanding is that nature and nurture are intertwined (as in the cliché, "biology is not destiny").[58] It is impossible to separate the impact of genetic or inherent factors from that of experiential ones. Systems theory and the concept of developmental trauma are considered to have sufficient explanatory value for psychological problems and "sinful" actions (or more commonly, sinful responses to trauma). A helpful framework is that of biological vulnerability or predisposition, the expression of which depends on environment and agency.[59]

Biological Concepts

There are some well-known cautions regarding scientific interpretation: do not equate correlation with causation, and avoid simplistic conclusions. Biologist Denis Alexander laments the sensationalism surrounding inheritance in the popular press, such as references to "liberal genes," "happiness genes," "binge drinking genes," as well as headlines such as, "blame your DNA."[60] Instead, biological organisms are complex dynamic systems, causation is usually multifactorial and best described using probabilistic terms, and medical science is inexact. In short, life is messy; there are things that happen to us, and things that we make happen.

Genetics is "the study of inheritance and variation of biological traits."[61] Our 23 chromosomes contain about 23,000 genes (the human genome), and development continues throughout life as mutations and consequent genetic variations continue to occur. Contrary to popular belief, the DNA that carries genetic information functions more like a flexible script than a fixed template, similar to differing movie adaptations of the same play.[62] An important concept is heritability: "an attribute of a quantitative trait in a population that expresses how much of the total phenotypic variation is due to genetic variation."[63] Calculating the latter is complex, based on statistics and dependent on definitions, and there is a wide spectrum: some disorders, such as developmental delay, have high heritability, whereas conditions such as depression and obesity have low heritability.[64] Almost all behavioral traits have low heritability; the effects of environmental interaction and free will are high. Alexander notes that "different genomes tend to correlate with different life outcomes in a probabilistic kind of way."[65]

Epigenetics

This leads us to the even more complex field of epigenetics: the study of "the mechanisms by which genes bring about their phenotypic effects,"[66] or "heritable

and stable changes in gene expression that occur through alterations in the chromosome rather than in the DNA sequence."[67] These modifications occur in response to environmental changes and in a sense turn genes on and off; the term genomic plasticity has been used to describe this phenomenon. Genetic expression is affected by intrauterine surroundings as well as by postnatal physical and psychological experiences, such as diet, toxins, and stress. Epigenetic changes help explain the pathogenesis of many diseases, including cancer. Stimuli are often small; for example, short-term vitamin D supplementation resulted in epigenetic modifications at more than 100 sites.[68]

The biochemical mechanisms involved include DNA methylation, histone modification, and non-coding RNA-associated gene silencing.[69] These changes can occur between parent and daughter cells, and can be passed from one generation to the next. The collection of all epigenetic modifications in a genome is called an epigenome, and there is a large diversity of epigenetic differences between individuals. This field of study helps bridge the gap between genotype and phenotype or, more broadly, between nature and nurture.

Of particular interest to our research question is how epigenetics can inform our knowledge of transgenerational trauma. Adverse experiences can leave a chemical mark on a person's genes, which can then be passed down to future generations. This mark does not cause a genetic mutation, but it does alter the mechanism by which the gene is expressed. Epigenetics mediates how early psychosocial experiences affect one's ability to handle stress and one's overall health; changes have even been found in the placenta.[70] Transgenerational epigenetic changes related to psychological health have been discovered in multiple studies, such as effects of parental stress on children, childhood abuse and suicide, aggressive behavior, brain processes in mental illness, and post-traumatic stress disorder.[71]

These effects are also evident at population levels. A well-known study examined grandchildren of those who suffered through famine for an extended period in 1945.[72] They found that men who had been in utero during this time had offspring who were heavier and experienced more chronic diseases than their peers who were unaffected by famine. Another study discovered a specific chemical mark, or epigenetic signature, on one of their genes.[73]

Epigenetic changes have also been found in children of Holocaust survivors (a distinctive pattern of DNA methylation) and in infants whose mothers were pregnant on 9/11. These children also demonstrated heightened emotional arousal (which may decrease their capacity to deal with stress and predispose them to psychological problems).[74]

This research is fascinating, implying that some people have more to overcome because of their genetic inheritance. This, of course, can lead to unhelpful responses in popular thought, such as sensationalism, overgeneralization, fatalism, and neglect of personal responsibility. Interestingly, in criminology (perhaps more closely associated with "sinful behavior"), the science of epigenetics has been deemed inadequate to warrant revisions to criminal law.[75]

Researchers themselves caution that the field is in its infancy, one cannot extrapolate from animal studies, and conclusions should be tentative. Psychiatrist Rachel Yehuda, a pioneer in this area, states that "studies have not yet conclusively demonstrated epigenetic transmission of trauma effects in humans."[76] In particular, it is difficult to prove the role of epigenetics in generational trauma because of the major and unavoidable consequences of current environmental experience and sociocultural inheritance. Biological and psychological effects interact, and epigenetic changes continue throughout the lifespan, including positive ones that overcome effects of developmental trauma.[77] To reiterate, nature and nurture are intertwined; simplistic, reductionistic approaches are to be avoided.

Possible Interactions Between Biblical and Biological Concepts

Thus far, it appears that neither theology nor science definitively support the transmission of trauma, let alone transmission of sinful tendencies or curses associated with some Christian teachers' claims about generational sin. However, we can further consider the broader question of the transmission of sin, as discussed in some academic literature on the relationship between theological and biological concepts, with respect to transgenerational inheritance. Biologists Evan Jones and Blaine Smith title their article "Epigenetics and Pastoral Counseling: The Science Behind What We Preach."[78] Although they rightly note that both nature and nurture are important and that psychological disorders are not simply a result of sin, they state that "one could potentially claim that sinful behaviour no longer needs to be considered a function of something mysterious (Rom. 7:15–25) but something engrained within one's physicality (the flesh)."[79] However, as discussed above,

both sin and biological inheritance are multifactorial processes. Whether or not there are epigenetic (along with genetic and environmental) predispositions to sinful attitudes and behaviors (whether in the form of domination or despair, whether individual or communal), we still bear responsibility for our own thoughts and deeds. Furthermore, in Christian theology (and likely biology too), there is always some uncertainty and mystery, which, of course, encourages dependence on God.[80]

Theologian Walter Sisto takes a more conservative and defensible approach.[81] He suggests that epigenetics offers an analogy for the process of the transmission of original sin, which he defines as humanity's weakened or wounded nature. We are connected to our ancestors biologically, culturally, and spiritually. Generations of sinful persons can amplify the effect of sin, but we are not responsible for epigenetic markers inherited from our parents or their sinful deeds. Both epigenetics and sin (as well as grace!) are dynamic, not deterministic.

Megan Loumagne Ulishney provides a deeper, more nuanced discussion in a paper interestingly entitled "Visiting Iniquity upon the Generations."[82] She employs the approaches of systems biology and the extended evolutionary synthesis, which include non-genetic factors in the evolutionary process. Both epigenetics and systems biology suggest that, although we are shaped by external forces and environments, we are not passive recipients but active participants in the evolutionary process. With respect to Christian theology, sin is inevitable, all encompassing, and transmitted both biologically and culturally; the two work synergistically. We have agency and responsibility but are interdependent beings. Our sinful natures may be considered to be biologically inherited with the proviso that we acknowledge that nature and culture are intertwined. And, of course, biological imperfections are not necessarily sinful or a consequence of sin. Ulishney states:

> The past decisions made by our ancestors, our early childhood experiences, and the forces that came before us—the sinful and the good and everything in between—are always with us, although we are also not completely determined by these histories.[83]

Her emphasis on interconnection and non-determinism is helpful but might be better expressed using the language of predisposition rather than inheritance. Despite her cautions, the latter term carries implications of determinism as well as measurable mechanisms. In contrast, the term predisposition or vulnerability—used in biology, psychology, and theology—is broader, implying an ability to overcome any propensity for sin or psychological problems. Furthermore, the concept of genetic/epigenetic vulnerability fits with psychological theories of intergenerational trauma as well as theological notions of systemic sin and the sinful nature of humanity—our "guaranteed" predisposition to sin.

Conclusion

In sum, there is no doubt that adverse or sinful behaviors persist through generations. However, this is not a result of "generational sin" or divine curse, and our examination of the key texts showed that such persistent behaviors should not be interpreted in this manner. Neither is this persistence due to epigenetic inheritance, although there are suggestions of biological patterns that correspond to traumatic events, for example. The ubiquity of sin and the concept of generational trauma are best understood as a complex intertwining of biopsychosocial-spiritual predispositions, life experience, creational order, and human agency.

Recall that the Bible depicts sin as complex and systemic, intertwined with culture and with evil spiritual forces. The triune God is primarily concerned with his love relationship with his people; he forgives to the "thousandth" generation, emphasizes grace, and commands us to love him in return as well as our neighbors. These positive concepts are far more often discussed than "generational sin." However, God has created the world such that actions have consequences—he does not need to punish people but can rely on natural moral order. The Bible emphasizes individual responsibility for sin and its restitution.

I suggest we also consider the issue of the "inheritance" of sin more broadly. With respect to God's world, one could argue that pollution is a "sin" passed down through generations, but it would be difficult to attribute this to epigenetic changes. We should also acknowledge contrasts to sin and adverse experiences: the "inheritance" of blessings, and the possibility of divine healing and salvation.

On an individual level, as with pastoral counseling, it is important to consider family history and context when encountering ungodly behaviors and to recognize that sin is often a response to being sinned against. However, it is potentially more harmful than helpful to include the concept of "generational sin," as individual responsibility is more important. Prayer is always helpful but does not necessarily need to be specifically directed against curses, which can lead to simplistic and magical thinking. I don't discount anecdotal evidence,

such as discussed in the introduction, or the concept and practice of deliverance but, as discussed, there are interpretive options other than that of generational sin. We can rely on the Holy Spirit to guide our care of individuals and avoid generalizing—the process is likely different for each person; perhaps the balance, or imbalance, of biopsychosocial-spiritual factors involved in our attitudes and actions is unique to individuals.

With respect to the science-faith dialogue, there are some compatibilities between "generational sin" and biological and psychological findings. This is not surprising, in that science in many ways observes the created order. Theology and science concur that the past affects the present and that actions have consequences. Epigenetic research offers more specifics with respect to how "consequences," such as sensitivity to the stresses of "sin,"—for example, the Holocaust—can affect the next generation, even though sufferers did not commit this sin. This observation accords with the biblical notion of moral order and the cause-effect nexus. However, scientific research cannot address questions related to morality, guilt, punishment, or redemption. I also question whether it is a fruitful endeavor to scientifically determine how the "sins of the fathers" affect their children—at least from a Christian perspective. In fact, I am not convinced that the concept of inherited sin, or even predispositions, has explanatory value or advances our knowledge. It has long been known that there are biological correlates to psychological states and behaviors.

Interestingly, there is perhaps more evidence from science for the inheritance of sinful tendencies than from biblical theology. However, I think that this is a meaningful parallel that is likely coincidental. Although it is tempting to claim that scientific findings prove biblical teachings, this approach is unwise on many levels. Science and Christianity are broadly compatible, but each has different contexts, purposes, and methodologies. I suggest we interpret science through the lens of Christianity rather than looking to affirm biblical teaching with scientific discoveries. Furthermore, if a Christian concept is supported by science, this does not necessarily make the concept "more" true.

However, the possibility of epigenetic transmission of trauma can inform Christian faith. Biology and psychology remind us that humans are holistic beings, with "body-soul-spirit" unity. By reinforcing the importance of considering biblical teachings about the communal dimensions of sin, they add a corrective to the individualism characteristic of Western Christianity. Biology and psychology remind us of the complexity of human behavior and suffering, and the potential for transgenerational healing. In turn, Christian theology can perhaps stimulate scientific research on biological correlates of salvation or "generational blessing."

In the meantime, we need caution to avoid facile conclusions that can be detrimental. It may be more helpful to consider epigenetics as an analogy for systemic sin rather than a mechanism for it. Biological findings perhaps add a dimension to the necessity of covenantal obedience and the call to ethical living as the body of Christ. Ultimately, we are each responsible for our own thoughts and actions. Thankfully, the Bible speaks of a God who shows love to the "thousandth" generation; grace always trumps sin.

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Notes

[1]All Scripture references are from the New Revised Standard Version, Anglicised (NRSVA) unless otherwise noted.

[2]See discussion in Paul A. Lombardo, "Return of the Jukes: Eugenic Mythologies and Internet Evangelism," *Journal of Legal Medicine* 33, no. 2 (2012): 207–33, https://doi.org/10.1080/01947648.2012.686798.

[3]Like many movements it is difficult to be precise about its origins, though it is often associated with Agnes Sanford, whose work *The Healing Power of the Bible* (Hodder & Stoughton, 1974) influenced others such as Charles Kraft, *Defeating Dark Angels* (Servant, 1992) and Francis MacNutt, *Healing* (Ave Maria, 1974) and *Deliverance from Evil Spirits* (Chosen, 1995). It is predominantly associated with charismatic and evangelical streams of Christianity. Other popular speakers and ministers include Marilyn Hickey, *Break the Generational Curse* (Marilyn Hickey Ministries, 1988); Neil T. Anderson, *The Bondage Breaker* (Harvest House, 1990); and Derek Prince, *Blessing or Curse: You Can Choose* (Chosen Books, 1990). Note that my focus is the North American context.

[4]For example, Ed Murphy defines generational sin as "sin judgment which moves through the family line," in Ed Murphy, *The Handbook for Spiritual Warfare,* Revised and Updated (Thomas Nelson, 2003), 437; and Marilyn Hickey claims it is "hereditary traits or family weaknesses that are passed from generation to generation," in Marilyn Hickey, *Legacy of Faith* (Harrison House, 2011), 43.

[5]For example, note the title of Kenneth McAll's book, *Healing the Family Tree* (Sheldon Press, 1982). McAll recounts multiple anecdotes from his experience as a missionary physician and suggests that many mental maladies are due to control by ancestral curses. "Treatment" involves identifying the problem relative (often deceased) then "cutting spiritual bonds" through a service of prayer and holy communion.

[6]Charles Kraft, for example, refers to the "passing on of generational or bloodline spirits/power/curses" (*Defeating Dark*

Angels, 74). MacNutt refers to spirits of trauma (*Deliverance*, 182–95).

[7]The concept is popular enough to warrant both a Wikipedia and a WikiHow page, the latter including both spiritual and psychological strategies for breaking generational curses, https://en.wikipedia.org/wiki/Ancestral_sin; https://www.wikihow.com/5-Types-of-Generational-Curses.

[8]For a recent review and critique, see Peter Althouse, "Inner Healing, Embodied Emotions, and the Therapeutic Culture of Christian Healing Ministries: SPS Presidential Address 2023," *Pneuma* 45 (2023): 177–99.

[9]Lombardo, "Return of the Jukes."

[10]David Powlison, *Power Encounters: Reclaiming Spiritual Warfare* (Baker, 1995, 2000), 126–27.

[11]Scott E. Osenbaugh, "Generational Curses: Biblically Supported or False Teaching?," *Journal of Biblical Theology* 8, no. 2 (2025): 171–214.

[12]E.g., John Piper, "How God Visits Sins on the Third and Fourth Generation," *Desiring God*, March 6, 2009, https://www.desiringgod.org/articles/how-god-visits-sins-on-the-third-and-fourth-generation; and Murphy, *Handbook,* 437.

[13]Jeremy Wiles, "Epigenetics Reveals Your Habits Are Passed onto Your Children and Grandchildren," Soul Refiner, June 23, 2022; modified, May 12, 2023, https://blog.soulrefiner.com/science-confirms-bible-on-generational-curses.

[14]Jim Virkler, "Epigenetics Offers New Solution to Some Long-Standing Theological Problems: Inherited Sin, Christ's Sinlessness and Generational Curses Can Be Explained," Ankerberg Theological Research Institute (October 14, 2010), https://jashow.org/articles/epigenetics-offers-new-solution-to-some-long-standing-theological-problems-inherited-sin-christs-sinlessness-and-generational-curses-can-be-explained/.

[15]John Van Sloten, "God Speaks Science: Preaching from God's Other Book," BioLogos, September 10, 2018, https://biologos.org/articles/god-speaks-science-preaching-from-gods-other-book; and Fazale Rana, "Epigenetics—Sins of the Fathers," Reasons to Believe, June 1, 2011, https://reasons.org/explore/publications/articles/epigenetics-sins-of-the-father.

[16]For an overview on biblical interpretation, see Henry A. Virkler and Karelynne Gerber Ayayo, *Hermeneutics: Principles and Processes of Biblical Interpretation* (Baker Academic, 2023).

[17]For this section, see Carol Myers, "The Family in Early Israel," in *Families in Ancient Israel*, ed. Leo G. Purdue et al. (Westminster John Knox, 1997), 1–47; Leo Purdue, "The Household, Old Testament Theology, and Contemporary Hermeneutics," in *Families in Ancient Israel*, 223–58; and John Barton, *Ethics in Ancient Israel* (Oxford University Press, 2014), 53–55.

[18]אב, ʾāb, William Lee Holladay and Ludwig Köhler, *A Concise Hebrew and Aramaic Lexicon of the Old Testament: Based upon the Lexical Work of Ludwig Koehler and Walter Baumgartner* [15th, corrected impression, August 2000] (Eerdmans; Brill, 1988), s.v.

[19]H. Wheeler Robinson, *Corporate Personality in Ancient Israel* (T&T Clark, 1981), 4. He has been critiqued for overstating his case, e.g., Barton, *Ethics*, 53–55.

[20]For biblical and theological treatments of the topic, see Mark Biddle, *Missing the Mark: Sin and Its Consequences in Biblical Theology* (Abingdon, 2005), esp. vii–xix and 115–35; David L. Smith, *With Willful Intent: A Theology of Sin* (Bridgepoint, 1994), 153–309; Gary A. Anderson, *Sin: A History* (Yale University Press, 2009), esp. 3–35.

[21]E.g., Jonathan Klawans, *Impurity and Sin in Ancient Judaism* (Oxford University Press, 2000), 20–45, 119–55; Jay Sklar, "Pentateuch," in *T&T Clark Companion to the Doctrine of Sin*, Bloomsbury Companions, ed. Keith L. Johnson and David Lauber (Bloomsbury T&T Clark, 2016) 3–26.

[22]E. Janet Warren, *Cleansing the Cosmos: A Biblical Model for Conceptualizing and Counteracting Evil* (Pickwick, 2012), 129–38, 215–29.

[23]חַטָּאת, עָוֹן, Holladay and Köhler, *Hebrew and Aramaic Lexicon*, s.v.; *ἁμαρτία,* Frederick W. Danker and Kathryn Krug, *The Concise Greek-English Lexicon of the New Testament* (University of Chicago Press, 2009), s.v.; Biddle, *Missing the Mark,* 30–33; Anderson, *Sin,* 13–32; and Smith, *Willful Intent,* 289–310.

[24]Summarized in E. Janet Warren, "'I Do Not Do What I Want': Commonalities in Addiction and Sin," *Perspectives on Science and Christian Faith* 70, no. 4 (2018): 252–63, https://www.asa3.org/ASA/PSCF/2018/PSCF12-18Warren.pdf.

[25]E.g., 1 Cor. 8:12; Smith, *Willful Intent,* 301–26; Sklar, "Pentateuch."

[26]E.g., Warren, "'I Do Not Do What I Want.'"

[27]E.g., Rom. 8:38; 1 Cor. 15:24; Eph. 1:21, 3:10, 6:12; and Col. 1:16, 2:10; and Warren, *Cleansing*, 218–23.

[28]Theologian Drew (Andy) Everhart notes that social rules and norms regulate communal interactions; influence is reciprocal, hence, agency and responsibility are both personal and corporate: D. T. Everhart, "Communal Reconciliation: Corporate Responsibility and Opposition to Systemic Sin," *International Journal of Systematic Theology* 25, no. 1 (2023): 134–56, https://onlinelibrary.wiley.com/doi/pdf/10.1111/ijst.12570. Serene Jones similarly claims that sin is simultaneously individual and social and that "we are caught in webs of systemic evil that distort our capacities for good": Serene Jones, *Trauma and Grace* (Westminster John Knox Press, 2009), 37.

[29]Biddle, *Missing the Mark*, 76, 118–20, 130–36.

[30]Found mostly in Augustine, *Confessions,* trans. R. S. Pine-Coffin (Penguin, 1961), especially book II. Augustine's theology was informed by guilt about past sinful behaviors, as well as by his arguments against Pelagius, who held a high view of human goodness. George Murphy suggests that if Augustine had had access to modern science, he may have argued for a "gene for sin," which of course does not exist. See George L. Murphy, "The Twofold Character of Original Sin in the Real World," *Perspectives on Science and Christian Faith* 73, no. 3 (2021): 152–57, https://www.asa3.org/ASA/PSCF/2021/PSCF9-21Murphy.pdf. On Augustine and Reformed theology, see Millard J. Erickson, *Christian Theology*, 2nd ed. (Baker, 1998), esp. 652.

[31]E.g., Terence E. Fretheim, *God and World in the Old Testament: A Relational Theology of Creation* (Abingdon, 2005), 70–77; Biddle, *Missing the Mark*, 3–8; James Taylor, *Sin: A New Understanding of Virtue and Vice* (Northstone, 1997), 183–93; and Ian A. McFarland, "Original Sin," in Johnson and Lauber, eds., *T&T Clark Companion to the Doctrine of Sin*, 303–18. Many classical theologians (Zwingli, Barth, Brunner, Niebuhr) did not accept the concept of biological inheritance or inherited guilt due to the first sin. See, Smith, *Willful Intent*, 64–123.

[32]Many argue that Paul was referring to the common experience of sin in humanity, not genetic inheritance. See, e.g., Gerrit C. Berkouwer, *Sin: Studies in Dogmatics* (Eerdmans, 1971), 485–545.

[33]The scientific investigation of the relationship between sin and human origins is relatively recent. E.g., Luke J. Janssen, "'Fallen' and 'Broken' Reinterpreted in the Light of Evolution Theory," *Perspectives on Science and Christian Faith* 70, no. 1 (2018): 36–47, https://www.asa3.org/ASA/PSCF/2018/PSCF3-18Janssen.pdf; Oliver D. Crisp, "On Original Sin," *International Journal of Systematic Theology* 17, no. 3 (2015): 252–66, https://doi.org/10.1111/ijst.12107; and Benno van

den Toren, "Human Evolution and a Cultural Understanding of Original Sin," *Perspectives on Science and Christian Faith* 68, no. 1 (2016): 12–21, https://www.asa3.org/ASA/PSCF/2016/PSCF3-16vandenToren.pdf.

[34]Murphy, in "Twofold Character," attributes our sinful state to both nature and nurture; McFarland, in "Original Sin," suggests that we emphasize sin as part of human nature, rather than as an event in the past; and Crisp, in "On Original Sin," retains the language of original sin, an inherited moral corruption, but denies original culpability. He is concerned with protecting those who may not live long enough to sin or those lacking moral properties.

[35]See discussion in Osenbaugh, "Generational Curses," 1–6.

[36]For this section, see Fretheim, *God and World*, 163–65; Barton, *Ethics in Ancient Israel*, 94–126; Nathan Bills, *A Theology of Justice in Exodus* (Penn State Press, 2020), 54–78; Nancey Murphy and George F. R. Ellis, *On the Moral Nature of the Universe: Theology, Cosmology, and Ethics* (Fortress, 1996), esp. 206–10; and Alister E. McGrath, *The Open Secret: A New Vision for Natural Theology* (Wiley, 2008), 292–96.

[37]Ronald Simkins, in *Creator and Creation* (Hendrickson, 1994), summarizes the association between human obedience and order in the cosmos: "When humans follow the covenant, the order of creation is maintained. The established boundaries remain fixed. If humans neglect or reject the covenant, however, the creation itself suffers. The order of creation disintegrates, and the world reverts to its original chaotic state" (p. 198).

[38]The parallel text (Deut. 5:1–22) contains differences not significant for our purposes.

[39]For this section, see discussions in Terence E. Fretheim, *Exodus* (Westminster John Knox Press, 2010), 220–28; Victor P. Hamilton, *Exodus: An Exegetical Commentary* (Baker Books, 2011), 510–25; Peter Enns, *Exodus* (Zondervan, 2014), 338–40; Sklar, "Pentateuch"; and Biddle, *Missing the Mark*, 120–25.

[40]פָּקַד, pāqad, Holladay and Köhler, *Hebrew and Aramaic Lexicon,* s.v.; and Hamilton notes that "when God shows up for a 'visit,' you need to do one of two things: either welcome him, or run for cover" (Hamilton, *Exodus*, 524).

[41]שָׂנֵא (*sa.ne*), Holladay and Köhler, *Hebrew and Aramaic Lexicon,* s.v.

[42]Hamilton, in *Exodus: An Exegetical Commentary*, also points to several instances in which a fourth occurrence is a final, accurate one; e.g., in 1 Sam. 3:5–10, Samuel hears God's voice correctly the fourth time, after previously mistaking it for Eli's voice (p. 525).

[43]Enns, *Exodus*, 440.

[44]E.g., Mark J. Boda, *A Severe Mercy: Sin and Its Remedy in the Old Testament* (Eisenbrauns, 2009), 45.

[45]Sklar, "Pentateuch," 19–20; and Osenbaugh, "Generational Curses."

[46]חָסַד, *che.sed*, Holladay and Köhler, *Hebrew and Aramaic Lexicon*, s.v.

[47]William J. Webb and Gordan K. Oeste, *Bloody, Brutal, and Barbaric? Wrestling with Troubling War Texts* (IVP Academic, 2019), 56–60.

[48]Sklar, "Pentateuch," 21; Osenbaugh, "Generational Curses"; and Mark J. Boda, "The Prophets," in Johnson and Lauber, eds., *T&T Clark Companion to the Doctrine of Sin*, 27–44.

[49]Boda, "Prophets"; and Osenbaugh, "Generational Curses," 19–20.

[50]C. Clifton Black, "Synoptic Gospels," in Johnson and Lauber, eds., *T&T Clark Companion to the Doctrine of Sin*, 61–78.

[51]Gary M. Burge, "The Gospel and Epistles of John," in Johnson and Lauber, eds., *T&T Clark Companion to the Doctrine of Sin*, 79–96.

[52]Timothy G. Gombis, "Paul," in Johnson and Lauber, eds., *T&T Clark Companion to the Doctrine of Sin*, 97–110.

[53]Osenbaugh, "Generational Curses," 20–25.

[54]"Trauma" in Gary R. VandenBos, ed., *APA Dictionary of Psychology* (American Psychological Association, 2007), s.v., updated on 04/19/2018, https://dictionary.apa.org/trauma.

[55]Vincent J. Felitti et al., "Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults: The Adverse Childhood Experiences (ACE) Study," *American Journal of Preventive Medicine* 14, no. 4 (1998): 245–58, https://doi.org/10.1016/S0749-3797(98)00017-8; and Bessel van der Kolk, *The Body Keeps the Score: Brain, Mind and Body in the Healing of Trauma* (Penguin, 2015), 107–201.

[56]See discussions in A. S. Huda, *The Medical Model in Mental Health: An Explanation and Evaluation* (Oxford University Press, 2019); David N. Elkins, *The Human Elements of Psychotherapy: A Nonmedical Model of Emotional Healing* (American Psychological Association, 2016); and Christopher C. H. Cook and Isabelle Hamley, eds., *The Bible and Mental Health: Towards a Biblical Theology of Mental Health* (SCM Press, 2020).

[57]"Intergenerational trauma," VandenBos, *APA Dictionary,* s.v. See also, Sue Grand and Jill Salberg, "Trans-Generational Transmission of Trauma," in *Social Trauma: An Interdisciplinary Textbook*, ed. Andreas Hamburger et al. (Springer, 2021), 209–15; Gabriele Schwab, *Haunting Legacies: Violent Histories and Transgenerational Trauma* (Columbia University Press, 2010).

[58]E.g., Timothy D. Johnston and Laura Edwards, "Genes, Interactions, and the Development of Behavior," *Psychological Review* 109, no. 1 (2002): 26–34, https://psycnet.apa.org/doi/10.1037/0033-295X.109.1.26; and David St. Clair and Bing Lang, "Schizophrenia: A Classic Battle Ground of Nature Versus Nurture Debate," *Science Bulletin* 66, no. 10 (2021): 1037–46, https://doi.org/10.1016/j.scib.2021.01.032.

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[60]Denis R. Alexander, *Are We Slaves to Our Genes?* (Cambridge University Press, 2020), 4–6.

[61]"Genetics," Robert C. King et al., *A Dictionary of Genetics*, 7th ed. (Oxford University Press, 2006), s.v.; and for an overview, see Ricki Lewis, *Human Genetics: The Basics* (Taylor & Francis, 2016).

[62]Nessa Carey, *The Epigenetics Revolution: How Modern Biology Is Rewriting Our Understanding of Genetics, Disease, and Inheritance* (Columbia University Press, 2012), 2.

[63]"Heritability," King et al., *Dictionary of Genetics*, s.v.

[64]Alexander, *Are We Slaves to Our Genes?,* 55–73.

[65]Alexander, *Are We Slaves to Our Genes?,* 192.

[66]"Epigenetics," King et al., *Dictionary of Genetics*, s.v.

[67]Nora M. Al Aboud et al., "Genetics, Epigenetic Mechanism," updated August 14, 2023, in StatPearls [Internet]. (StatPearls Publishing, 2025), 1, https://www.ncbi.nlm.nih.gov/books/NBK532999/. See also, Alexander, *Are We Slaves to Our Genes?*, esp. 36–54; and Carey, *The Epigenetics Revolution*.

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[70]Moshe Szyf et al., "The Social Environment and the Epigenome," *Environmental and Molecular Mutagenesis* 49, no. 1 (2008): 46–60, https://doi.org/10.1002/em.20357; Moshe Szyf, "The Early Life Social Environment and DNA Methylation," *Epigenetics* [the Official Journal of the DNA Methylation Society] 6, no. 8 (2011): 971–78, https://doi.org/10.4161/epi.6.8.16793; and Michael Mortillo and Carmen J. Marsit, "Select Early-Life Environmental Exposures and DNA Methylation in the Placenta," *Current Environmental Health Reports* 10, no. 1 (2023): 22–34, https://doi.org/10.1007/s40572-022-00385-1.

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[79]Jones and Smith, "Epigenetics and Pastoral Counseling," 50.

[80]Denis D. Haack, "When Spiritual Growth Involves Discomfort: Disequilibrium in Biblical Perspective," *Presbyterion: Covenant Seminary Review* 41 (2015): 31–49; and Warren, "'I Do Not Do What I Want.'"

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