HUMAN EVOLUTION AND THE CHRISTIAN CALL TO LOVE

by David Poister

Abstract. This article will examine the Christian call to love as an invitation to participate in an ongoing evolutionary transformation of humanity. This interpretation recognizes that the ability to love others is both a product and driver of evolutionary change. Through natural selection, humans evolved the neurological capacity to benefit from the cooperation generated by empathy. Additionally, these evolutionary origins have created constraints on altruism such as the tendency to favor members of one's own group. Christianity and other religions are well-suited to encourage the specific behaviors and cultural conditions that allow humans to overcome these constraints. Religions can provide consistent reinforcement of the symbolic and behavioral information that establishes empathy as a desirable trait and steers human evolution in a prosocial direction. Also, religious concepts such as the kingdom of God and Teilhard's Omega Point can inspire cooperation by associating even small acts of kindness with the evolutionary transformation to improve the human condition.

Keywords: altruism; empathy; evolution; John F. Haught; human progress; Pierre Teilhard de Chardin

Introduction

Of the post-enlightenment scientific advances initially viewed as conflicting with existing Christian orthodoxy, it is the evolutionary origin of human life that has arguably had the most enduring impact on the division between science and religion. Evolution through natural selection continues to be used to discredit religious beliefs and practices (Dawkins 2006, 157–58). In contrast, some have utilized our expanding understanding of evolutionary processes to enrich Christianity. Perhaps the best-known proponent of this view is the French Jesuit and geologist, Pierre Teilhard de Chardin (1881–1955). Teilhard believed humans are evolving to create

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an increasingly connected and united group. Teilhard built his ideas from the observation that over geological time, material complexity on earth has continued to increase. Conceptually, Teilhard described this change as the accumulation of increasingly complex layers (geosphere, biosphere, noosphere) with the final layer representing a heightened consciousness created by hominization, the interconnection of human thought (Teilhard de Chardin [1955] 1999, 122–23).

In recent decades, the foundational insights of Teilhard have been expanded by the work of John Haught who proposed a system of "anticipatory metaphysics" that embraces the ongoing change that evolutionary processes generate. Haught views God as using evolutionary change to draw humanity forward in a process he describes as an unfolding cosmic drama. Articulating a theology informed by an evolutionary view of life, John Haught wrote:

> By urging us to "wait upon the Lord," to live in trust and hope, the biblical vision inevitably locates the fullness of being in an arena that we can locate only "up ahead" and not "up above" in a timeless heaven of total perfection, nor behind us in the fixed routines of past physical causation. (Haught 2008, 106)

Haught embraces a vision of evolution as a process with a clear direction, leading to the "fullness of being." Teilhard named this ultimate state of being the Omega Point, "The universe completing itself in a synthesis of centers, in perfect conformity with the laws of union. With God, the Center of centers" (Teilhard de Chardin [1955] 1999, 211). Obviously, both Haught and Teilhard envisioned this state of human existence as highly desirable. The question then becomes, how do we achieve such a state?

Teilhard provides the following guidance to set the course for a science-based understanding of how we can move toward the Omega Point. Referring to the extant structures of human civilization, Teilhard wrote:

> The spectacle is before our eyes everywhere, and its episodes fill the annals of peoples. But if we wish to comprehend its secret and to appreciate its drama, there is one thing we must not forget. No matter how hominized the events have become, in this rationalized form human history truly prolongs in its own way and to its own degree the ongoing movements of life. Through the phenomena of social ramification that it relates, it is *still* natural history. (Teilhard de Chardin [1955] 1999, 144)

Teilhard insists that we ground our understanding of society and human behavior in the same evolutionary processes that gave rise to the physical features of organisms we observe. In the decades following Teilhard's directive, scientific advances have largely justified his evolutionary view. In addition to revealing the origins of the "spectacle before our eyes," this research has also provided an understanding of how humans can consciously shape evolutionary change. Specifically, we can now understand how

aspects of the Christian moral code can foster human progress by selecting for increasingly cooperative human behavior. In scientific terms, this behavior is called altruism.

Altruism is defined here as behavior that benefits another but creates a cost to the actor. Dixon describes this definition as "behavioral altruism" to distinguish it from definitions that consider the actor's motivation or awareness of the moral goodness of the behavior (Dixon 2013). This definition is consistent with the use of the term in the biological literature including the seminal work of (Hamilton 1964). Because altruistic behavior occurs at the expense of the actor, it is distinct from other forms of cooperation such as mutualism and commensalism but like all forms of cooperation, it requires coordination between individuals. Using the more general term "cooperation" to refer to behaviors that could be considered altruistic avoids the issue of whether or not there is truly a cost to the actor that is not always clear. This article focuses on altruism because it is the form of cooperation that is most challenging for humans. For this reason, the limits to our altruistic behavior limit human cooperation generally and in turn, restrain human progress. By understanding the evolutionary origins of altruism and the behavioral restraints this origin has generated, one can see how specific aspects of religions such as the Christian call to love can be used to remove these impediments and foster human progress through increased cooperation.

Altruism and Evolution

The notion that human behaviors such as altruism have been influenced by evolutionary processes was originally suggested by Charles Darwin (Darwin 1859, 488) and gained traction through the work of the evolutionary biologist Edward O. Wilson. In his 1975 book *Sociobiology: The New Synthesis*, Wilson explained how natural selection can shape animal behavior by selecting for genes that create the biological structures or chemical conditions that encourage specific behaviors (Wilson 1975). Although Wilson's ideas initially met with resistance from both outside and within the scientific community, some aspects of his work gained acceptance and spawned a new field of study, evolutionary psychology, which seeks to provide an evolutionary explanation for human behaviors. Much of the fruitful dialogue between science and religion generated by sociobiological ideas has occurred within the pages of *Zygon: Journal of Religion and Science* (Cavanaugh 2000).

The evolutionary forces that have generated altruistic behavior in humans have been the focus of considerable research. Although the interpretation of this body of work is continually debated, some conclusions have been widely accepted. These findings have been summarized in *Behave: The Biology of Humans at our Best and Worst* by Robert Sapolsky, a

neuroscientist and primatologist (Sapolsky 2017). As Sapolsky explains, two of the evolutionary mechanisms thought to have contributed to the genesis of altruism are kin selection (also known as inclusive fitness theory), and reciprocal altruism. For altruism in humans, a third factor, group selection, may also be relevant. Of course, these factors alone do not adequately explain the specific behaviors of individual humans. But, they warrant further consideration here because they provide a plausible evolutionary explanation for both why humans cooperate and, perhaps more importantly, why we do not cooperate in all circumstances. Thus, these forces relate directly to Teilhard's "synthesis of centers" described above.

Kin selection, reciprocal altruism, and group selection are specific aspects of biological evolution. Although scientific research continues to reveal previously unknown aspects of this process, the fundamental components are well-understood. All organisms contain genetic information encoded on molecules of DNA (deoxyribonucleic acid) or RNA (ribonucleic acid). Some sections of the nucleic acids (commonly referred to as genes) contain information that can be used by cells to create proteins which then control cellular processes. Either directly or indirectly, the information contained in the genes of an organism controls the organism's development, general characteristics, and functioning. However, genes alone do not determine the fate of a cell. Whether or not a cell is actively using a specific gene is determined by the type of cell and is influenced by signals from the external environment or from other cells within an organism. In addition to their role as ultimate controllers of cellular activity, genes are transferred to offspring during reproduction, ensuring that subsequent generations will have a form and function similar to their ancestors. But over time, biological evolution can act on the genes within a population of organisms to change their form and function.

The net effect of biological evolution is to select for genes that encode traits that increase fitness, with fitness defined as the ability to reproduce. Consider a population of interacting organisms of the same species. The individuals within the population will have similar genetic material but there will be some variation. Traditionally, this variation was thought to arise from random mutations that alter the encoded genetic information within cells. Recent research indicates that generation of the genetic novelty within cells that fuels evolution may be more actively regulated than previously realized (Shapiro 2011, 143–44). Regardless of the source, if genetic variability exists within the population, it can generate phenotypic variability where some individual organisms have traits that differ from the rest of the population. This difference will then fuel the process of natural selection. If the new trait increases the fitness of the organism, individuals with that trait will have more offspring than other members of the population. As a result, over many generations, the gene or genes encoding for the beneficial trait will be found in an increasingly large fraction of

the population. If the new trait decreases fitness, the opposite effect will eventually diminish the gene in the population. In this description of evolution, the basic unit that is acted upon by natural selection is the gene, a concept emphasized by Richard Dawkins in his 1976 book, *The Selfish Gene*. Dawkins makes a distinction between "replicators," the genes that transfer information to future generations, and "vehicles," the organisms that contain genes. Dawkins explains that it is useful to think of organisms as entities that genes create and use to propagate themselves: "We are survival machines—robot vehicles blindly programmed to preserve the selfish molecules known as genes" (Dawkins [1976] 2006, XXIX). Dawkins' view emphasizes that when we speak of "survival of the fittest," the things that survive are genes, not individuals. Although genes can appear to act selfishly, one should not infer that this activity necessarily generates selfish individuals. Certainly, self-preservation behaviors result from natural selection, but selfish genes can also give rise to altruistic behavior as described below.

The first step that organisms must overcome to meet the reproduction-based fitness criteria is to remain viable. Thus, evolution has selected for numerous traits that allow individuals to avoid danger, combat disease, and obtain the basic requirements of life. For organisms such as humans that reproduce sexually, another important trait is added to the list of fitness criteria: the ability to produce viable offspring through mating. This introduces another opportunity for evolution to favor certain genes through the process of sexual selection if those genes improve mating success. Thus, organism can evolve traits from sexual selection even if those traits alone are detrimental to the survivability of an individual. The large, showy feathers of the peacock are a classic example. The feathers are used by males to convey fitness to potential mates, which enhances their ability to attract females. Although the plumage increases the bird's susceptibility to predation, the trait has been selected for because the overall impact on reproductive success has been positive.

This brief overview of biological evolution through natural selection will now be used to explain the evolutionary origins of altruism. In a scientific context, altruism is a behavior exhibited by an individual that benefits another at some cost to that individual. Although other forms of cooperation can be easily understood as a product of natural selection, the evolutionary origins of altruism are more complicated because the cost of the altruistic act can decrease the fitness of the altruistic individual. Of the various evolutionary mechanisms thought to contribute to the emergence of altruistic behavior, the inclusive fitness theory relates most directly to the process of natural selection described above. This mechanism, also known as kin selection, is based on the premise that the genes that are being protected and transmitted need not be contained in the individual acting to protect them. Thus, closely related individuals will evolve

to act altruistically because in doing so, the genes they have in common with their relatives will be protected and transmitted to future generations (Hamilton 1964). In the terms developed by Dawkins described above, vehicles will evolve to protect and nurture other vehicles that carry the same replicators. Although the altruistic act is detrimental to the individual, it is beneficial to that individual's genes because those genes are also in the individual benefitting from the altruism. Because more closely related individuals will be more likely to share genes, natural selection will generate stronger altruistic feelings toward more closely related family members. The behavior of parents sacrificing for their children's benefit is an obvious example of altruistic behavior that can be explained by inclusive fitness theory. The theory has also been used to explain social behavior in humans and other animals (Gardner, Griffin, and West 2016).

Although some scientists believe inclusive fitness theory can explain the evolutionary origin of most altruistic behavior, increasing evidence suggests that reciprocal altruism has also played a role. The key difference is that reciprocal altruism can generate cooperation between organisms even when they are not closely related. The essence of reciprocal altruism in an evolutionary context is that evolution will select for traits that have a short-term cost to an individual if the long-term gain leads to a net benefit in fitness. Consider the following scenario. If an individual living in a group detects a predator, it is likely to be in that individual's best interest to flee or seek shelter. Making a loud noise and serving as a sentinel to warn the neighbors will increase their survival but would draw attention to the sentinel and increase the likelihood of falling victim to the predator. Of course, if the sentinel's neighbors return the favor, that would benefit the sentinel. One can argue that such behavior can be generated through kin selection given the likelihood that the sentinel's neighbors are also close relatives. Indeed, that may be the case in some situations, but there is evidence that evolution can foster altruistic behavior and cooperation even between unrelated individuals. A fascinating example is the feeding habits of vampire bats.

The common vampire bat (*Desmodus rotundus*) is native to Central and South America. These flying mammals roost in caves and hollow trees during the day and forage for blood at night. Although blood is a nutrient-rich food, it poses some risks. Two consecutive nights without food is lethal to the bats and each night around 7 percent of adult bats return to the roost without feeding (Wilkinson 1990). Fortunately, vampire bats have another source of blood, each other. Upon returning to the roost, successful hunters regurgitate blood to share with unfed roost-mates. Around 70 percent of blood sharing happens between mothers and offspring, not surprising given the close genetic connection. If blood sharing were driven by kin selection alone, one would predict that the remaining food sharing would preferentially occur between related individuals. But that is not the

case. In controlled experiments, vampire bats were much more likely to share food with bats that had previously fed them than with relatives and feeders were more likely to initiate the exchange than recipients (Carter and Wilkinson 2013). It appears that food sharing has evolved to mitigate what would otherwise be a substantial risk of starvation. Bats that will be at the lowest risk for starvation will include not only those that are successful hunters, but also those that can rely on roost mates for food. The latter group will consist of bats that have previously shared food because they are most likely to be fed by others. The evolutionary selection for cooperative behavior has led some to refer to this phenomenon as "survival of the kindest."

The food sharing behavior of bats is even more remarkable when one considers all the factors that make this cooperative behavior evolutionarily successful. For example, bats must keep track of the food-sharing history of roost-mates to ensure that only reciprocators are rewarded by cooperation. Otherwise, nonforaging bats would receive the benefits of cooperation without bearing any of the cost, putting them at a competitive advantage. In the short-term, these "freeloader" bats would have increased fitness and would outcompete foraging bats. Obviously, this would not be sustainable because the food-harvester genes would diminish over time until the population could no longer feed itself. How are vampire bats able to execute the complex behaviors that allow them to benefit from reciprocal altruism?

Vampire bat physiology may reflect the neurological demands imposed by their cooperative habits and provide a link to human behavior. Relative to other bat species, the common vampire bat has the largest neocortex (Baron, Stephan, and Frahm 1996). The neocortex is a part of the mammalian brain that plays a particularly important role in processing information related to social interactions. Species of primates with larger neocortices are found in larger social groups and have more complex social interactions (Dunbar 2003). Among primates, humans stand out as having a particularly large neocortex. Correlations between brain size and social complexity such as those among bats and primates have contributed to a new explanation of how evolutionary processes generated the remarkable complex organ that is the human brain. "The Social Brain Hypothesis" holds that evolutionary selection for large brains in primates and humans resulted from the need to process complex social information rather than factual or ecological information (Dunbar 1998). An important implication is that increasing the complexity of social interactions within a species increases fitness. Otherwise, the large, metabolically costly brains of humans would not have evolved.

There is no doubt that humans have been a particularly successful primate species from an evolutionary standpoint. Our success can largely be attributed to our cognitive capacity that has enabled us to engineer our

surroundings to meet our needs and adapt to a changing environment. What is now obvious is that among all these cognitive abilities, the ability to cooperate and maintain complex social structures has played a particularly pivotal role. Not only has cooperation allowed humans to deal with specific challenges to our fitness, but by generating the neurological structures that enabled other cognitive advances, cooperation has been a driving force in human progress. This insight is particularly consequential for the linkages I will develop below between religion and evolutionary change, a process that will continue to leverage the benefits of cooperation.

Sapolsky suggests that in addition to kin selection and reciprocal altruism, the emergence of altruistic behavior in humans may also have been influenced by group selection. This theory explains that traits such as altruism that may be maladaptive for individuals can be selected for if they increase the likelihood that a group with the trait will outcompete a different group without the trait. Obviously, this requires that costly intergroup conflicts occur with some frequency and continuously over evolutionary relevant time periods. Although the theory remains controversial, it has gained acceptance by some prominent scientists including E. O. Wilson (2014, 29).

Regardless of the relative importance of the aforementioned evolutionary mechanisms that selected for altruistic behavior, the results of the processes are undeniable. Humans exhibit altruistic behavior. Our altruistic repertoire ranges from the simple acts of caring for children to the heroic. We have the neurological and behavioral tools to employ cooperation to our benefit and prevent exploitation. We have an instinctive sense of fairness. We forgive transgressions to a degree. We actively seek and maintain social networks. The psychology and neurology of any of these behaviors is worthy of consideration when attempting to understand human nature but one is particularly relevant to Christian moral codes: the emotion of empathy.

Empathy is often described as the ability to step into the shoes of another person as a way to understand that person's experience. Empathy is related to altruism because in order to meet another person's needs, we must be able to recognize those needs and accept them as valid. As the neuroscientist David Eagleman explains, the neurological basis for empathy is related to our own desire to avoid pain (Eagleman 2015, 142–43). When humans experience physical pain, certain regions of the brain become active as indicated by increased blood flow that can be detected using imaging techniques. Collectively, the activated regions are known as the pain matrix. Thus, when a subject is exposed to painful stimuli such as a needle stick, blood flow to the pain matrix increases. Remarkably, a similar activation of the pain matrix was demonstrated in experiments where subjects were exposed to visual images of the infliction of pain on others. As an experimental control, subjects viewed an image of a human hand

as it was being touched by a cotton swab that activated parts of the brain used to process visual information. However, if subjects were shown a picture of a human hand being stuck with a needle rather than a cotton swab, there was not only activation of the visual processing parts of the brain, there was also increased blood flow in the pain matrix of the observer. To some extent, the observer experienced the pain of another. The neurological response to the emotional pain of others is similar to the response to physical pain described above. When a subject experienced social exclusion in a laboratory setting, blood flow increased in the same pain matrix regions that were activated by physical pain (Eisenberger, Lieberman, and Williams 2003). Additionally, observers of others experiencing social exclusion exhibited an empathic neurological response and were motivated to act to comfort victims (Masten, Morelli, and Eisenberger 2011). With this empathic brain response, it is easy to see why an observer would be motivated to help others avoid physical and emotional pain. In a sense, empathy fuels altruism because by helping others, we alleviate our own pain.

Thus far, I have examined the evolutionary origins of human altruism and discussed some of the neurological aspects of this behavior. Although this has been a summary of only a fraction of the relevant scientific knowledge on the subject, I hope it is sufficient to demonstrate that while we may contain selfish genes, this has not resulted in the creation of selfish individuals. As noted by Matt Ridley in his book *The Origins of Virtue*: "Our minds have been built by selfish genes, but they have been built to be social, trustworthy and cooperative" (Ridley 1997, 249). This fact alone is noteworthy. The principal resistance to the sociobiology concept when it was initially articulated by Wilson was that an evolutionary view of human behavior would lead to deterministic justifications for inhumane behavior. In fact, kindness and altruism are at least part of the spectrum of human behavior that has been handed to us by the process of natural selection. Frans de Waal, a primatologist with an interest the evolution of human morality, summarized the effect as follows: "Early human societies must have been optimal breeding grounds for 'survival of the kindest' aimed at family and potential reciprocators. Once this sensibility had come into existence, its range expanded" (de Waal 2005, 181).

What about the other end of the spectrum of human interactions? We certainly do not need an exhaustive review of the behavioral science literature to agree that humans are capable of treating each other with malice. Is the evolutionary perspective useful for understanding the limits of our altruistic impulses? In a religious context, there are at least two relevant factors that constrain human altruism: the need for fairness and the impact of group identity. Both these factors can be explained by reexamining the evolutionary processes that contributed to the emergence of altruism in humans.

As was explained in the previous section, reciprocation ensures that the overall fitness of cooperators is increased by their altruistic behavior. To ensure that individuals do not benefit from cooperation without bearing any of the cost, mammals that practice reciprocal altruism have developed behavior that can be described as a sense of fairness. This behavior has been observed in humans by social scientist studying economic behavior using games in which participants are given money and asked to share that money with others under various scenarios (Güth, Schmittberger, and Schwarze 1982; Forsythe et al. 1994). A similar need for fairness has been observed in other primate species (Brosnan and de Waal 2003). The need for fairness generated by evolution and displayed by humans has obvious implications for aspects of theology that focus on social justice and human dignity. It is relevant here because attempts to leverage our natural inclination toward cooperation at the individual and institutional level are unlikely to be successful unless fairness is considered.

Inclusive fitness, reciprocal altruism, and group selection are three mechanisms described above that likely contributed to the emergence of altruistic behavior in humans. They have a feature in common that requires further examination: they do not generate universal altruism but rather select for altruistic acts directed at a defined group. Inclusive fitness generates altruism directed at relatives. The fairness requirements associated with reciprocal altruism limit this form of cooperation to individuals that trust each other. These could be individuals that interact frequently, are parts of groups with a history of intergroup cooperation, or those that display some overt sign of trustworthiness. Group selection is most obvious in its limitation because it is partly predicated on generating cooperative groups that are more fit due to their ability to outcompete less cooperative groups of the same species. As a result, cooperation with individuals outside one's own group would be deselected. Regardless of the specific mechanism, the result is that an individual will be more likely to empathize and cooperate with a member of that person's own group. This aspect of human behavior has been referred to as ingroup/outgroup bias, us/them bias, or tribalism. It has been shaped by evolutionary forces and it can be detected in the behavior and neurology of modern humans. It has contributed to immense suffering and constrains human progress. Importantly, it is also the target of the "love your neighbor" component of the Christian moral code.

Perhaps the most compelling evidence that humans create us/them dichotomies has been the examination of the neurological empathy response to ingroup/outgroup membership. David Eagleman adapted the experimental approach used to demonstrate the empathic neural response to evaluate ingroup/outgroup effects. Similar to the previous studies, subjects

viewed images of a human hand being stuck with a syringe and pictures of a hand being touched by a cotton swab as an experimental control. However, in this version of the experiment, the hands were accompanied by labels bearing the name of a group defined by religious belief. The images were viewed by subjects who identified with one of the groups. When an image showing a syringe stick to a hand with the label of the subject's own group, the subjects had a typical empathic neurological response. In contrast, when the label described another group, subjects had little to no response on average (Eagleman 2015, 153–54). A similar experiment was conducted by another research group to evaluate the effect of racial identification on empathic neural response. In these experiments, Chinese and Caucasian subjects were shown unlabeled images of Chinese and Caucasian faces (Xu et al. 2009). Each image showed a face receiving either a needle stick or a poke with a cotton swab. When Caucasian subjects viewed Caucasian faces receiving a needle stick, they exhibited an empathic neural activation of parts of the pain matrix. In contrast, when Caucasian subjects viewed painful stimulation to Chinese faces the empathic response decreased significantly. A similar ingroup/outgroup bias was observed in Chinese subjects. The results of these experiments and others like them reflect a human propensity to define groups as worthy of empathy and cooperation and to classify nonmembers as less worthy of those prosocial behaviors.

The bias created by us/them dichotomies seems to have taken this examination of the evolutionary sources of altruism to a bleak conclusion: we have been created to be kind but only to people like us. Fortunately, such a deterministic view is not supported by scientific research. As Sapolsky stresses, limiting any explanation of complex human behavior to genes and neurons is inadequate and inaccurate. A more complete view must incorporate effects of hormones, neurotransmitters, past experiences of the individual, and cultural influences (Sapolsky 2017, 386). Rather than rendering the previous discussion moot, these caveats can serve as the basis of moving forward because they emphasize a critical aspect of human behavior and its neurological underpinnings: plasticity. For the most part, the nature versus nurture debate has been replaced by the nature and nurture synthesis. Our genes and the biological and chemical systems they generate have created a spectrum of behaviors. The specific region within the spectrum that is expressed at any given time is determined by the circumstances and environment. To a degree, our brains can adapt and even reconfigure as needed. The plasticity of our brains and behavior provides the critical link between our evolutionary past and the hope for continued human progress generated by religious beliefs and practices. By guiding humans to prosocial regions of our behavioral spectrum, religions can improve the human condition and, perhaps, drive truly evolutionary change as Teilhard described.

Answering the Christian Call to Love

The call to love each other is prominent feature of Judeo-Christian scripture. Early Jewish writing stressed the neighborly love among Israelites and included examples of extending that love to others (Meisinger 2000). Likewise, the authors of the New Testament identified the extension of the love command to all, including enemies, as a critical component of the transformation of humanity fostered by the message of Jesus. Of the numerous New Testament passages that support this interpretation, the parable of the Good Samaritan (Luke 10:25–37 NABRE) relates most directly to the evolutionary view developed above. The passage begins as Jesus is questioned by a "scholar of the law" who asks, "what must I do to inherit eternal life?" Jesus initially references the love command from scripture "…love your neighbor as yourself" (Leviticus 19:18 NABRE). In response, the scholar asks, "And who is my neighbor." This question is critical because, in essence, the scholar explicitly asks Jesus to define an ingroup/outgroup boundary. The familiar parable describes the fate of a traveler brutally beaten by robbers. The victim was first discovered but ignored by a priest and a Levite, people that would likely be defined as part of the victim's ingroup. Subsequently, the victim is aided by a Samaritan who attends to both his immediate and long-term needs by taking him to an inn to ensure his recuperation. Jesus then directs the scholar to emulate the Samaritan. As Amy-Jill Levine stresses, understanding this parable requires viewing Jesus as a Jewish preacher addressing a first-century Jewish audience (Levine 2006, 144–48). Given the cultural and religious differences between Jews and Samaritans, the original Jewish audience would clearly identify a Samaritan as an outgroup member. By choosing a Samaritan to exemplify right action, Jesus calls his audience to expand the love command to include all people. This expansion is the essence of the radical, world-transforming, and evolution-driving message of Christianity. As it did in the first century, the parable continues to challenge us to recognize all humans as worthy of our love and empathy. How can we most effectively respond to this call?

An evolutionary perspective on altruism was used above to understand why answering the call to love as described by the parable of the Good Samaritan can be challenging. Fortunately, this perspective also provides guidance as to how humans can overcome these challenges. Acknowledging that the empathy response is plastic and can be changed by the experience of the individual, Sapolsky offers the following: "Thus in order to lessen the adverse effects of Us/Them-ing, a shopping list would include emphasizing individuation and shared attributes, perspective taking, more benign dichotomies, lessening hierarchical differences, and bringing people together on equal terms with shared goals. All to be revisited" (Sapolsky 2017, 422). The neurological perspective used above to illustrate

the
limitations of the empathy response also reveals the potential efficacy of Sapolsky's advice. For example, Gutsell, Simon, and Jiang (2020) used electroencephalographic measurements to show that study participants that adopted a perspective-taking mindset resonated with members of a racial outgroup more than participants that adopted an objective mindset. Other forms of social science research also support Sapolsky's analysis. Using a meta-analysis of 515 separate studies, Pettigrew and Tropp (2006) found that generally, fostering contact between groups decreases intergroup prejudice.

Overcoming the constraints on altruism imposed by us/them dichotomies does not require us to act contrary to human nature. Rather, the call to love articulated by the parable of the Good Samaritan asks us to be aware of our aversion to those outside our group and to actively move to a more prosocial region of our existing behavioral spectrum. de Waal seems to agree: "It is good to realize that in stressing kindness, religions are enforcing what is already part of our humanity. They are not turning human behavior around, only underlining pre-existing capacities" (de Waal 2005, 181).

To summarize, scientific research can illuminate the Christian call to love in several useful ways. The evolutionary perspective explains how we have developed a natural tendency to feel empathy toward others and to act cooperatively even with unrelated individuals. This perspective also reveals why the love command is challenging for humans because we may tend to favor members of our own groups as we define them. Additionally, research has provided guidance for how we can best follow the love command. For me, this research-based guidance is the link to religion. The Christian call to love operationalizes the Sapolsky "shopping list" of items designed to extend empathy to all and thereby drive evolutionary improvement of the human condition. It seems likely that Christianity is not uniquely capable of meeting this goal, as the call to love is common to the moral codes of many religions.

Some scientists would likely disagree with my view of Christianity as a positive force driving human progress by facilitating increased cooperation. Sapolsky admits that he "more readily focus[es] on religion's destructive than its beneficial aspects" (Sapolsky 2017, 621) but nonetheless offers an objective and useful summary of current research into links between behavior and religion. While acknowledging that religions can foster certain prosocial behavior, he cites "human history" as evidence of religion's potential for destruction. "The big challenge is when communal aspects of religiosity fuel out-group hostility" (Sapolsky 2017, 626). Sapolsky is not hopeful that religions will overcome this dark aspect.

The evolutionary psychologist Steven Pinker has extensively researched trends in human violence and cooperation and has come to a generally op-

timistic conclusion: "The decline of violence may be the most significant and least appreciated development in the history of our species" (Pinker 2011, 692). Although Pinker's analysis of violence among early humans has been questioned (Bregman 2020, 88–91), he makes a compelling case for a more recent increase in harmony among humans. Pinker attributes this improvement to an expanding circle of sympathy fueled by the ascent of reason and science that began with the Enlightenment. Although Pinker acknowledges isolated contributions of particular religions to decreases in violence, he does not consider them to be a significant contributor to the general trend in peacefulness he describes: "The theory that religion is a force for peace, often heard among the religious right and its allies today, does not fit the facts of history" (Pinker 2011, 677). In contrast to Pinker's view, Cavanaugh suggests that some scholarship exaggerates the historic link between religion and violence because it fails to distinguish religion from other ideologies that produce violence (Cavanaugh 2009, 54–56).

In addition to these historical perspectives, experimental studies indicate that religion can be a criterion used to fuel in-group/out-group bias. As discussed above, the neurological empathy response can be attenuated when pain recipients are identified as belonging to a religious group different from the observer of the painful stimulation (Eagleman 2015, 153–54). There is also evidence that religious in-group/out-group bias can generate negative attitudes and less compassion for adherents to other religious groups (Johnson, Rowatt, and LaBouff 2012; Różycka-Tran 2017).

The experimental and historical evidence that religions limit cooperation between humans by establishing in-group/out-group boundaries is compelling but it is balanced by evidence of the prosocial effects of religious practices. This research includes studies of how religion effects current human behavior as well as analysis of religion's impact over the course of human history. Examples of this work have been summarized in *Big Gods: How Religion Transformed Cooperation and Conflict* by the psychologist Ara Norenzayan. Norenzayan presents evidence indicating that religions that feature omniscient gods can increase trust among strangers and foster cooperation. He argues that such ancient religions may have played a key role in the genesis of large, agricultural-based communities from smaller bands of hunter-gatherers with limited interaction: "We do not need religion to be moral beings. But moral communities of strangers may not have evolved as readily without religions with Big Gods" (Norenzayan 2013, 143). There is also experimental evidence that modern adherents to certain religions display more prosocial behavior (Norenzayan 2013, 49–51).

It is apparent that scientists have reached different conclusions regarding the effect of religious practice on prosocial behavior. Some of the discrepancy is likely explained by differences in experimental design (Norenzayan 2013, 52–53) which is not surprising given the difficulty of accurately

defining and measuring something as complex as human behavior. Perhaps the most definitive conclusion one can draw from this body of research is that religion is capable of both promoting and discouraging prosocial behavior. Actually, that is one of the most important implications of viewing the Christian call to love from an evolutionary perspective. Answering this call does not just require individuals to act with increased empathy to all, it requires us to shape our institutions and the religious groups we create to ensure that they do not act counter to our goal of expanding our circle of sympathy by creating yet another criterion for exclusion.

If Christianity is to create the type of evolutionary change that Teilhard predicts will lead to the Omega Point and that Haught anticipates as the result of divine love, action is required. Haught's "anticipatory metaphysics" presents a hopeful vision of humanities' future. But if we are to realize this vision, our anticipation is not enough. Our *participation* is required. The call to love is a call for humanity to shape the trajectory of its own evolution. As individuals, we are called to move to prosocial regions of our behavioral spectrum. The same applies to religions if they are to be a relevant force for human progress fueled by increased cooperation. The role of divine love in inspiring our participation in the evolutionary process is described by Jackson using the concept of agape, altruism resulting in unrequited self-sacrifice and motivated by pure regard for the well-being of others: "…divine Agape creates evolution, which in turn makes human agape possible" (Jackson 2013).

There are several important implications of the evolutionary view of the call to love I have developed in this article including benefits to both individuals and society. First, this view reveals the meaning and purpose common to each human life. Individuals answer the call to love on a daily basis. Occasionally, the answer takes the form of spectacular sacrifice or bravery. But most often, the answer takes the form of small acts of kindness directed at those we encounter. Kindness toward the "other" is the way people operationalize Sapolsky's "shopping list" of actions we can take to mitigate the negative impacts of our inclination to favor the ingroup. The evolutionary perspective reveals these acts of kindness as fuel for evolutionary change toward increased cooperation. This change drives human progress and relieves suffering. When individuals answer the call in even small ways, they contribute to the slow movement to a better world, what Christians call the "kingdom of God." The realization that individual actions are part of a larger movement with evolutionary consequences can serve as inspiration to continue the sometimes-difficult work of expanding one's circle of empathy to include all others. As Haught noted when addressing morality: "You will be more inclined to be good if you first have a sense that you are contributing something significant to the ongoing work of creation" (Haught 2012, 116). If a recognition of the evolutionary implications of the call to love serves to inspire more individuals to follow

this path of behavior, the benefit to society is obvious: by creating more compassion toward those outside one's immediate group, the suffering humans inflict on each other will decrease.

But is humanity capable of the self-transformation that Teilhard envisions? Can humans create a world where increased cooperation reduces suffering and drives human progress? Can the call to love reshape humanity on such a global and permanent scale? I believe that the degree to which we can answer these questions affirmatively depends in part on the extent to which religions like Christianity that have articulated the call to love the "other" can overcome their tendency to create ingroup/outgroup divisions and instead, cultivate increasingly prosocial attitudes. Why are religions capable of driving this transformation?

Historically, religions have effectively fueled cultural change on the scale required to influence the evolutionary trajectory of humans. For example, the previously discussed work summarized by Norenzyan indicates the transition of human populations from small groups of hunter-gatherers to larger, agricultural groups similar to modern society was facilitated by the belief in "big gods" which fostered prosocial behavior. Religion may have also helped our ancestors navigate the increased cost of selfishness that accompanied the evolution of theory of mind and complex languages (Johnson 2013). The extensive changes to Western culture that were fueled by the Christian movement is the theme of *Dominion: How the Christian Revolution Remade the World* by Tom Holland. This work includes an explanation of how the Christian call to love influenced early formulations of canon law that were foundational to modern ethical and legal principles (Holland 2019, 237). Another specific example of the cultural influence of Christianity is how behavioral norms regarding kinship established by the medieval Western Church generated a number of identifiable psychological tendencies in modern humans (Schultz et al. 2019). But acknowledging the historic impact of religions does not require one to accept their relevance to the creation of continued progress. As Norenzyan observes, many of the most prosperous and trusting societies today are those in Scandinavia and Western Europe, among the least religious countries in the world (Norenzyan 2013, 173). de Waal poses the question about the current relevance of religion as follows: "Perhaps religion is like a ship that has carried us across the ocean, having allowed us to develop huge societies with a well-functioning morality. Now that we are spotting land, some of us are ready to disembark. But who says the land is as firm as it looks?" (de Waal 2013, 236).

My assertion that religions hold the potential to affect the type of change needed for the transformation being discussed is rooted in my view of that transformation as an evolutionary process. Understanding where religion fits into this process requires breaking human evolution into its components. Traditionally, this division categorizes the relevant

forces shaping human evolution into two categories: genetic (information encoded in an individual's nucleic acids) and cultural (information that is experienced by an individual). As summarized by Meiseinger (2000): "Human beings are thus in their behavior simultaneously subject to two quasi-independent information systems: the genotype and the culture-type." Although this dichotomy continues to be employed (Richerson, Boyd, and Henrich 2010), it can be readily replaced by the four-dimension system described by Jablonka and Lamb (2014). While retaining the genetic compartment from the traditional categorization, Jablonka and Lamb categorize information typically described as "cultural" into two distinct compartments: behavioral and symbolic. Of particular importance for the current discussion, these authors add a fourth, intermediate category: epigenetic. Epigenetic information is contained within cells in the form of chemical "tags," small molecules (usually methyl or acetyl groups) that attach either directly to nucleic acids or to the proteins used for their storage. These chemical modifications influence how readily genes are transcribed and thus, can increase or decrease gene expression. Research in the nascent field of behavioral epigenetics indicates that epigenetic systems may be a previously unknown mechanism linking the social and cultural environment to behavior. For example, rats reared by non-nurturing mothers had epigenetic modifications that decreased the production of a specific hormone receptor in their brains. These epigenetic changes persisted into adulthood and caused a decrease in cognitive function and decreased the ability to recover from stress (Moore 2015, 77–80). Remarkably, some epigenetic changes related to behavior appear to evade the usual scrubbing of epigenetic signals during germ cell creation and are transmitted to subsequent generations (Jablonka and Lamb 2014, 425–26). Although research has yet to demonstrate that epigenetic effects explain how culturally established behavior norms are maintained within a population, controlled laboratory experiments such as those cited above suggest such a connection. Eventually, behavioral epigenetics research may illuminate the cellular mechanisms that link religious symbols, practices, and moral codes to human behavior at both an individual and societal scale. Thus, epigenetic forms of information need to be considered when exploring the evolutionary impact of religion.

The "evolution in four dimensions" concept is particularly useful because the four categories can be ranked in order of increasing robustness. Changes to the behavioral information an individual receives can be made rapidly and the effect of this information on an individual's behavior can be relatively ephemeral if exposure to the information ends. Behavioral information is not persistent in that it is not transferred automatically to subsequent generations. Symbolic information is somewhat more permanent and more likely to affect multiple generations. To compare the robustness of these first two categories, consider how information recorded as text and

images continues to inform people for many years but unless behavioral traditions are actively maintained, the impact of the information diminishes as does the fidelity to the original source. It is still unclear where epigenetic information should be placed along the robustness continuum because while epigenetic states change in response to environmental conditions, these changes can persist throughout an organism's lifetime and possibly through multiple generations without continued signaling from the environment. At the other end of the spectrum of robustness is genetic information, which is passed on with remarkable fidelity between generations regardless of changes to the external environment. Although genetic information can and does change over time, these changes require many generations to become widespread in a population.

With the four-dimensional view of the evolutionary process, we can now return to the central goal of this article, to examine the Christian call to love as an invitation to participate in an ongoing evolutionary process and evaluate the role of religion in effectively guiding this participation. The call to love asks humans to participate in our own evolution by creating an environment that fosters empathy and cooperation. In terms of the four dimensions of evolution, this participation involves shaping the behavioral, symbolic, and the subsequent epigenetic information that permeates human society. Importantly, these are the three dimensions of evolution that lack the robust quality of genetic information. For this reason, these more ephemeral forms of evolutionary information require continuous reinforcement if they are to remain constant over time and throughout the human population. Supplying this reinforcement on a global scale is the key role religions can play in the evolutionary process.

Christianity is replete with symbols and behaviors that are built on the foundation of the call to love and are capable of nudging human evolution toward increased empathy and cooperation. In the earliest Christian writings, the primacy of the call to love is acknowledged (Galations 5:14 NABRE). Throughout scripture, stories like the Parable of the Good Samaritan emphasize the importance of extending human compassion beyond our own groups. These writings also predict the impact of the call to love by revealing it as a path toward the ultimate state of humanity, the kingdom of God (Mark 12:28–34 NABRE). Communal rituals, which foster connections to our immediate neighbors, can also be used to extend these connections to all of humanity, including those of other religious traditions. Christianity and other religions encourage frequent and ongoing participation that provides the continuous reinforcement of symbolic and behavioral information required to drive evolution change. Furthermore, religious traditions are often embedded in family traditions, ensuring transgenerational transfer of this reinforcement. Whether one believes that religions have evolved to serve a strictly utilitarian purpose or that they exist because they connect humans to an ineffable truth, it is obvi-

ous that they are ubiquitous and powerful tools that shape human change. The Christian call to love serves to guide that change toward increased empathy and toward a more harmonious humanity.

Finally, the issue of feasibility must be addressed. This article describes a mechanism by which a critical mass of people responding to the call to love could fundamentally transform the way humans interact, eventually leading to a world with less suffering and continued progress generated by cooperation. No doubt, such a world would be welcome by all, but to some, such a transformation will seem unlikely if not impossible. I am optimistic. As a scientist, I see such a transition in human behavior well within the grasp of evolution. We are beginning to understand how changes to cultural (or behavioral/symbolic) information can drive more permanent genetic changes (Jablonski and Lamb 2014, 279–304; Richerson, Boyd, and Henrich 2010). It is likely that such behavioral transitions have played critical roles in the evolutionary success of our ancestors. 50,000 year ago, our species (*Homo sapiens*) coexisted on the earth with Neanderthals (*Homo neaderthalensis*) and at least two other species of humans (Rutherford 2016, 62). Archeological evidence indicates that some of these extinct "cousins" were probably stronger and smarter than their *Homo sapiens* contemporaries (Bregman 2020, 59). It is possible that the key advantage for our distant ancestors was their unique friendliness toward each other that allowed them to exploit the power of cooperation (Bregman 2020, 54–72). As de Waal noted, "Everything science has learned in the last few decades argues against the pessimistic view that morality is a thin veneer over a nasty human nature. On the contrary, our evolutionary background lends a massive helping hand without which we would never have gotten this far" (de Waal 2013, 240). The question is not are we capable of evolving toward increased cooperation? The question is, are we capable extending cooperation beyond our immediate circle under the current conditions and population size?

If Christianity and other religions can help direct human behavior toward increased empathy and cooperation across groups, religions will hasten human progress and decreased suffering. Because religious institutions are already embedded within cultures throughout the human population, they are uniquely positioned to impact the direction and pace of evolutionary change. The call to love is already a prominent component of Christian symbols and practices. Leveraging these features is thus a matter of emphasizing existing components rather than redirecting dogma and tradition. This emphasis must include specific efforts to decrease the effects of the ingroup/outgroup bias that religions can create because this aspect of human behavior continues to be a major impediment to moving humanity toward the kingdom of God using the call to love. Fortunately, we are beginning to use scientific insight to develop the theological tools required to inspire and sustain our efforts and to trust in the slow work

of God: "Without a horizon of expectation that links our present efforts to the universe's future and its final destiny, we can easily underestimate the importance of our lives. The new scientific sense of an emerging universe… …can help us connect our hopes meaningfully to the anticipatory outlook of Abraham, the prophets, and Jesus" (Haught 2015, 19).

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