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Article

The Role of Psychology in Advancing Dialogue between Science and Christianity

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Those interested in the intersection of science and Christianity, rightfully pay attention to specific issues in the landscape of science and religion. Despite progress made in science-religion scholarship, asking and answering thorny questions and unearthing new ones, it sometimes appears that these advances make little progress shifting the narrative in individuals or culture. In this article, I argue that for progress in difficult conversations, such as those between science and Christianity, we must acknowledge and account for the psychology of the individuals engaging in these conversations. This article discusses how normal psychological processes involved in reasoning may influence engagement with science-religion material. I conclude by offering several suggestions to increase the fruitfulness of these conversations.

A review of recent articles published in *Perspectives on Science and Christian Faith* indicates topics including cosmology, artificial intelligence, origins, mathematics, and addiction. Psychology is rightly represented in this list, as research in psychological science has implications for, and can be informed by, Christianity.[1] This article, rather than engaging a specific piece of scientific content with theology, seeks to ask a more fundamental question: *what can psychology contribute to how ongoing conversations in science and religion unfold?*

The need to bring together experts in diverse areas is evident and, as the study of people's thinking and behaving, psychology has much to contribute to understanding how to do that well.[2] One of the goals of science-religion conversations across disciplines is to better understand and evaluate evidence, with the hope that subsequent scientific and theological beliefs will better align with reality. The implication is that, with the engagement of evidence, some people will need to revise and change some of their beliefs.

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Research in psychology—examining how people develop, maintain, and change their beliefs and attitudes—converges on the conclusion that humans are not objective or neutral processers of information.[3] Data, as it were, are not self-evident, and beliefs are not so easily changed. There are many influences on how people engage with information, especially when this information is inconsistent with current beliefs. The goal of this article is to provide a brief review of the research highlighting several influences on human reasoning in order to provide empirically supported suggestions for how to better navigate the difficult conversations at the intersection of science and religious faith. If these conversations intend to move the participants closer to the truth, then understanding how people process information that challenges their beliefs is crucial. Furthermore, if conversations in science and Christianity are successful in shifting beliefs to be more consistent with reality, then they will have the potential to be important both academically and in transforming cultural narratives and people's daily lives.

Human Reasoning

Reasoning refers to the process by which humans consider available information, putting various bits of experience,

perspectives, and data into proper relation. Engaging with information—including information emerging from science, theology, and religious tradition—involves reasoning. Fundamentally, for many religious believers, disagreements about contentious issues emerging from science are disagreements about the reasoning process prior to the conclusion.[4] These disagreements are complicated by aspects of the human reasoning system, including the difficulty with which we process large amounts of information and the fact that accuracy is only one of many competing goals of reasoning.

Keith Stanovich and Richard West introduced a two-system metaphor for understanding human reasoning, a metaphor subsequently adopted by Nobel Laureate Daniel Kahneman and his longtime collaborator Amos Tversky.[5] Each of these systems represents a different way of engaging information, with engagement patterns influencing the quality of the subsequent reasoning outcome. System 1 represents reasoning based on intuition, emotions, or gut feelings. This system is quick, efficient, automatic, and, as a result, prone to errors. By contrast, System 2 processes information explicitly, rationally, and according to an analysis of the data. As a result, System 2 is difficult, time consuming, and relatively slow; however, it is also more likely to lead to a more rational, thoughtful, and logical conclusion, given the available data. Although these systems are discussed often, sometimes by alternative names such as emotional/rational systems, it is important to keep in mind that the two-system idea is a useful *metaphor;* the actual functioning of human cognition, rooted in multiple competing neurological processes, is much more complex.[6]

Given the sheer quantity of information impinging on our sensory systems at any given moment, we are prone to use System 1-based heuristics for much of our daily reasoning. In many circumstances, these mental shortcuts offer a quick and reliable means to navigate the complicated—and potentially incomplete—information in front of us.[7] However, the tradeoff for the speed and efficiency offered by System 1 is decreased accuracy, as evidenced in cognitive biases.[8] Cognitive biases are systematic errors that arise from the inappropriate use of System 1 (i.e., "this feels right") when System 2 processes (i.e., "let's evaluate the data systematically") would have resulted in an answer that is a better, or more probable, reflection of reality. For example, although the fat content of yogurt labeled 95% fat free is the same as yogurt labeled 5% fat, people overwhelmingly prefer the former; the same information packaged differently influences subsequent evaluation and choice.[9]

Yet, another piece in the puzzle of human reasoning is that accuracy is only one of several possible goals. Although explicitly stated goals of reasoning may focus on the production of accurate conclusions, a large body of research on motivated reasoning indicates that another potent goal is to arrive at a desired conclusion.[10] This goal is not explicit—that is, people do not indicate at the outset that they will examine, engage with, and remember information in such a way that they can retain their beliefs, regardless of what the information may reveal. Rather, we unconsciously adopt different strategies for the process of information evaluation—strategies that allow us to maintain, or even strengthen, our preexisting beliefs regardless of the evidence.[11] We are largely unaware of these unconscious influences on our current reasoning.[12]

Motivated reasoning produces outcomes in a desired direction and can influence any stage of the reasoning process. For example, it can be seen in the evidence search process that we are more likely to seek out and remember information that is consistent with our preexisting beliefs.[13] It can be seen in our asymmetrical use of analytical reasoning, such that we are more sensitive to deficiencies in evidence that contradict our beliefs than evidence that supports them.[14] Motivated reasoning can also be seen in how beliefs shift relative to how the evidence is framed; when under threat from conflicting evidence, individuals are more likely to stress aspects of their beliefs that are unfalsifiable with empirical evidence.[15] Moreover, even if we accurately identify and articulate data that conflict with our current beliefs, when these data imply a solution at odds with our values, we engage in other means to reduce the need to change beliefs.[16] These aspects of human reasoning are not new, but they are exacerbated in a cultural climate of echo chambers.[17] Increasingly, evidence suggests that we are likely to affiliate—and read, comment, and share online—with people and information that we already agree with, even if that information is inaccurate.[18]

At first blush, this seems like an entirely irrational goal: maintaining beliefs in the face of evidence to the contrary. However, as Dan Kahan points out, the purpose of some beliefs—especially those that are relevant to our identity—is not *just* to form accurate perceptions about the world.[19] In fact, some beliefs that we hold are central to the maintenance of our sense of self and our deeply held connections to important social groups, connections that often start in early childhood.[20] From this vantage, interpreting information through a lens of what is already believed and shared as true, even when it results in the often unconscious misinterpretation of the information at hand, is rational, in that it maintains

stability of self and self-in-social group (more discussion later).

An important point from this discussion is that data—new information, especially information that may challenge a currently held belief or attitude—are not self-evident.[21] All data processed through a human reasoning system are subject to filters, filters such as current beliefs, previous experiences, and cultural worldviews. These filters pre-date the new information to be processed and act on the new information in an automatic, unconscious fashion, serving as the unconscious motivational factors that bias how we engage with information.[22] Although these filters reduce the cognitive burden associated with information assimilation, they are also the fuel of motivated reasoning. The research on these filters tends to focus on the rejection of science in the United States, yet the general principles elucidated by this research on motivated reasoning apply across domains, including science acceptance, religious faith, and the relationship between science and Christian faith.

Importantly, there is considerable evidence to suggest that these filters—and the information distortion they predict as a function of motivation to maintain beliefs—are not explained by intellectual capacity. For example, Kahan has demonstrated that individuals scoring the highest on measures of analytical thinking (versus heuristic, System 1-driven processing) were the *most* likely to display motivated reasoning, misrepresenting key factual information in order to maintain consistency of the implications of the data with current beliefs.[23] In other research, Kahan and colleagues found that participants who scored highest in measures of numeracy, the ability to reason with empirical data, were better able than less-numerate individuals to reason about the outcome of a medication in the treatment of a skin rash by evaluating numerical outcomes.[24] However, when the exact same numerical evaluation test was nested in a politically polarizing context (i.e., gun control), high numeracy individuals were the *most* likely to misinterpret the data when they were presented as inconsistent with participants' own beliefs. In other words, when the data were at odds with individual beliefs about an important topic—when there was more to lose with a numerically accurate interpretation of the data—the data were much more likely to be misinterpreted by those who were best able to interpret the data. Prior beliefs about gun control (for or against), just as other prior beliefs, are powerful filters shaping human reasoning, even in clear-cut circumstances involving direct numerical evaluation.[25] Note the similarity here to the claim that some researchers make—that religious individuals are religious or antiscience because of their cognitive deficiencies—and the considerable research that debunks or nuances that claim.[26] Surely, the range of intellectual abilities among the religious and nonreligious are variable; yet they are not systematically varied according to religious belief.

Taken together, the two-system model of human reasoning and the role of unconscious motivational influences on the outcome of reasoning suggest that the formation, maintenance, and revision of beliefs are not typically the result of rationality. New information funnels through System 1 filters unconsciously, making the effects of these filters on our thinking difficult to spot, yet powerful nonetheless. Better understanding of these filters opens the possibility of intentionally promoting more-accurate reasoning about data. As mentioned, much of the work on motivated reasoning has been focused on the general public's acceptance of science (e.g., climate change, vaccine safety) in the context of polarizing *political* ideologies, yet the role of religion in scientific engagement is not lost in this discussion.[27] In discussions on the intersection of science and religious belief, these are particularly important questions to understand as public presentations often serve to polarize rather than to bridge.

As there is considerable variation on views of the Bible and science, even within denominations, we would expect these disagreements among Christians to be subject to these same cognitive biases and filters.[28] However, for Christians who claim to hold ultimate truth about reality, the importance of integrity of belief to evidence (i.e., accuracy in reasoning) is paramount for the sake of trustworthiness to others. Accuracy in reasoning should be a top priority for Christians, even when that requires belief revision. Thus, better understanding and limiting the negative impact of filters that may bias our reasoning are especially important for the Christian. With this in mind, I offer a brief discussion below of some of the specific filters beyond a System 1 / System 2 divide that affect human reasoning. Following, I turn to a discussion of the implications of these filters for enhancing more accurate and better-tempered engagement with potentially contentious topics in science and religion.

Filters in Human Reasoning

Research in motivated reasoning indicates that there are a number of filters affecting the outcome of human reasoning. Researchers employ different terms and theories to define and explore these filters, although the finer points of differentiation are beyond the scope of this review. Instead, the goal in the following paragraphs is to highlight three filters that may promote the interpretation of information that conflicts with current

beliefs in a biased (i.e., inaccurate) fashion: (1) cultural worldview, (2) implicit bias, and (3) shared reality.

Cultural Worldview. Research in psychology has demonstrated that culture permeates all aspects of human functioning, even the most seemingly biological functions.[29] That culture—a set of ideals, beliefs, and practices passed down from one generation to another—would also mediate how we perceive and interpret information is unsurprising.[30] Human thinking and behavior are not independent of cultural context; therefore, understanding any aspect of human functioning and activity requires understanding the culture in which that human is embedded.[31]

Consistent with understanding the role of culture in human psychology, the scholars involved in the Cultural Cognition Project seek to better understand how cultural worldview and values shape the way in which individuals perceive and interact with information around potential public risk, especially those that are polarized in the American context.[32] This project has indicated that differences in cultural values more powerfully predict beliefs about these topics than any other individual characteristic.[33] Although views on these topics appear divided along political affiliation, this research suggests that cultural worldviews concerning values related to hierarchy and individualism are more predictive than political affiliation alone.

Specifically, these core cultural values can be understood as existing along two orthogonal dimensions: hierarchy-egalitarian and individualist-communitarian.[34] Someone who endorses a hierarchical worldview endorses the belief that society functions best when social characteristics such as gender, wealth, or background are used to define proper roles and activities. On the other hand, an egalitarian worldview is consistent with the view that these characteristics should not be considered in the distribution of roles and activities within a society. An individualist, who could be either more hierarchy or more egalitarian leaning, gives priority to individual freedoms, action, and responsibility. Conversely, a communitarian believes that societal concerns take precedence over individual concerns and that a society is responsible for the overall well being of its members. When scientific information (i.e., data and evidence) is presented in a way that is consistent with worldview beliefs, it is readily accepted (e.g., endorsing freedom for an individualist); when the information is presented as inconsistent with these beliefs (e.g., endorsing limits of freedom for an individualist), it is more likely to be rejected or misrepresented. Although these worldviews are not all-or-nothing, patterns of worldview endorsement are powerfully predictive in understanding the formation of beliefs about scientific evidence. Cultural worldview, then, motivates reasoning.

One important implication for this work in thinking about issues of science and the Christian faith is that although Christians are unified as one body in Christ, we are also divided along many differences in theology and praxis.[35] Even within denominations, in which theology and praxis is more or less shared, there is variation in specific beliefs about how to read the Bible in light of science and what science means, if anything, for Christian faith.[36] These differences, even just within a Western context, may relate to meaningful differences in cultural worldviews—those described by Kahan and those yet unmeasured. Differences in the global body of Christ are likely even more marked.

Implicit Bias. Implicit bias refers to an unconscious affinity toward or disliking of something or someone as a function of its category membership. Organizing individuals into groups, the process of social categorization, is a foundational principle in human cognition and behavior as humans are fundamentally social beings.[37] Although for many years psychological research has focused on explicit attitudes, especially attitudes regarding social groups, these reports often fall short of predicting behavior toward members of shared/unshared social categories.[38]

To add explanatory power to the prediction of behavior, researchers have turned to implicit cognition in which "past experience influences judgment in a fashion not introspectively known by the actor."[39] These past experiences influence attitudes and stereotypes, both of which guide thinking and future behavior. In the past twenty years, research measuring these unconscious influences, using indirect or implicit measures, has exploded, answering many questions and igniting just as many.[40] For example, experimental research found that individuals who expressed negative attitudes toward African Americans on a measure of implicit bias were rated by independent observers as engaging in more negative social interactions with individual African Americans than those who did not express these negative implicit attitudes.[41]

By definition, individuals are unaware of the influence of these biases on their behavior, making them notoriously difficult to isolate outside of large sample sizes and group-level interpretation. As such, many researchers think about implicit bias as assisting in understanding the cultural context from which that bias is evident; that is, implicit bias is a form of "unsought cultural expertise."[42] From this perspective, it may be

easier—and more appropriate—to look at the results of implicit bias measures as indicative of the *context* in which those results emerge, rather than as a measure of individual bias or prejudice. For example, there is evidence suggesting that the implicit bias of White community members toward African Americans is strongly predictive of deviations within that community from base rates of police use of lethal force against African Americans.[43] This does not suggest that the individual police officers are racist, but rather that their behavior is informed in important—even if unobservable—ways by the community context in which they work. Thus, implicit bias, though existing and measured at the level of the individual, is primarily a measure of the effect of culture on an individual.

Although the bulk of research on implicit bias deals with categorization according to externally observable characteristics (e.g., race, gender, age, weight), this work is relevant to discussions about science and religion. There is a growing body of research indicating the presence of three related cultural views: (1) that atheism is associated with increased intelligence, (2) that science decreases belief in God by increasing analytic thinking, and (3) that Christians are antiscience or unintelligent.[44] Even if these are not the views of most religious believers or scientists, the prevalence of these conflict narratives in popular media has the psychological effect of making them appear more supported than they are.[45] These stereotypes about Christian (un)intelligence and nonbelievers' scientific acumen negatively influence Christian engagement in science.[46] Furthermore, there is some evidence suggesting that science is perceived as a discipline for atheists.[47] This evidence persists amid a host of research documenting pervasive and negative stereotypes toward atheists.[48] For Christians embedded in this cultural context, the perception of Christians as antiscience and unintelligent or the perceived association between science and atheism undoubtedly informs implicit, culturally driven attitudes via the same mechanisms as those documented in other implicit bias research. Even for an individual who rejects these negative perceptions about Christians and science (explicit beliefs), the impact of these culturally endorsed attitudes on implicit bias and behavior may still be powerful.

Figure 1 displays a theoretical cycle that can emerge as a function of cultural narratives and their influence on implicit cognition. I do not intend to make claims about the origin of this cycle (boxes are numbered for clarity only), but there is evidence suggesting the

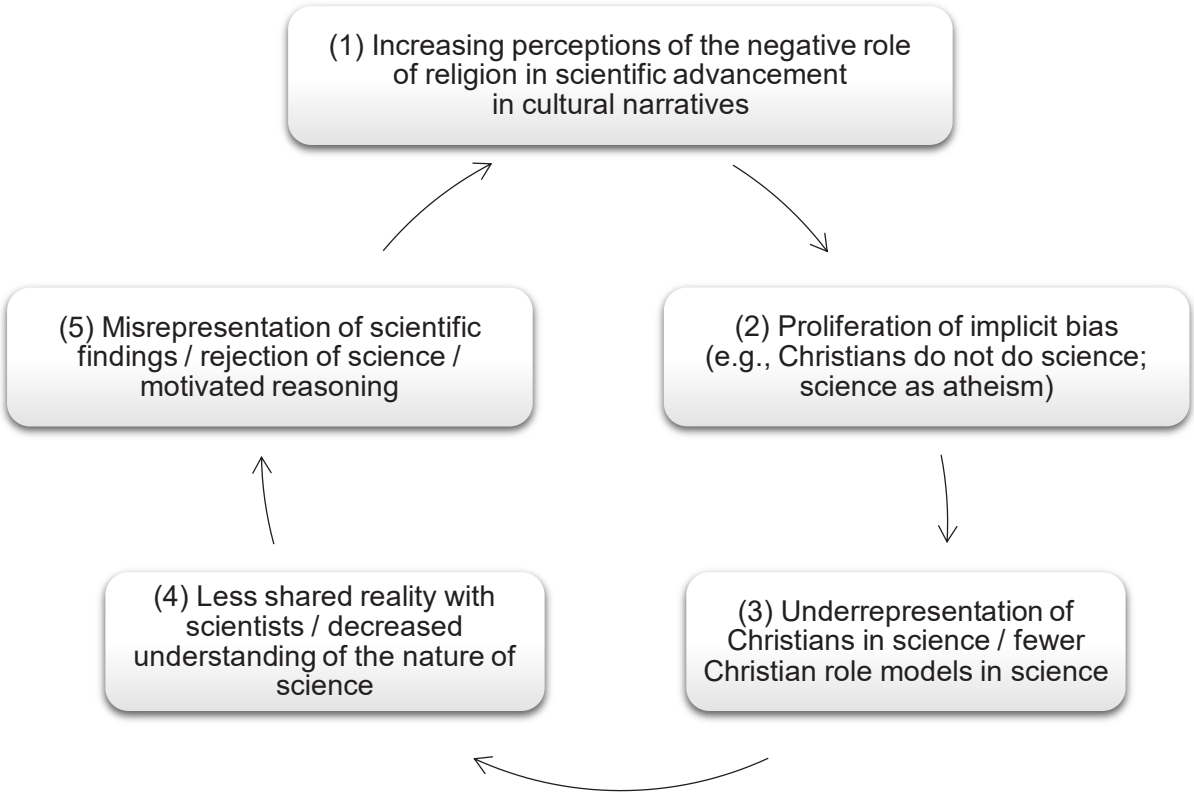

Figure 1. Theoretical cycle of cultural narratives and implicit bias around Christianity and science.

interrelationship of these various components. When, for example, there is cultural endorsement of negative stereotypes about Christians as antiscience and/or religion as detrimental to scientific progress (1), these cultural beliefs negatively affect science performance via implicit, unconscious cognition among Christians (2), which subsequently may explain the lower-than-expected representation of Christians in science.[49] Having fewer Christians in science means there are, overall, fewer role models for Christians who may otherwise pursue science. Although there are notable exceptions to this (e.g., Francis Collins, Jennifer Wiseman), research suggests that having role models with whom we can identify is central to overcoming potential stereotypes about who scientists are (3).[50] Having less access to trusted members of a religious community who can address potentially contentious scientific findings—and with whom shared reality can operate—can negatively influence learning about and engaging with science (content and foundations; see next section) (4). This makes science-religion issues not just "potentially contentious" but threatening; this result promotes misrepresenting or rejecting specific scientific findings via motivated cognition (5).[51]

This theoretical model does not suggest that implicit bias alone is sufficient to explain how members of a religious community engage with science. For example, the influences of cultural worldview on reasoning, as discussed in the previous section, are involved in the process of motivated reasoning (5). Although cultural worldview is not the same as political affiliation, political affiliation is often perceived as a shorthand for these cultural worldviews; especially in tumultuous, ideologically threatening political environments, religious beliefs are more strongly tied to political ideology.[52] Regardless of whether these views are objectively correct, the research discussed here indicates that these *perceptions* about the relationship between religious belief, political affiliation, and cultural worldview matter. One consequence of these perceptions is that they may reinforce the negative perception of religion relative to science (1), suggesting one possible role for cultural worldview in this cycle.

What this model does make clear is that implicit attitudes toward science generally, as well as the relationship between religious believers and science specifically, are an important filter provided by the broader culture that individuals use in their evaluation of information. In the context of scientific information that may conflict or challenge religious beliefs or vice versa, this filter may increase the presence of motivated reasoning.

Shared reality. Where implicit bias may serve as a measure of cultural imprinting on an individual, the broader cultural milieu exerts its influence in specific relational contexts. That is, the potential threat to religious beliefs implicitly posed by cultural perceptions about the relationship between Christians and science may be exacerbated or assuaged by important relationships. For example, Michael Magee and Curtis Hardin found that the unconscious threat posed to religious beliefs by evolution was negated when individuals believed that key individuals with whom they had a supportive, loving relationship—such as their parents—shared their religious beliefs.[53] This is in line with shared reality theory, which suggests that our subjective experiences become real, or objective, when they are shared with others.[54] Importantly, shared reality is more than just a mutual understanding; it is not enough to simply know what others know or believe. Shared reality is the joint experience and acceptance of that information for the purposes of regulating future social interaction. There is considerable evidence suggesting that when reality is shared, it regulates not only social interactions but also the self, especially concerning fundamental questions about individual meaning and purpose.[55] Our sense of who we are is deeply connected to the important and trusted social interactions that verify this sense of self.[56]

The role of looking to important social relationships as a verification of self, starts early in development. Children's sense of self is deeply connected to their sense of attachment with caregivers; children internalize the pattern of interactions with caregivers into implicit templates for understanding themselves, others, and the relationship between the two.[57] The role of shared reality—making the subjective real—continues to be important as children rely on the testimony of others for important information about the world that they cannot easily verify firsthand.[58] Across key relationships in a child's life, there is unity in these messages: for example, a unity that turns an otherwise singular statement about unobservable "germs" into a shared reality of fact. Although preschool-aged children have likely never seen a germ with their own eyes, they ubiquitously endorse their existence. Because the existence of germs is a belief shared with others, germs become real in children's minds.[59]

Notably, we do not receive the same messages about all things. Although there may be considerable consistency concerning the existence of germs, people receive different patterns of communication about the existence of Santa Claus, angels, and God, for example. These differences can divide social relationships and cultural contexts along important lines. Both psychology and scriptures recognize the fundamental importance

of social relationships to human functioning,[60] and for many families and communities, belief in God is a factor regulating the closeness of interpersonal relationships. What, then, is a rational response when an individual encounters information that conflicts, or appears to conflict, with beliefs that form the core of their identity and are shared in these important social relationships? Although the distortion of evidence via motivated reasoning may not be rational in one sense, to the extent that it promotes the maintenance of identity-in-relationship, this form of identity-protective cognition is highly rational in an important psychological sense.[61] If sharing beliefs is core to the perception of reality, including our sense of who we are, then the role of identity-protective cognition as a form of motivated cognition becomes clear. That is, shared reality serves as a filter for what kinds of information can be easily integrated as-is and what needs to undergo a protective, directionally motivated reasoning process so as not to threaten our sense of self and our self-in-relationship.

Summary. Human reasoning is constrained by the need to process large amounts of inconsistently complete information. Despite the computational complexity of the reasoning tasks humans engage in daily, we typically process and respond to this information without much difficulty, aided by the use of efficient System 1 heuristics and unconscious filters. Heuristics simplify mental tasks by employing strategies to shortcut the burden of exhaustive search and evaluation of information. Although these strategies are often good enough, their use may also systematically bias our engagement with information with important implications. By filtering information according to prior beliefs, the complexity of mental tasks is reduced. Three of these interrelated filters have been discussed: cultural worldviews, implicit bias, and shared reality. Cultural worldviews serve as a frame around important values about how the world should work, values that predict patterns of engagement with scientific information. Implicit bias is a feature of an individual that is an imprint of broader cultural views about how the world is categorized (e.g., what is good/bad) and includes narratives about the relationship between Christianity and science. Shared reality is an explanation for how beliefs are tied to identity in the context of relationships within which these beliefs are shared and subsequently experienced as real. Together, these filters work to shape how we encounter and process information that conflicts with our beliefs so as to, in most circumstances, protect important beliefs from the challenges posed by that information.

It is clear that human cognition is not neutral; we do not objectively process information and update internal models of reality according to the best data. Yet, these same data, describing how and why these heuristics and filters influence reasoning, also offer suggestions for improving the reception of challenging information. It is to these suggestions I now turn.

Improving Reasoning around Difficult Topics

Although the list of potential "difficult topics" appears to be quite large—weather is a common topic at social gatherings for a reason—the goal of this discussion is to offer suggestions that can be particularly useful for Christians aiming to engage difficult topics that emerge at the intersection of scientific research and religious beliefs. For Christians, accuracy in reasoning is important as a means of maintaining integrity; religious beliefs are less likely to be evaluated as accurate if they are expressed alongside beliefs that are the result of motivated processes. It is important to make clear that good reasoning may not always result in identical beliefs across people; in science and religion we are dealing with incomplete data, data that several competing theories may equally explain. We do not have unhindered access to reality.[62] It is not this kind of disagreement I am suggesting is problematic; it is the disagreements that come out of the perversion of evidence *so that beliefs do not need to be revised* that I take issue with. Disagreements, stemming from integrity to the evidence, advance understanding; disagreements, stemming from a motivated distortion of evidence, stymie (at best) and erode (at worst) understanding. As such, all of these suggestions are offered in the context of the encouragement of the Apostle Paul to the Ephesians: "Be completely humble and gentle; be patient, bearing with one another in love" (Eph. 4:2).

Psychological Threat

Psychological threat is the experience of anxiety, discomfort, or insecurity and can be experienced in a number of domains.[63] These threats may not be explicit, but, when perceived as real, they have important implications for thinking and behavior. One consistent means used to buffer against the adverse experience of threat is to bolster other psychologically protective features of self or environment. For example, a large body of research in terror management theory suggests that threat and the psychological terror it creates—thus, the origin of the theory's name—is "managed through the development of cultural worldviews: humanly created belief systems that are shared by individuals in groups."[64] The shared reality of these cultural values mitigates potential threats; there is psychological strength in the bolstering of these worldviews partly as a function of social consensus.

At the core of research on motivated reasoning is the concept of psychological threat. When exposed to information that is contrary to beliefs, individuals' engagement of motivated reasoning processes allows the maintenance of their beliefs, serving to assuage the potential threat of that evidence. As we have seen, when cultural worldviews are inconsistent with data—that is, threatened by data—these data are more likely to be misinterpreted.[65] When negative implicit bias about Christian engagement in science is activated, Christians demonstrate a decreased ability to reason correctly about science.[66] When evidence suggests that beliefs may need revision, the foundation of reality—the sharing of these beliefs with critical social relationships—is under siege.[67] If the goal is to reduce motivated reasoning, then the means of achieving that goal need to account for these psychological threats. The threat of the information, then, is not *just* the information, but a much broader threat to how an individual understands the way the world does and ought to work. Any success in increasing engagement under these circumstances requires disentangling the evidence from the threat to self and relationship.

Reducing threat makes psychological space for rational evidence evaluation. Below are three strategies to promote threat reduction: (1) affirming self-concept, (2) focusing on value congruity, and (3) expanding group identity. Particularly in discussions between Christians[68] on controversial or potentially threatening matters of science and religious beliefs, employing these strategies is likely to improve the outcome of the discussion. On their own, these strategies will not change minds, but the evidence suggests that they will promote the psychological safety for minds to be open to hear and engage with otherwise threatening ideas and data. As suggested by the title of this article, one particularly meaningful role for psychology is to improve the quality of science-religion dialogue by better understanding the humans involved in the dialogue rather than simply focusing on the dialogue content.

Affirm Self-Concept. According to self-affirmation theory, the threat in psychological threat comes from a potential reduction in our sense of self-worth.[69] The implication, then, is that, if an individual's sense of self-worth is bolstered prior to the experience of psychological threat, then the threat will not be as potent. This is what the data demonstrate. For example, Geoffrey Cohen, Joshua Aronson, and Claude Steele found across three experiments that participants who engaged in self-affirmation were more willing that those who did not, to revise their beliefs when given evidence disconfirming their original beliefs.[70] Unlike the patterns noted during motivated reasoning, self-affirmed participants were more critical of arguments from those who agreed with them, and, importantly, they were more open to the possibility that their beliefs may be wrong. The affirmation of self-worth prior to the introduction of threatening information effectively diffused the threat of that information, reducing potential defensive reactions that lead to motivated reasoning.

In these studies, the affirmation of self-worth is not simply an affirmation that "you are a good person." Instead, these affirmations ask participants to identify traits/aspects of themselves that are important to them, and to reflect on specific experiences in which they were able to positively exhibit those traits.[71] These affirmations focus on aspects of the self that promote feelings of industry and success, drawing from memories of these traits in specific social contexts.[72] Essentially, these affirmations are not just shallow esteem bolsters, but reminders of personal and relational resources.[73] This highlights two important notes about self-affirmation. First, participants affirmed themselves in a multifaceted manner. It was not just the affirmation of one aspect of identity, but three or four. In this way, if the information was threatening to one aspect of identity, there were several others already in mind that an individual could think on to retain a sense of self-worth. Second, memories are not isolated from the original context in which they occurred; thus, the memory retrieval of these self-affirming experiences also activates the memory of the social context and relationships surrounding these self-affirming experiences.[74] The activation of social relationships brings to mind another resource that affirms the self: social and relational resources.[75] Similar to the research on shared reality suggesting that the identification of shared beliefs reduces threat, the self-affirmation highlights one's importance and belonging while lowering resistance to potentially threatening information.[76]

The suggestion for constructive science-religion dialogue, then, is that constructive dialogue is more likely to occur when (a) participants' identities are affirmed in a multifaceted way and (b) participants' affirmations serve to remind them of their contributions to social relationships. Although this suggestion has not been tested specifically in science-religion dialogues, it is consistent with previous research on facilitating more rational engagement with threatening information. By affirming multiple aspects of personally important traits, if the information threatens part of one's identity, there are several other recently affirmed aspects to lean into. Moreover, the threat to identity that may arise from the challenging information is assuaged by a recent reflection on memories of social experiences that affirm one's value. The role of self-affirmation may be

the easiest to induce in a classroom context; an educator can take advantage of this by leading their students through a series of reflective, self-affirming activities prior to the introduction of theoretically unrelated information that is potentially threatening. Another way to facilitate self-affirmation, albeit indirectly, may come in the focus on value congruity.

Focus on Value Congruity. Value congruity refers to the extent to which information is understood as being consistent with personally meaningful ideas. Like self-affirmation, there is evidence suggesting that when information is framed in a value congruent manner, individuals respond to challenging information in a less threatened manner. For example, research suggests that Republicans' skepticism toward climate science abates when the problem is presented in a way that fosters a free-market solution. This same research shows an identical result for Democrats and gun rights.[77] In other words, when the information is framed in a way that is congruent with an individuals' political values, it is more likely to be accepted than when it is framed in a way that is value incongruent. Although the information did not change, its presentation did—presentation that matters for subsequent engagement. Likewise, despite the plethora of research suggesting that taking another person's perspective increases empathy and attitude change (i.e., may shift their beliefs, given conflicting evidence), when asked to take the perspective of someone with whom there is little perceived overlap in core values, research suggests that individuals experience a reduction in openness to belief change.[78]

Thus, a key implication from this research is that potentially threatening information is less likely to be engaged when it appears to be coming from a position or person who holds different values. For the Christian engaging with other Christians in a dialogue about science and religious belief, this presents a really promising avenue for improving the dialogue. Despite differences in beliefs about science, Christians can—at the outset—agree on many essentials about their core Christian values.[79] From these shared values, motivated reasoning to protect these core values is less necessary. This is the essence of shared reality theory; it is not sufficient to know or understand another's viewpoint, but shared beliefs about that viewpoint are the start of constructive and meaningful conversation.[80] To increase openness to ideas that are inconsistent with current beliefs, start with common ground—shared core values—and *then* explore the difference in beliefs/evaluation of evidence.

This suggestion can be extended further. In the context of individual uniqueness, Christians share core values about important aspects of self.[81] For the Christian, it may be possible to highlight shared values not only in terms of beliefs, but also in terms of character and the behavior that extends from character. Highlighting aspects of a Christian identity—such as humility, charity, compassion, and loving those who are unlike ourselves—may also serve as powerful cues of self-affirmation *in the context* of shared values. The suggestion, then, is to engage in a Christian identity self-affirmation and affirmation of shared values prior to discussing specific content that may spur disagreements and motivated reasoning.

Although it is an empirical question whether the affirmation of these traits—which are undoubtedly in development for the Christian—will serve to reduce the experience of threat in the face of belief-challenging information, there are some empirical clues to suggest that this would be the case. For example, motivated reasoning is less likely when individuals are in a positive mood, likely sharing some core features with the role of self-affirmation.[82] In addition, reflecting on one's ideal self, such as the development of Christlikeness, increases positive emotions.[83] Moreover, thinking about how a Christian ought to act may change subsequent behavior as a form of reputation management. For example, a child who believes that they were selected for a game because they are a "good kid" is less likely to cheat when given the choice; their behavior conforms to the belief that they are a good kid and that good kids do not cheat.[84] Similarly, a Christian reminded of the character traits of a Christian, according to Jesus and scripture, may be more likely to act accordingly. Awareness of identity can shape even implicit evaluation, at least in the short term, and practicing these aspects of identity is how they develop in the long term.[85]

Expand Group Identity. Psychological threat is experienced as a lack of security over beliefs about identity, self-worth, and belonging. As fundamentally social creatures, when changing beliefs requires changing social groups, there is an inherent and powerful resistance to belief revision.[86] This powerful draw to maintain beliefs for connection to important social networks is seen even among those who have revised beliefs. For example, research suggests that nonreligious believers may seek out a religious community specifically for the social connections, especially those offered to families.[87] Moreover, there is a strong societal influence, particularly in the United States, to present as religious—in part to prevent a disruption to the social context and relationships associated with the stigma of nonbelief.[88] Thus, a challenge in the presentation of

data that is inconsistent with beliefs is to communicate clearly what these data do and do not imply about the stability and confidence of one's group membership.

From childhood, we create categories of in-group and out-group members on a number of characteristics.[89] However, many groups are not inherently defined by physical or observable characteristics. In this circumstance, our implicit biases, drawn from examples available in culture and memory, fill in the boundaries of group membership. For example, female STEM faculty, who, from their pictures, were rated high on femininity, were subsequently less likely to be viewed as scientists than those who rated lower in femininity because they did not conform to implicit expectations about what a scientist "looks like."[90] However, when individuals are exposed to women scientists, such as through the #ILookLikeAnEngineer campaign, their boundaries around category membership of "scientists" are expanded.[91] Exposure to exemplars pushed the boundaries around category membership, increasing the heterogeneity of subsequent ideas about membership. Other research suggests that beliefs about category membership are more rigid when exposure to members of that group is relatively homogeneous; yet exposure to diverse examples makes beliefs about the rigidity of category membership more flexible.[92]

In the context of science-religion dialogues, there are two different categories that need to be considered: boundaries around the categories of scientists, and boundaries around those of fellow Christian believers. As reviewed above, research suggests that many individuals draw boundaries around the category of scientists along lines of religious belief (i.e., scientists are not religious believers). There is evidence of implicit and explicit beliefs that to be a scientist is to be an atheist and to be a Christian is to be incapable of science.[93] Despite the error of these boundaries, they appear relatively entrenched in an American context. Taking a cue from the research on expanding representation of women in science, Christians would do well to increase exposure to Christians in science, especially mainstream and elite science. There are some notable examples here, such as Francis Collins and Jennifer Wiseman. There is evidence that exposure to these exemplars does shift conceptions about the nature of science and religion as collaborative, rather than combative.[94] Yet, for these exemplars to really shift these boundaries beyond the individual person, the number of exemplars needs to be increased. In the absence of modern exemplars, increasing religious believers' understanding of the historical relationship between Christianity and science may be equally important.[95]

In addition to expanding ideas about membership in the "scientist" category, Christians hoping to improve the status of dialogue in issues within science and religion also have to consider the "Christian" category. Augustine of Hippo famously claimed: *In essentials, unity. In non-essentials, liberty. In all things, love.* But what is essential? As many Christians know, there is considerable diversity within the Christian tradition. However, without intentional exposure to this diversity, human cognitive processes, such as those outlined above, increase the likelihood that *my* specific beliefs and the specific beliefs of *my* local faith community will be extended as the *only* beliefs that are acceptable or true. Yet, there is considerable, honest disagreement within the Christian faith on a number of issues, including a number of topics in science. It would be an error to believe that most of these contentions have only one acceptable belief in order to be included within the Christian category. Although only one belief may ultimately be correct, the diversity of beliefs exist because it is not yet clear which belief is correct.[96] The mistake of believing that our view on a particular implication in science is *the* view essential to salvation is the root of many of the hostilities between science and Christianity,[97] and within Christianity itself. The role of organizations like the ASA is vital to expanding the foundation of what being a Christian requires in terms of beliefs about religion and science. The intentional exposure to diversity reduces the threat of belief-challenging data, because to change some beliefs does not require abandoning our most important identity and community-giving beliefs.

Summary of suggestions. Drawing on research on self-affirmation, value congruence, and the expansion of group identity, three basic suggestions have been offered and are summarized here. These suggestions focus on how to approach, frame, and engage in discussions in science and religion that risk the distortion or denial of information, to the detriment of approaching a truthful understanding of reality.

1. Affirm self-worth to reduce the threat to identity associated with the possibility that belief change necessarily causes a change in identity and social relationships. Emphasize the multifaceted nature of identity and the stability of self-in-social context.
2. Agree first about core values (beliefs) and character traits (Christlikeness). Focus on framing information in a way that emphasizes value congruity, especially the shared values with those providing the information.
3. Highlight the diversity within Christian belief and point to exemplars of this diversity. Understanding that some religious and scientific viewpoints

> are heterogeneous, opens the possibility of diversity and tolerance to that diversity. Changing beliefs where there is diversity and tolerance is less threatening as it does not (and will not) require leaving important social relationships (e.g., the church).

Examples of Dialogue in Science and Christian Faith

The foundation of my argument is that filters in human cognition are ubiquitous, affecting reasoning about a host of topics, including those at the intersection of science and the Christian faith. I have suggested that understanding these filters and employing strategies to assuage the potential threat of challenging conversations will allow for the advancement of content-specific science and faith dialogue. Although true across topics and domains (i.e., not limited to science and religion discussions), in this section I want to provide a brief example of the application of this content in two areas of science that have overwhelming scientific consensus and yet have been met with varying degrees of controversy among Christians: the age of the earth, and evidence for climate change. My perspective is that most of the individuals opposing the dominant scientific perspective in these domains are engaging some degree of motivated reasoning, given the extent of scientific evidence for these claims. This is not to say that criticisms leveraged by those rejecting the scientific consensus are without value; important conversations, including conversations about how science works and biblical interpretation, have resulted from thoughtful critiques in these areas. At the same time, there is evidence that these critiques, even when thoughtful and earnest, are not immune to motivated reasoning.[98]

Age of the Earth

The scientific consensus is that the earth, and the universe that contains it, is billions of years old.[99] This is a view shared by many Christians (scientist or not), but it has also been subject to intense debate within some Christian communities.[100] The most notable voice challenging the scientific consensus in this debate comes from the Answers in Genesis (AiG) organization, which promotes apologetics related to a young-earth creationist viewpoint.[101] According to the AiG website, questions of creation and the age of the earth are vital because

> if Christians doubt what at first appears to be insignificant details of Scripture, then others may begin to look at the whole Bible differently, eventually doubting the central tenets of the Christian faith, namely the life, death, and resurrection of Jesus Christ.[102]

Thus, although AiG agrees that "our unity should be centered in Christ," AiG advances the view that being centered in Christ requires belief in a young earth (e.g., 10,000 years) and life as the result of special creation within that time period.[103] John Mark Reynolds says that "*Answers in Genesis* would concede that YEC [Young Earth Creation] is not 'necessary for salvation,' but insists that the YEC position is the only acceptable one for believers."[104] Given this conflict, how can two Christians engage with one another in a productive manner, in a way that reduces the likelihood of motivated reasoning about data—both empirical data from science and evidence from other sources such as biblical interpretation and scholarship, Christian tradition, and reason?[105]

In light of the preceding discussion, any productive dialogue should not start with the data. Thus, the first point to consider is the goal of the dialogue: by engaging a fellow Christian with a different view on the age of the earth, clarify the hoped-for outcome—at least within one's own mind. Even if persuasion is the ultimate goal, the proximate goal of the conversation at hand should not be about "winning." Instead, genuinely affirm the worth of the other (*affirm self-concept*) in the conversation. Make the conversation space psychologically safe by identifying and highlighting shared values, especially core values of the Christian faith (*value congruity,* creating space for *shared reality*). Starting with a recognition of the inherent value of the other, regardless of their views on the age of the earth—views which do not negate or mar the *imago dei* of either participant—refocuses the tone of the conversation. Rather than a battle, it can truly be a dialogue between individuals who believe they have been created with equal worth in Christ's eyes. Moreover, these shared core values make salient the kinds of behaviors that are appropriate and pleasing to Christ (e.g., humility, being quick to listen, and slow to speak). In the context of disagreement, it is easy to lose sight of these values. This can result in degrading both the quality and the impact of any heated discussion.

Moreover, looking for common ground (scientifically, theologically) in light of shared values may ultimately create a path for the dismantling of the core processes involved in motivated reasoning, even if this does not happen in one conversation (*engage System 2*). Consider also the possibility that belief change never happens as a result of this conversation and that the belief that the earth is thousands, not billions, of years old is maintained. If the goal was persuasion, this would be a failure; however, if the goal is about pursuing Christlikeness then such a conversation is a worthwhile one. Even without belief revision, when

individuals leave a conversation feeling edified, valued, and heard—perhaps especially in light of legitimate disagreement—this will produce better outcomes in terms of respect for and future willingness to engage in an open and honest way with future scientific and theological knowledge.[106]

Finally, by starting with shared values and viewpoints about science and theology, it is possible to identify otherwise implicit presuppositions that necessarily influence thinking. Presuppositions can operate like *implicit bias*, guiding thinking in ways that may be unarticulated. For example, when engaging with AiG, it is important to understand the "presuppositional approach to the debate" that starts with one particular interpretation of scripture.[107] All scientific statements must be filtered through that particular viewpoint; inconsistencies are rejected (e.g., the evidence is viewed as inherently flawed since it produces an outcome inconsistent with preexisting beliefs about scripture). At the core, the AiG stance is problematic from the perspective of motivated reasoning because, as John Mark Reynolds states, "a Christian in science has adequate reasons in theology and history to look for an alternative set of scientific explanations that would *preserve her or his preferred reading* of scripture."[108] In this viewpoint, one's personal interpretation of scripture is independent and superior to all other knowledge, including knowledge informed by scientific data and biblical scholarship, both of which continue to develop our understanding of the world as they change with new and better methods, understanding, and evidence.[109] When a belief is untouchable by any form of external evidence, this lays the foundation for the processes of motivated reasoning.[110] By taking the time to identify these presuppositions, the implicit can be made explicit and thus its bias reduced.[111] This can offer an important starting point for dialogue; data that are implicitly rejected because of unspoken presuppositions or biases are bound to fail to persuade.

Climate Change

Similar to questions about the age of the earth, research shows an overwhelming scientific consensus—at least 97% of climate scientists—concerning the change in global climate and the role of human activity in that change.[112] However, there is considerable discrepancy between the scientific consensus and the perspective of the American (and, in many cases, international) public on issues of climate change. Some of this discrepancy is attributable to the public's underestimation of the scientific consensus concerning climate change,[113] but other challenges to the alignment of public and scientific perspectives are more ideological. For example, views on climate change between 2002 and 2012 were more strongly influenced by cues from political leaders than from scientific communication and content.[114] Consistent with this finding, there is evidence that the rejection of climate change science is more strongly associated with political conservatism than religious ideology.[115] However, the close association between political conservatism and evangelical Christianity may explain why evangelicals are less likely than other Christians to accept climate change science.[116]

Just as with discussions around the age of the earth, to more effectively dismantle motivated reasoning processes, it is important to clarify the goals of the conversation while affirming the worth of the participants and highlighting the shared reality and connection afforded by shared core values and virtues. Keep in mind that the goal is not for Christians to simply accept some scientific finding uncritically. Christians may have legitimate reasons to be skeptical of science, which has been used to justify agendas that are entirely inconsistent with Christian values (e.g., slavery, eugenics). Rather, the goal is to promote better reasoning with all available data, even if disagreement remains. Uncritical rejection or acceptance of scientific information reflects motivated reasoning and is unhelpful in moving toward the goal of a clearer understanding of reality. The pursuit of this goal in the context of climate science may especially benefit from highlighting the diversity of viewpoints about climate change within the Christian faith (*expanding group identity*).

When scientific content produces psychological threat, it is, in part, due to the potential threat to loss of relationships and identity. The view that belonging to a particular "in group" (e.g., faith community[117]) requires a specific belief, even if a non-essential belief, can promote the rejection of evidence that points to a contrary conclusion (e.g., to be a Christian is to be a Republican is to reject climate change; deviation in one disrupts the whole). As argued above, one effective way to combat this identity chain is to highlight the diversity of beliefs around a particular issue; within the same in-group, there are many viewpoints. Doing this requires more effective listening and additional preparation.

When engaging in a dialogue with a climate science skeptic, more effective listening is required to better develop understanding around the reasons for the skepticism. Is it a form of solution aversion,[118] connections to a political party,[119] or a mistrust in scientists' agendas, scientists who may be perceived to be atheists?[120] Better identifying the root of the resistance can help move the conversation from System 1 to System 2 dialogue. Moreover, with an understanding of the source of the skepticism, additional preparation makes it possible

to more effectively provide *relevant* exemplars with whom the skeptic can identify as sharing core values, an important component of when perspective-taking is persuasive.[121] Motivated reasoning, at its core, suggests that it is not just enough to know the scientific content. In this case, it is also important to know who are the scientists themselves, especially when the scientists share important identity features (e.g., Katharine Hayhoe as a Christian, pastor's wife, and climate scientist[122]). Moreover, by understanding the biggest concerns first, the most relevant exemplars can be selected: would highlighting Christians in science be the most meaningful approach to combat a science-as-atheism bias or would it be more meaningful to highlight conservative politicians who acknowledge the reality of climate change and promote politically conservative solutions to combat climate change? In addition to these distant exemplars, it would be relevant to initiate conversations within one's own faith community where it is likely that diversity of viewpoints already exists and where these kinds of conversations may be especially important for motivating action to combat climate change.[123]

The important point is not that there is a disagreement—that is inherent in a world with incomplete access to knowledge. Instead, the important point is that the disagreement happens in a way that de-escalates the potential psychological threat of evidence. Recognizing and highlighting disagreement *within the Christian community* helps to normalize disagreement; a divergence of opinion on many issues is not the dividing line between membership and exclusion from Christian fellowship.

Challenging Conversations

Challenging conversations can happen in a variety of contexts. As an educator, I actively work to include these conversations in my classroom. I care that my students know and understand the relevant science in my classroom; however, because the science will likely change with new technology and data, I work to make space for students to participate in difficult conversations so that they might develop the skills necessary to engage science and Christianity with openness and integrity once they leave my classroom. I cannot leverage all of the tools I have described above in a classroom of thirty students, so I am careful to start difficult conversations at the intersection of science and Christian faith by first working to establish my relationship with students. When I am known to students first as a Christian and as a person who cares for them and shares many of their core values, it is much easier to ask challenging questions from science because my motives are not suspect and I know my conversation partners.

In the context of these specific conversations that might trigger psychological threat at the intersection of science and Christianity, I start as I have suggested above. I identify the goals of the conversation and what it looks like to have this conversation as Christians. Next I identify core values of excellence in Christian work and highlight Christian virtues.[124] In reminding my Christian students that we share these beliefs and are all equally prone before the cross, I clarify that my goal in the discussion is not to have students agree with me. Rather, my goal is to promote their clear, thoughtful, and evidence-based thinking.

As previously discussed, good thinking does not always produce a single answer, as we do not have access to all the necessary information for full and complete access to reality. In addition to promoting a psychologically safe space for respectful disagreement, this method of communication also models a humility of knowledge, for example, about science. Science can (and has) answered a lot of questions—many questions being asked and answered by Christians in science—but there are inherent limits to what science can say about reality.[125] These limits are not a reason to dismiss science, but they need to be thoughtfully considered as we engage with scientific content. Acknowledging the limits of science does not render science meaningless; it renders it appropriately leveraged alongside other sources of knowledge from theology, tradition, and reason in our work to better understand reality.

Conclusion

One thing that should be clear from these discussions is the insufficiency of data and rationality alone to persuade. Seemingly intractable problems in the landscape of science and religion will not be solved by amassing more or better data. A rational, System 2 solution alone will likely be insufficient. Instead, forward movement requires a thoughtful consideration of the *individuals* who are engaging with the problem. Even scientists, who practice data-driven thinking for a living, are prone to the influences described in this article and are often unconvinced by System 2 arguments.[126] For example, when scientists receive data inconsistent with their hypotheses, they are likely to generate alternative explanations for that data.[127] In other words, they, in the same manner as nonscientists reasoning about things they believe, are motivated to retain their well-thought-out, though unsupported, hypotheses.

Despite these cognitive shortcomings, science works in part because it supersedes the potential bias of any one individual, and is instead social and democratic. Faults that scientists are unable to see in their own work may be flagged by a reviewer or other scientists operating

from a different theoretical framework.[128] This is a strength of science: disagreement is standard in the scientific conversation; it does not imply or require separation from the scientific community. Instead, scientific disagreements are a defining feature of belonging in the scientific community and of the advancement of knowledge toward truth. Engaging the suggestions above may likewise provide space among religious believers to disagree in community. By affirming a multifaceted sense of self-worth, affirming core values, and expanding group identity to include diversity within the group, individuals can engage belief-challenging information without diluting or misrepresenting that evidence. In that, it may be possible to see these strengths of science duplicated into broader discussions of science and religion, advancing conversations as a result of accounting for the psychology of the participants in these conversations, and changing the culture around how these conversations occur. ●

Acknowledgment

The author is grateful to Emily A. Stewart for her work in formatting this article.

Notes

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[43]Eric Hehman, Jessica K. Flake, and Jimmy Calanchini, "Disproportionate Use of Lethal Force in Policing Is Associated with Regional Racial Biases of Residents," *Social Psychological and Personality Science* 9, no. 4 (2018): 393–401, https://doi.org/10.1177/1948550617711229.

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[51]Kunda, "The Case for Motivated Reasoning," 480–98; Lewandowsky and Oberauer, "Motivated Rejection of Science," 217–22; and Rutjens, Sutton, and van der Lee, "Not All Skepticism Is Equal," 384–405.

[52]For example, Republicans as anti-science. Campbell and Kay, "Solution Aversion," 809–24; Farias et al., "Scientific Faith," 1210–13; Friesen et al., "The Psychological Advantage of Unfalsifiability," 515–29; and Sheldon Solomon, Jeff Greenberg, and Tom Pyszczynski, "A Terror Management Theory of Social Behavior: The Psychological Functions of Self-Esteem and Cultural Worldviews," in *Advances in Experimental Social Psychology*, Vol. 24, ed. Mark V. Zanna (San Diego, CA: Academic Press, 1991), 93–159.

[53]This research only addresses participants' perceptions of shared religious beliefs with their parents; it did not also measure whether participants perceived their parents to be more comfortable or threatened by evolution. Importantly, when participants perceived that their parents shared their religious beliefs, this reduced the threat of evolution. It seems unlikely that there would be a systematic relationship that those who shared beliefs with their parents would also have parents more comfortable with evolution such that it is actually the perception of the parents' comfort with evolution driving the reduction of evolution threat. This, however, is an empirical question. Michael W. Magee and Curtis D. Hardin, "In Defense of Religion: Shared Reality Moderates the Unconscious Threat of Evolution," *Social Cognition* 28, no. 3 (2010): 379–400, https://doi.org/10.1521/soco.2010.28.3.379.

[54]Hardin and Higgins, *Handbook of Motivation and Cognition*, 28–84.

[55]Ibid., 28–34.

[56]James F. M. Cornwell, Becca Franks, and E. Tory Higgins, "Shared Reality Makes Life Meaningful: Are We *Really* Going in the Right Direction?," *Motivation Science* 3, no. 3 (2017): 260–74, https://doi.org/10.1037/mot0000071.

[57]Inge Bretherton, "Communication Patterns, Internal Working Models, and the Intergenerational Transmission of Attachment Relationships," *Infant Mental Health Journal* 11, no. 3 (1990): 237–52, https://doi.org/10.1002/1097-0355(199023)11:3<237::AID-IMHJ2280110306>3.0.CO;2-X.

[58]For example, "Wash your hands to get rid of germs [that you cannot see] that will make you sick." Paul L. Harris and Melissa A. Koenig, "Trust in Testimony: How Children Learn about Science and Religion," *Child Development* 77, no. 3 (2006): 505–24; and Heiphetz, "The Development and Importance," 1–5.

[59]Paul L Harris et al., "Germs and Angels: The Role of Testimony in Young Children's Ontology," *Developmental Science* 9, no. 1 (2006): 76–96.

[60]Roy F. Baumeister and Mark R. Leary, "The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation," *Psychological Bulletin* 117, no. 3 (1995): 497–529, https://doi.org/10.1037/0033-2909.117.3.497; John Calvin, "Genesis 2:18," in *Commentaries on the First Book of Moses Called Genesis*, Vol. 1 (Grand Rapids, MI: Christian Classics Ethereal Library, 1554); and John Calvin, "Matthew 22:37–40," in *Commentary On a Harmony of the Evangelists, Matthew, Mark, and Luke,* Vol. 2 (Grand Rapids, MI: Christian Classics Ethereal Library, 1563).

[61]Kahan, "The Expressive Rationality," 26–28.

[62]1 Corinthians 13:12.

[63]For example, threat to sense of self, relationships, control. Kennon M. Sheldon and Tim Kasser, "Psychological Threat and Extrinsic Goal Striving," *Motivation and Emotion* 32, no. 1 (2008): 37–45, https://doi.org/10.1007/s11031-008-9081-5.

[64]Sheldon Solomon, Jeff Greenberg, and Tom Pyszczynski, "Pride and Prejudice: Fear of Death and Social Behavior," *Current Directions in Psychological Science* 9, no. 6 (2000): 200–201, https://doi.org/10.1111/1467-8721.00094.

[65]Dan M. Kahan, "Ideology, Motivated Reasoning, and Cognitive Reflection," *Judgment and Decision Making* 8, no. 4 (2012): 407–24; and Kahan et al., "Motivated Numeracy," 54–86.

[66]Rios et al., "Negative Stereotypes," 959–67.

[67]Gerald Echterhoff and E. Tory Higgins, "Shared Reality: Construct and Mechanisms," *Current Opinion in Psychology* 23 (2018): iv–vii, https://doi.org/10.1016/j.copsyc.2018.09.003; Hardin and Higgins, *Handbook of Motivation and Cognition*, 28–84; and John T. Jost et al., "Ideological Asymmetries in Conformity, Desire for Shared Reality, and the Spread of Misinformation," *Current Opinion in Psy-*

chology 23 (2018): 77–83, https://doi.org/10.1016/j.copsyc.2018.01.003.

[68]Although these unconscious factors are not limited to the Christian, the focus of this discussion is on leveraging psychology for improving intra-Christian dialogue. Within the Christian community, we can start from a shared understanding about the need to see clearly ourselves before we correct others (e.g., Matt. 7:3–5). Moreover, when the Christian community can engage in civil dialogue on contentious issues and demonstrate disagreement with integrity (i.e., correcting beliefs when the data overwhelmingly support that correction) and in love, this is a powerful witness to non-Christians. At least philosophically (even if not always in reality, for many of the psychological reasons discussed in this article), the scientific community respects disagreements in weight of evidence and theoretical arguments; seeing this same kind of discussion done with humility and Christian charity may be an especially important waypoint for a non-Christian scientist.

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[70]Geoffrey L. Cohen, Joshua Aronson, and Claude M. Steele, "When Beliefs Yield to Evidence: Reducing Biased Evaluation by Affirming the Self," *Personality and Social Psychology Bulletin* 26, no. 9 (2000): 1151–64, https://doi.org/10.1177/01461672002611011.

[71]For example, if humor was important, participants would reflect on a time when they felt good about themselves in direct relationship to their humor. Cohen, Aronson, and Steele, "When Beliefs Yield to Evidence," 1151–64.

[72]Constantina Badea and David K. Sherman, "Self-Affirmation and Prejudice Reduction: When and Why?," *Current Directions in Psychological Science* 28, no. 1 (2019): 40–46, https://doi.org/10.1177/0963721418807705.

[73]Roy F. Baumeister and Kathleen D. Vohs, "Revisiting Our Reappraisal of the (Surprisingly Few) Benefits of High Self-Esteem," *Perspectives on Psychological Science* 13, no. 2 (2018): 137–40, https://doi.org/10.1177/1745691617701185; and Geoffrey L. Cohen and David K. Sherman, "The Psychology of Change: Self-Affirmation and Social Psychological Intervention," *Annual Review of Psychology* 65, no. 1 (2014): 333–71, https://doi.org/10.1146/annurev-psych-010213-115137.

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[75]Cohen and Sherman, "The Psychology of Change," 333–71.

[76]Magee and Hardin, "In Defense of Religion," 379–400.

[77]Campbell and Kay, "Solution Aversion," 809–24.

[78]Rhia Catapano, Zakary L. Tormala, and Derek D. Rucker, "Perspective Taking and Self-Persuasion: Why 'Putting Yourself in Their Shoes' Reduces Openness to Attitude Change," *Psychological Science* 30, no. 3 (2019): 424–35, https://doi.org/10.1177/0956797618822697.

[79]"ASA Statement of Faith," The American Scientific Affiliation, https://network.asa3.org/general/custom.asp?page=ASAbeliefs.

[80]Hardin and Higgins, *Handbook of Motivation and Cognition*, 28–84; Sara D. Hodges, Kathryn R. Denning, and Sara Lieber, "Perspective Taking: Motivation and Impediment to Shared Reality," *Current Opinion in Psychology* 23 (2018): 104–8, https://doi.org/10.1016/j.copsyc.2018.02.007; and Namkje Koudenburg, "Regulating Shared Reality with Micro-Dynamics in the Form of Conversation," *Current Opinion in Psychology* 23 (2018): 47–51, https://doi.org/10.1016/j.copsyc.2017.12.002.

[81]For example, the fruit of the Spirit (Gal. 5:22–23).

[82]Cohen, Aronson, and Steele, "When Beliefs Yield to Evidence," 1151–64.

[83]Kennon M. Sheldon and Sonja Lyubomirsky, "How to Increase and Sustain Positive Emotion: The Effects of Expressing Gratitude and Visualizing Best Possible Selves," *The Journal of Positive Psychology* 1, no. 2 (2006): 73–82, https://doi.org/10.1080/17439760500510676.

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[86]Baumeister and Leary, "The Need to Belong," 497–529.

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[90]Sarah Banchefsky et al., "But You Don't Look Like a Scientist!: Women Scientists with Feminine Appearance Are Deemed Less Likely to Be Scientists," *Sex Roles* 75, no. 3–4 (2016): 95–109, https://doi.org/10.1007/s11199-016-0586-1.

[91]Rebecca Zamon, "#ILookLikeAnEngineer Reminds Us That Anyone Can (and Should) Be an Engineer," *The Huffington Post Canada*, August 4, 2015, https://www.huffingtonpost.ca/2015/08/04/ilooklikeanengineer_n_7934098.html; and Cheryan et al., "Do Female and Male Role Models," 656–64.

[92]Tara M. Mandalaywala et al., "The Nature and Consequences of Essentialist Beliefs about Race in Early Childhood," *Child Development* 90, no. 4 (2019): e437–e453, https://doi.org/10.1111/cdev.13008.

[93]Rios et al., "Negative Stereotypes," 959–67; and Simpson and Rios, "Is Science for Atheists?," 740–58.

[94]Scheitle and Ecklund, "The Influence of Science Popularizers," 25–39.

[95]Peter Harrison, *The Territories of Science and Religion* (Chicago, IL: The University of Chicago Press, 2015).

[96]For example, 1 Corinthians 13:12.

[97]James K. A. Smith, "Introduction: Taking Theology and Science to Church," in *All Things Hold Together in Christ: A Conversation on Faith, Science, and Virtue,* ed. James K. A. Smith and Michael L. Gulker (Grand Rapids, MI: Baker Academic, 2018), xi–xxi.

[98]As stated previously, motivated reasoning can occur on both sides of the same issue. Although I focus this section on dismantling the protective processes that promote motivated reasoning away from the scientific consensus, this posture does not assume clear, rational, and totally unmotivated reasoning on the side of mainstream science. As with all of these conversations, nuance is key; knowledge is not held exclusively and perfectly in the minds of scientists or theologians.

[99]Michael G. Strauss, "Age of the Universe and Earth (Billions-of-Years View)," in *Dictionary of Christianity and Science,* ed. Paul Copan, Tremper Longman III, Christopher L. Reese, and Michael G. Strauss (Grand Rapids, MI: Zondervan, 2017), 28–32.

[100]Todd S. Beall, "Age of the Universe and Earth (Thousands-of-Years View)," in *Dictionary of Christianity and Science,* ed. Copan, Longman, Reese, and Strauss, 32–36.

[101]Marcus R. Ross, "Answers in Genesis," in *Dictionary of Christianity and Science,* ed. Copan, Longman, Reese, and Strauss, 42–43.

[102]"Does Young-Earth Creation Matter?," Answers in Genesis, https://answersingenesis.org/why-does-creation-matter/.

[103]"Biblical Creation Divisive?," Answers in Genesis, https://answersingenesis.org/why-does-creation-matter/.

[104]John Mark Reynolds, "Creationism, Young-Earth (Supportive View)," in *Dictionary of Christianity and Science,* ed. Copan, Longman, Reese, and Strauss, 146.

[105]J. W. Rogerson and Judith M. Lieu, eds., *The Oxford Handbook of Biblical Studies* (New York: Oxford University Press, 2006); Kevin Vanhoozer, "From the Literal Interpretation of Genesis to the Doctrine of Literal Six-Day Creation," lecture for Creation Project, Scripture and Ministry from Carl F.H. Henry Center for Theological Understanding, Deerfield, IL, September 14, 2016, video and audio, 57:56, https://henrycenter.tiu.edu/resource/from-the-literal-interpretation-of-genesis-to-the-doctrine-of-literal-six-day-creation/; Gavin Ortlund, "Did Augustine Read Genesis 1 Literally?," September 4, 2017, https://henrycenter.tiu.edu/2017/09/did-augustine-read-genesis-1-literally/; and Victor Reppert, "Argument from Reason," in *Dictionary of Christianity and Science,* ed. Copan, Longman, Reese, and Strauss, 563–65.

[106]I have heard a pastor state that we cannot shout someone into salvation. In the same way, I do not believe that we can shame someone into science. Research on belief polarization and motivated reasoning would affirm this conclusion.

[107]Reynolds, "Creationism, Young-Earth (Supportive View)," 145.

[108]Ibid., 146 (emphasis added).

[109]Rogerson and Lieu, eds., *Oxford Handbook of Biblical Studies.*

[110]Friesen et al., "The Psychological Advantage of Unfalsifiability," 515–29. It is also worth noting the philosophical consistency here between this kind of thinking in Christian communities and the kinds of statements made by ardent atheists such as Richard Dawkins endorsing the belief that it is not possible to pursue good science and be a Christian. In both these extremes, there is not a lot of room for diversity of viewpoint. These viewpoints may be particularly recalcitrant to change.

[111]Mason D. Burns, Margo J. Monteith, and Laura R. Parker, "Training Away Bias: The Differential Effects of Counterstereotype Training and Self-Regulation on Stereotype Activation and Application," *Journal of Experimental Social Psychology* 73 (2017): 97–110, https://doi.org/10.1016/j.jesp.2017.06.003.

[112]Edward Maibach, Teresa Myers, and Anthony Leiserowitz, "Climate Scientists Need to Set the Record Straight: There Is a Scientific Consensus That Human-Caused Climate Change Is Happening," *Earth's Future* 2 (2014): 295–98, https://doi.org/10.1002/2013EF000226.

[113]Sander L. van der Linden et al., "The Scientific Consensus on Climate Change as a Gateway Belief: Experimental Evidence," *PLOS ONE* 10, no. 2 (2015): e0118489, https://doi.org/10.1371/journal.pone.0118489.

[114]Robert J. Brulle, Jason Carmichael, and J. Craig Jenkins, "Shifting Public Opinion on Climate Change: An Empirical Assessment of Factors Influencing Concern over Climate Change in the U.S., 2002–2010," *Climate Change* 114 (2012): 169–88, https://doi.org/10.1007/s10584-012-0403-y.

[115]Rutjens, Sutton, and van der Lee, "Not All Skepticism Is Equal," 384–405.

[116]Pew Research Center, "Religion and Views on Climate and Energy Issues," October 22, 2015, https://www.pewresearch.org/science/2015/10/22/religion-and-views-on-climate-and-energy-issues/.

[117]Or scientific community.

[118]Campbell and Kay, "Solution Aversion," 809–24.

[119]Rutjens, Sutton, and van der Lee, "Not All Skepticism Is Equal," 384–405.

[120]Simpson and Rios, "Is Science for Atheists?," 740–58; and Rutjens and Heine, "The Immoral Landscape?," 1–16.

[121]Catapano, Tormala, and Rucker, "Perspective Taking and Self-Persuasion," 424–35.

[122]Katharine Hayhoe, "Biography," http://www.katharinehayhoe.com/wp2016/biography/.

[123]____, "The Most Important Thing You Can Do to Fight Climate Change: Talk about It," lecture for TEDWomen, November 2018, video, 17:04, https://www.ted.com/talks/katharine_hayhoe_the_most_important_thing_you_can_do_to_fight_climate_change_talk_about_it?language=en.

[124]For example, Colossians 3:23; Galatians 5:22–23.

[125]Samir Okasha, *Philosophy of Science: A Very Short Introduction* (New York: Oxford University Press, 2016).

[126]Jeffrey Winking, "Exploring the Great Schism in the Social Sciences: Confirmation Bias and the Interpretation of Results Relating to Biological Influences on Human Behavior and Psychology," *Evolutionary Psychology* 16, no. 1 (2018): 1–10, https://doi.org/10.1177/1474704917752691.

[127]William F. Brewer and Bruce L. Lambert, "The Theory-Ladenness of Observation and the Theory-Ladenness of the Rest of the Scientific Process," *Philosophy of Science* 68, no. 3 (2001): S176–S186; and John P. A. Ioannidis, "Why Science Is Not Necessarily Self-Correcting," *Perspectives on Psychological Science* 7, no. 6 (2012): 645–54, https://doi.org/10.1177/1745691612464056.

[128]Christopher Allen and David M. A. Mehler, "Open Science Challenges, Benefits and Tips in Early Career and Beyond," *PLOS Biology* 17, no. 5 (2019): e3000246, https://doi.org/10.1371/journal.pbio.3000246.