THE THEOLOGICAL DEBATE OVER HUMAN ENHANCEMENT: AN EMPIRICAL CASE STUDY OF A MEDIATING ORGANIZATION

by John H. Evans

Abstract. For most theologians, theology should ultimately be used by the laity and/or the public. However, the religion and science debate has not focused on the divide between theologians and the laity. In this case study I examine the debate among theologians about human enhancement. I focus on the extent to which the structure of the debate in a "mediating organization" between the theologians and the public coincides with the structure of the debate among the theologians. I conduct a survey of participants in the organization, and find that the basic divides among the theologians are largely replicated. These results, when combined with studies of the theologians themselves and the laity, provide a more holistic understanding of the future debate about human enhancement.

Keywords: human enhancement; mediating organization; survey

One of the most prominent current areas of theological reflection on scientific activity concerns human enhancement (Waters 2006; Cole-Turner 2011; Mercer and Trothen 2015). Much of this reflection has occurred in academic venues, but ultimately the goal for perhaps most theologians is for their ideas to expand beyond academia into churches and the public more generally. There is a body of research that explicitly or implicitly examines whether the laity and general public have the same perspective as theologians (e.g., Evans 2016). However, a more comprehensive understanding of the potential for the diffusion of theological ideas requires an examination of those who mediate between the theologians and the laity. The first contribution of this article is to take a first step toward assessing the likelihood of this diffusion through a survey of participants in one organization that mediates between theologians and laity. I find that the

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connection between theological ideas and support or opposition to human enhancement is broadly similar to that of the theologians.

The term "mediating organization" is based on the term "mediating institution" from political theory. "Mediating institutions" are "social movements, political parties, and interest organizations" that "sit at the intersection between the public and the institutions that govern them." They "help educate the citizens about political processes and policy issues," "socialize the public as to its civic duties," and "provide vital information about public debates" (Wolbrecht 2005, 103). Similarly, for my case, a "mediating organization" sits between academic theology and the laity, translating and spreading the ideas from the theologians (and potentially consolidating the views of the laity for transmission to the theologians). Given that it is a rare layperson who reads academic theology, a mediating organization is a critical path of influence for theology. Members of a mediating organization are laypersons who are engaged with but do not produce theology.

There are many mediating organizations such as denominational educational agencies and religiously based social movements. Specifically in the religion and science debate, examples include Biologos, the Discovery Institute, Answers in Genesis, and the Dialogue on Science, Ethics and Religion of the AAAS. Whether the theological debate about human enhancement will be similar for the laity depends to at least some extent on whether these mediators interpret these theological ideas as do the theologians, and whether these ideas lead to the same conclusions about human enhancement. In this article I examine, as a case study, whether the American Scientific Affiliation has a similar viewpoint as Christian theologians.

It is important to note that mediation is diffuse. It is not that the members of a mediating organization receive a theological work and directly bring it to the laity. Rather, the members of a mediating organization are aware of theological debates and bring these to the laity. More concretely, I would not expect that any members of the ASA had necessarily read any of the theology of human enhancement. However, I would expect them to be more familiar with the theological concepts found in the religion and science debate that are used by the theologians to reach conclusions about human enhancement. For example, I would expect that the members of the ASA are very aware of the theology of creation because this impacts on so many religion and science discussions. They would be more able than others to articulate the various ways that Protestants accommodate Genesis with neo-Darwinism. I measure these abstract theological concerns in my survey. Do these mediators reach the same conclusions about enhancement from these theological beliefs as do the theologians?

A secondary contribution of this article is to develop new tools for the social scientific examination of the relationship between religion and science. In recent years it has become clear that any conflict between religion

and science in the West for regular members of the public—not necessarily academic theologians—is primarily about morality and not about fact claims about nature (Evans 2018). Moreover, since the 1970s the moral issues that religious and scientific communities have been in the greatest conflict over have concerned the human body—abortion, birth control, human genetic engineering, organ transplantation, the definition of death, cloning, and euthanasia. It is no coincidence that religious communities were increasingly concerned with these topics at the same time institutional science moved from focus on topics like physics to human biology (Evans 2018, 146–47).

But, the survey questions used by sociologists of religion and science are typically limited to beliefs about biblical literalism, belief in heaven, belief in miracles and so on.[1] It is unlikely that these would be related to openness to human enhancement or other issues concerning the body and nature. For a newfound academic concern with the moral concerns that the religious may have with scientific activity, we need measures of theological concepts implicated in the human body and human relationship to nature that have not yet been developed. This article offers some initial questions for others to use or improve upon.

The Case of Human Enhancement

Humans have always wanted to improve themselves, be it mentally, morally or physically. We could learn to play the piano, study another language or lift weights, but our ability to enhance ourselves has been limited. In recent decades, new innovations in human genetic modification, pharmaceuticals, mechanical implants and other technologies offer promise for much more powerful enhancements (Harris 2007; Agar 2010; Mehlman 2012; Hauskeller 2013).

I distinguish between two types of enhancement. Moderate enhancement would "improve" an individual human, but be limited to making that human like another human. For example, if you made a 5 foot tall man 5 feet 6 inches tall, that would be a moderate enhancement. This is only somewhat controversial because it just entails making a human like some other human in God's creation (to use the Christian parlance). The controversy is about radical enhancement, which is making a human—and by extension the human species—unlike any that have proceeded us (Agar 2010, 1). I focus upon radical enhancement.

Existing Research

Academic theologians do not have the same views as the laity for a number of reasons, such as their higher educational level compared to the average layperson and the fact that religious professionals are subtly rewarded for keeping up with theological debates. Theologians would not be expected

to have the same relationship between theological ideas and conclusions about human enhancement.

There are no studies of theology and enhancement in any mediating institutions. There are, however, a few studies of the public that are suggestive for this study. A few survey studies of the attitudes of the general public toward enhancement include a variable for religion and conclude that the more religious are more opposed to enhancements, with evangelicals more opposed than other groups (Evans 2010; Pew Research Center 2016, 3; Scheufele et al. 2017).

More importantly, existing studies suggest Christians will have different reasoning for what I am calling moderate and radical enhancement. Evans examined the faith that religious people had in human reproductive technologies. Among his conclusions was that lay Christians saw human genetic technology as a source of hope, primarily in fighting disease. Second, that they do not sacralize the current human body or the current human genome, and viewed the current human as flawed, and potentially in need of improvement. However, the third conclusion was that the design plans for the new human should not come from our own human desire, but from God's plan for us. God's plan is generally to relieve suffering—seen as part of completing creation—and not to create enhanced superhumans (Evans 2016).

Evans also shows that conservative Protestants are most opposed to science when it is portrayed as a system of meaning for society—as a pseudo-religious replacement for religion (Evans 2018, 138–39). Evans's overall work can therefore be interpreted to show differential opposition to two levels of radical enhancements. There is a weaker opposition, but opposition nonetheless, to making a distinct human trait better than any previous human has had. This "trait enhancement" could be seen as improving on one aspect of God's creation, but perhaps with some justification, like making humans resistant to cancer. There is a stronger opposition to "ideological enhancement," the idea that an enhancement is part of an over-arching ideology of human perfectability, which implies that God's entire Creation is deficient and in need of human-designed improvement.

The Theological Debate and Associated Survey Questions

Ideally I would compare the views of theologians and the mediators using the same method, but I lack an equivalent survey of theologians. Therefore, for the theologians I generalize from the theological literature about the relationship between theological belief and openness to radical human enhancement.

It is the fairly abstract theological belief specific to discussions of religion and science that I expect to be mediated by the members of the ASA, not the specific conclusions about human enhancement. What is critical is

whether the members of the ASA interpret those theological ideas in the same way as do the theologians of enhancement so that the particularities of the theological belief lead to the same conclusions about enhancement.

Creatures versus Co-Creators

The first theological concept from the religion and science debate more broadly that structures the enhancement literature is whether humans are primarily creatures created by God or are co-creators with God (Cole-Turner 1993). Or, put differently, what is the relationship between humans and God's creation? If we are creatures and only part of God's creation, then it is not our role to modify the existing design of nature, including humans. If we are co-creators, God gave us the brains and wisdom to complete creation, which could include modifying humanity.

Theologian Celia Deane-Drummond advocates for a place between these two end points, criticizing those who "detach human beings from their sense of being finite creatures rooted in animal desires, fears, and needs" (Deane-Drummond 2011, 118). Theologian Brent Waters moves even further toward the creaturely end of the continuum. He starts by rejecting the commonly asserted location on the continuum, that we are co-creators with God, when he writes that: "We may begin by saying that humans are the creatures that God has elected to oversee the providential unfolding of God's creation. . . . This does not imply that God has authorized humans to master and shape creation in whatever form they might desire. Since they are creatures and not the creator, their oversight is limited; they have been chosen by God to be the agents that align creation to its created order" (Waters 2006, 117).

As you would expect, those theologians who accept the idea that we are co-creators are more accepting of human enhancement because it is our role as humans to improve ourselves—to continue God's creation. Those theologians who emphasize our creation by God, our creatureliness, are more skeptical about enhancement.

While this co-creator divide is found among academic theologians, and generally predicts their view of enhancement, it is not clear that these views and their effects will be found among participants in a mediating organization. To capture variation in the idea of humans as co-creators I included a survey question that stated "There are many ways to compare the responsibilities of humans and the responsibilities of God for the natural world. One continuum is below. Please place your views upon that continuum." On one end of the continuum, labeled with a "1," was the statement "humans are to *oversee* what God has already created," which represents the creature role. At the other end of the continuum, labeled with a "10," was the statement "Humans are to aid God in ongoing creation." This is the co-creator end of the continuum. Such a question should be

useful not only for future studies of enhancement but for studies of the human relationship to nature.

Humans as Vulnerable and Finite

Theologians who are toward the creature end of the continuum are concerned that enhancement would violate our true creaturely self and thus make us no longer human. In Waters's view, being a creaturely human includes being vulnerable and limited, so enhancement proponents are advocating "being saved from being human" (Waters 2011, 165). For theologian Gerald McKenny, *the* debate within Christianity is:

> Whether genuine fulfillment is to be found in a life that is needy, mortal, vulnerable to disease and disability, bound by conditions of embodiment, and limited to the kinds of transcendence we are capable of experiencing through our finite, bodily nature and not apart from it; or whether it is to be found in release from at least many of these limitations in order to live as long as we want, free from bodily affliction and physical and mental decline and able to exercise control over our moods and thoughts, to experience new forms of consciousness and sensation, and so on. (McKenny 2011, 181–82)

McKenny argues that human finitude is part of what a human is, and to try to enhance ourselves out of that condition is to violate Christian notions of the human.

Thus, one of the divides among the theologians is whether our human vulnerability should be affirmed, not resisted. And, therefore, those who believe that humans are defined as being vulnerable and limited should see less reason to engage in enhancement. Vulnerability is measured in the survey by three questions. First, respondents were asked if they strongly agree, agree, disagree or strongly disagree with the statement "part of being human is to be vulnerable and limited."

A fact claim like this may not be associated with views of enhancement because half of the respondents could agree with this and see our creatureliness as something to celebrate, and the other half could agree with this and see our creatureliness as something to overcome. Therefore, the next question puts a moral valuation on finitude, asking for evaluation of the statement: "it is good that humans are vulnerable and limited."

Finally, the ideal change for enhancement proponents is to make humans more intelligent, and they presume that more intelligent humans would be happier (Hopkins 2015, 71–72; Hauskeller 2013, 55). This increased happiness is their main motivation for leaving our creatureliness behind, so those who believe we would be happier would be more supportive of enhancements. To evaluate this the survey asked the extent the respondent agreed with the statement "People in general would be happier if they had more intelligence."

Theosis

Beyond the co-creator end of the Creature versus Co-Creators spectrum is the position that we humans should use enhancement to become more like God. This is called deification or "theosis," and is more traditionally associated with Eastern Orthodoxy than Western Christianity (Lustig 2008, 47). Historically, the most known figure to hold this view was Teilhard de Chardin, who advocated humans evolving toward deification in the "Omega Point" (Burdett 2015). In contemporary debates, a similar position is held by Ronald Cole-Turner, who argues that "the primary question for Christian theology is not about the specific technologies that may be employed to produce these changes, but whether these technologies play any role in God's transformation of humanity" (Cole-Turner 2015, 155). For Cole-Turner the answer seems to be yes, and if God's intention is for us to become more like God (theosis), why not use technology to do so? In this vision of theosis, we become "a new kind of glorified being who will enjoy what might be described as youthful health, fullness of knowledge and immortality" (Cole-Turner 2011, 197–200).

Those Christians who agree with the theological concept of theosis should be, like Cole-Turner, more supportive of human enhancement. Therefore, the survey asked the extent of agreement with the statement "God wants the human species to become more like God."

Eschatology

A related theological concept in discussions of religion and science, and human enhancement in particular, is eschatology. In Christianity such discussions usually include the second coming of Christ, millennialism, and the Kingdom of God at the end of time. In much millennial thought, the question is how the paradise at the end of time will come into being. For example, in post-millennial thought, we humans create the Kingdom of God on Earth, after which the second coming of Christ occurs. This impulse was most evident in the American social gospel movement of the early twentieth century (Dorrien 2010). The opposite end of the spectrum, pre-millennialism, depicts the Kingdom coming into being independent of human efforts.

I hypothesize that participants in mediating organizations who agree with the abstract idea that we humans have to create the Kingdom of God on Earth are more likely to agree with the concrete idea that we should engage in human enhancement, because they are more open to humans perfecting nature. To measure views of the Kingdom, the survey question started with "It is often said that Christians yearn for the Kingdom of God. Do you think the Kingdom will be:" This statement was followed by a one to ten scale, with "1" labeled "come into being largely independent

of human intention" and "10" labeled "be built through the efforts of Christians."

A more specific theological debate is whether technology can be used to bring about the Kingdom. Within the general technological utopianism of American culture, Christians debate the role of technology in eschatology. For example, Teilhard de Chardin's eschatology involved humans engaging with technology to move toward a more Christ-like human. In contrast, Jacques Ellul has a more pessimistic engagement with technology in his eschatology (Burdett 2015, 36, 80). I hypothesize that those who see a stronger role for technology would see human enhancement as contributing to bringing about the Kingdom. To measure this, the survey asked the extent of agreement with the statement "Technology will help build the Kingdom of God."

Made in the Image of God

A central theological concept in the religion and science debate is anthropology. When applied to debates about enhancement, the question is whether in so doing we would somehow become nonhuman—a claim which obviously depends on the definition of a human. In a book-length study, Evans examines the extent to which the public agrees with the dominant definitions of the human found in academia. The three definitions are the Christian theological, where humans are those that are made in the Image of God; the biological, where humans are those with a particular DNA sequence; and the philosophical, where humans are those with a particular set of traits. Ordinary Christians do not only hold the Christian version, but agree to a lesser extent with the others (Evans 2016).

I hypothesize that more heavily weighting the biological definition would lead to increased acceptance of human enhancement because we would then be ultimately like the other animals that we humans regularly enhance through breeding. Following Evans, to assess the respondent's views of humanity, a section with three matching questions began with "there is a debate about what is most important in making us human. To what extent do you disagree or agree with each of the following:" This was followed by the statement "What makes us human is our genes (DNA)," which was then followed by a 1 to 7 scale: "1" was anchored with "strongly disagree," "4" was anchored with "neither agree nor disagree," and "7" was anchored with "strongly agree."

I hypothesize that more heavily weighting the philosophical definition of the human would lead to the increased acceptance of enhancement because the emphasis on valued traits in this definition should lead to seeking better traits. The statement measuring this concept was "What makes us human is our traits like higher intelligence and ability to plan for the future."

The third definition of the human in Evans's book is the theological, where humans are made in the image of God with souls that allow communication with God and other humans. I would assume that people who more strongly accept the idea that humans are made in the Image of God will be less accepting of enhancement. There are two reasons. First, with enhancement humans would presumably no longer match the Image. Second, they would view the existing version of humanity as the result of God's will. To measure this view of humans, the survey statement was: "What makes us human is that we are made in the image of God and have souls."

The general statement about the Image of God masks more fine-grained debates within theology about the nature of the Image (Case-Winters 2004, 814). One tradition makes the Image like a version of the philosophical definition of a human, where God has certain capacities that humans then share. Emphasizing this aspect of the Image could either make one more willing to entertain enhancements because enhancements could make our traits more like those of God; or it could make one less willing to entertain enhancements because they would make us incompatible with the Image. The other tradition defines the image as our ability to be in relationship with God and other humans. These concepts were included in the survey for exhaustiveness, but I lack a hypothesis of the impact of these views on human enhancement.

To measure these two traditions of the *imago Dei* concept, the survey asked the extent of agreement with the statement "A central concept in the Christian tradition is that humans are made in the Image of God. There have long been debates about the exact meaning of the Image." This was followed by "the Image exists primarily in the *capacities* of humans like reason or will." The next statement for evaluation was "The Image exists primarily in the *relationship* with God and other humans."

Finally, Evans found strong effects when humans were described using machine metaphors. One of the concerns that people have about enhancement is that it will make us more machine-like: lacking in creativity and free will. Therefore, I hypothesize that respondents who think that humans are like machines will be supportive of human enhancement. To measure this, the survey stated "People debate whether the human mind is like a machine. Would you say that everything, most things, some things, a few things, or nothing the human mind does is like a machine? Everything; Most things; Some things; A few things; Nothing."

Mastery over Nature

In the span of human history the survival and eventual flourishing of humans has depended upon controlling nature. The quest to control nature is often called the Baconian project, which theologian Gerald McKenny

describes as the imperative "to eliminate suffering and to expand the realm of human choice . . . to relieve the human condition of subjection to the whims of fortune or the bonds of natural necessity" (McKenny 1997, 2). Whether humans should be subduing nature is a long-standing theological question.

As many commentators have noted, human enhancement completes the project of the human control of nature by applying this control to the controller. For example, Michael Hauskeller writes that enhancement has developed to the point where "the ancient dream of conquering nature might actually come true to such an extent that even our own human nature could be controlled and changed at will" (Hauskeller 2013, 73). As another interpreter summarizes: "we need to ask whether we are prepared to reduce the entire natural world to the status of an artifact" (Lauritzen 2005, 25, 26).

The divide is then between those who want more total control of nature and those who do not, and I assume that those who want more control are more likely to agree with human enhancement. This view was measured in two ways. First, the survey asked the extent of agreement with the statement "It is important that some aspects of nature remain mysterious, unpredictable and uncontrollable." Also, to measure the extent to which the respondent thinks individual control over one's environment is actually possible, the survey asked respondents to evaluate the statement "my own success in life has been due to circumstances beyond my control."

Enhancements as Promoting the True Self

Do we have a true self? Critics of enhancement "worry that a given technological intervention will separate us from who we really are or from what is most our own: our own way of flourishing." For example, some worry that mood altering drugs will "separate us from the actions and experiences that normally accompany our moods," and thus separate us from "who we really are and from how the world really is" (Parens 2015, 51). Enhancement therefore is said to take us away from our "true self."

In contrast, the social science literature on individual body enhancements like weight loss and plastic surgery suggest that people pursue individual enhancements to realize or create their true self. The conclusion is that "ordinary people have usually responded to enhancement technologies" as "offering new opportunities for authenticity" (Levy 2011, 308).

To measure if the respondent thinks people have true, authentic selves that do not necessarily match their body, the survey asked the degree of agreement with the statement "People have true, authentic selves that do not necessarily match who they appear to be." The literature on enhancement suggests two possible and opposing connections between this abstract idea and views of enhancement. One is that those who think people have

true, authentic selves are less supportive of enhancement because it would violate that authenticity. The other is that those who think people have true authentic selves are more supportive of enhancement because they think that enhancement may be required to achieve this authenticity.

The Case of the American Scientific Affiliation

This case study is of the participants in a mediating organization called the American Scientific Affiliation (ASA). The ASA is an over 75-year-old organization dedicated to the examining the interface of religion and science. Founded in 1941 as a network of Christians in science, it has been a central part of the debates in conservative Protestantism over human origins, arguably being responsible for producing the 1940s divide between what are now considered to be the distinct traditions of fundamentalism and evangelicalism. It is now distinctly on the evangelical side. Historian Ronald Numbers summarizes the historical positions of the group by writing that shortly after its founding, "the prevailing sentiment in the ASA shifted away from strict creationism to progressive creationism and even theistic evolutionism" (Numbers 2006, 181). Theistic evolution argues for an ancient Earth and evolution—but that evolution as described by scientists is God's way of creating.

In the terms used to describe theological debates, the ASA is comprised of what Peter Harrison has labeled "neo-harmonizers," (Harrison 2018) where science and religion are both correct and must be synthesized. The ASA writes that "as scientists, members of the ASA take part in humanity's exploration of nature, its laws, and how it works. As Christians, ASAers want to know not just how the universe operates and came into being, but why it exists in the first place." They have a commitment to what they call "orthodox Christianity" and "to mainstream science, that is, any subject on which there is a clear scientific consensus."[2] My survey results, below, suggest that the ASA is best described as mediating with mainstream evangelicalism and conservative mainline Protestantism.

While historically concerned with claims about the natural world made by science and religion, in recent years the ASA has also been discussing the relationship between evangelical faith and the ethics of science and technology. For example, the subject of the most recent annual meeting was "bioethics and technology."

The ASA is a mediator between the academic theologians and the laity. The ASA states that its "unique mission is to integrate, communicate, and facilitate properly researched science and theology in service to the Church and the scientific community. . . . the ASA is committed to advising churches and our society in how best to employ science and technology while preserving the integrity of God's creation." Among its goals is "to support churches and other communities in their effort to

facilitate the dialogue between scientists and Christians. We recommend speakers and home school materials and other resources. We work together with organizations . . . to facilitate a broader interaction and understanding between these communities."[3]

This statement reminds us that the ASA is not a random set of evangelicals, but rather evangelical scientists, so this case is not generalizable to all evangelicals. While individual members may not be familiar with particular theological debates about human enhancement, it is expected that they are familiar with the major theological concepts in debates about religion and science that lead to particular conclusions about enhancement for the theologians. For example, members of the ASA, more than the average lay person, would be familiar with the theological perspectives on human origins or the relationship between God and nature.

Those familiar with the theological debate and with this organization may predict that the ASA would be more theologically conservative than the largely more liberal theologians in the enhancement debate. This is an empirical question, the answer to which follows shortly. The main question is not how the mean opinion about theological concepts compares to the theologians, but whether the ASA is having the same debate. Do the theological beliefs held by ASA members structure their thought on human enhancement in the same way they do for the theologians?

During registration at the ASA's 2018 annual conference every attendee was offered a paper survey, and was given a $5 Starbucks gift card upon its completion. The survey was designed to be completed in 5–10 minutes. The vast majority of attendees at the meeting participated, resulting in 243 completed surveys. While this is obviously a low N for survey research, the low N only makes the hypotheses more difficult to support, resulting in a more conservative test. Since this is a case study, the sample is not representative of any phenomena beyond the participants in this organization.

Descriptive Statistics

The Scientific, Religious, Political, and Demographic Basis of the Sample

The survey began with some basic demographic questions which help us understand the sample and the ASA: 60.1 percent of respondents identified as men, and 39.1 percent as women. The survey used age categories, which revealed a fairly broad age distribution: 15.6 percent were less than 25 years old; 15.6 from 25 to 40; 16 percent from 41 to 55; 34.2 percent from 56 to 70; and 18.5 percent older than 70. As one would expect from the purpose of the organization, only 1.2 percent of respondents identified as Catholic, and none were non-Christians. Also, given its historical role in boundary drawing with fundamentalism, only 1.2 percent of the

respondents identified as fundamentalists; 70 percent identified as evangelicals; 13 percent as mainline Protestants; 5 percent as liberal Protestants; and 10.3 percent selected "other."[4]

Respondents were asked to select their professional field. These were Biology (21.9 percent); Physics/Astronomy (11.2); Geology/Earth Science (5.0); Engineering (9.9); Math (0.8); Medicine (8.3); Chemistry (10.7); Computer science (4.1); Theology/Ministry (6.2); Business (2.9); Social Science/Education (6.6); Arts and Humanities (4.5); Other/Uninterpretable (7.9).[5] While the classic conflicts over knowledge between evangelicalism and science concern biology, physics, and geology, the constituency of the organization is broader.

An established survey method of distinguishing different traditions within Protestantism is to examine views of the Bible, so the survey included this question. As we would expect, given this organization's historical struggle against fundamentalism, only 2.1 percent of respondents thought that "the Bible is the actual word of God and is to be taken literally, word-for-word."[6] On the other end of the spectrum, no respondent endorsed "the Bible is just another book of teachings written by men containing stories and advice." Less than 1 percent endorsed the more liberal Protestant account where "The Bible is not inspired by God but tells how the writers of the Bible understood the ways and principles of God." Nearly all respondents endorsed one of the two typically evangelical views: 62 percent chose "the Bible is the inspired word of God, without errors, but some parts are meant to be symbolic," and 35 percent selected "The Bible is the inspired word of God and contains some factual or historical errors." The responses to this question, combined with the religious self-identification results above, reinforce my description of this organization as mediating with the American mainstream evangelical and conservative mainline communities.

To further understand the nature of the sample, I asked the respondent's political views with the long-used General Social Survey question that has seven possible responses on a continuum from extremely liberal to extremely conservative. The results were almost a perfect bell shaped distribution centered on the 26.7 percent who selected "moderate," with 36.3 percent selecting one of the three liberal choices and 37.1 percent selecting one of the three conservative responses.

Enhancement Measures

Keeping in mind Evans's distinction between trait enhancement and ideological enhancement, the survey first asked four questions about enhancing particular traits. The survey said "In the future, scientists may be able to give humans abilities that no human has ever had. Do you strongly approve, approve, disapprove or strongly disapprove of the following changes?" I re-coded the responses so that more approval receives a higher number.

Table 1. Descriptive statistics, American Scientific Affiliation Survey on human enhancement

	Range	Mean	SD	D	A	SA
Human Enhancement Measures						
Make humans resistant to disease	1–4	3.4	1.7	3.3	49.4	45.6
Make humans physically stronger	1–4	2.5	11.0	38.4	43.0	7.6
Make humans have greater intelligence	1–4	2.5	11.9	35.7	44.3	8.1
Give humans greater mental focus	1–4	2.8	6.8	21.9	60.3	11.0
Trait enhancement index	4–16	11.1				
Ideological enhancement	1–10	3.89				
Humans as Co-Creator						
Co-Creators with God	1–10	5.09				
Humans as Creatures						
Humans are vulnerable and limited	1–4	3.37	0.4	4.2	53.3	42.1
Good that humans vulnerable and limited	1–4	3.14	0.4	11.3	61.8	26.5
Humans more intelligent would be happier	1–4	2.12	13.4	63.2	21.8	1.7
Theosis						
Theosis	1–4	2.97	7.7	16.7	47.0	28.6
Eschatology						
Humans bring the Kingdom	1–10	5.00				
Technology will bring the Kingdom	1–4	2.60	9.4	29.8	52.8	8.1
Definition of Humans						
Definition of humans: DNA	1–7	4.25				
Definition of humans: Traits	1–7	4.63				
Definition of humans: Image of God	1–7	5.80				
Image of God: Capacities	1–4	2.82	5.2	25.5	51.1	18.2
Image of God: Relationship	1–4	3.44	0.8	4.6	44.8	49.8
Human mind like a machine	1–5	2.87				
Mastery over Nature						
Nature should remain mysterious	1–4	2.83	3.8	29.0	47.5	19.7
Not in control of my own success in life	1–4	2.84	2.6	26.8	55.0	15.6
True, Authentic Self						
People have true, authentic self	1–4	2.92	1.7	17.5	67.9	12.8

The first change to humanity was to "make humans resistant to infectious disease," the second to "make humans physically stronger," the third to "make humans have greater intelligence," the fourth to "give humans the ability to have greater mental focus."

Table 1 summarizes the responses, and the high degree of support for trait enhancement is noteworthy. (In the Table I give the percent who selected each response category only when there were four categories or less.) As has been shown in studies of religion and reproductive genetic technologies, conservative Protestants—like all Americans—are much more accepting of human interventions to improve health than those designed to enhance traits not concerning health. The same is true here, but it remains striking that nearly all (95 percent) of the respondents agreed or strongly agreed

with changing humans to resist disease—even accounting for the fact that they are mostly scientists. On the three nonhealth enhancements, the respondents are essentially split on whether they approve or disapprove. For example, about half support modifying humans to give them greater intelligence and half do not.

For the subsequent analyses I combined the four trait enhancement questions into an additive index. An index assumes that the four questions are all indirect measures of the same latent and more abstract attitude, with each question being a partial measure. The numerically ordered responses to each of the questions are summed. The index then ranges from 4 to 16, with higher numbers indicating more approval of trait enhancement. The index has a mean of 11.1 and a fairly bell-shaped distribution.[7]

Ideological enhancement is advocated when the design of humanity itself would be replaced with a new, improved version, following a particular ideological vision. This is the perspective of the transhumanist movement which argues for, in their language, designing, and creating humanity 2.0 to replace the flawed humanity 1.0 currently populating the planet. Transhumanism is "the intellectual and cultural movement that affirms the possibility and desirability of fundamentally improving the human condition through applied reason, especially by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities" (Burdett 2015, 81). Much of the theological literature is devoted to showing that transhumanism is the functional equivalent of a religion (Peters 2005; Waters 2011; Trothen 2015).

Taking advantage of the association of transhumanism with the ideological enhancement perspective, the survey question said "'Transhumanism' is the belief that the current version of the human species should be replaced with an improved version. Have you heard of 'transhumanism' before now?" The fact that 53.6 percent of respondents claimed to have heard of transhumanism suggests that this really is a group that follows academic debates in religion and science, further suggesting that the description of the organization as a mediator is accurate.

With either their previous knowledge of transhumanism, or from reading the statement given in the survey, they were then asked "to what extent could transhumanism be consistent with Christian belief?" They were asked to circle a choice on a one to ten scale with "utterly inconsistent" at 1 and "totally consistent" at 10. There was much less support for ideological enhancement than trait enhancement, with the average response being 3.89. Table 1 also contains the descriptive statistics for the theology questions, with higher numbers representing more agreement.

Table 2. Factor analysis components, American Scientific Affiliation human enhancement survey

	Factor		
	1	2	3
Humans as Co-Creator			
Co-Creators with God	**.578***	−.146	−.052
Humans as Creatures			
Humans are vulnerable and limited	.173	**.785***	.053
Good that humans vulnerable and limited	−.034	**.818***	−.017
More intelligent would be happier	.101	.030	.049
Theosis	**.508***	−.036	−.027
Eschatology			
Humans bring the Kingdom	**.729***	−.052	−.068
Technology will bring the Kingdom	**.741***	.009	.035
Definition of Humans			
Definition of humans: DNA	.164	−.047	**.498***
Definition of humans: Traits	.046	−.132	**.805***
Definition of humans: Image of God	−.053	.117	**.753***
Image of God: Capacities	−.068	−.069	**.505***
Image of God: Relationship	.290	.088	.076
Human mind like a machine	.288	−.322	.005
Mastery over Nature			
Nature should remain mysterious	−.101	**.430***	−.267
Not in control of my own success in life	−.043	.235	−.095
True, Authentic Self	.217	**.460***	.205

Note: **bold** and * = loading above .40.

Patterns of Theological Belief

One of the goals of this article is to introduce survey questions for evaluating Christians' relationship to nature, broadly construed. Table 1 shows the extent to which respondents agree with each of the questions. Also important for future scholars who want to build in this area are the relationships between the various survey questions. Due to the very low number of cases I can only conduct a simple exploratory analysis of which responses are related to each other. Table 2 therefore shows exploratory factor analysis scores.[8] This is an analysis that examines which variables are related to each other by grouping them into "factors." The assumption in this method is that there is an abstract idea underneath the related questions. The numbers in the table can be thought of as the extent to which the responses to that survey question are correlated with the more abstract concept that the other variables in the factor share. Consistent with others' use of factor analysis, I highlight correlations above .4.

Examination of the first column in Table 2 shows that the first factor has four variables that are fairly highly associated with it. That is, the responses to these variables are related. Specifically, people who answer that we should be co-creators with God also say we humans should create the Kingdom, that technology can be used to build the Kingdom, and also agree with theosis. That the first three of these are related is not surprising, but it is surprising that theosis is part of this group. I would name this shared factor "belief in improving the Created order."

The second column shows four variables that are related: belief that humans are vulnerable and limited; that it is good that humans are vulnerable and limited; that mystery is important: and that we have a true self. What these all seem to have in common is the idea that we should respect that which currently exists. I would name this factor "humans as creatures."

Finally, the third column groups together variables that measure definitions of the human. This reveals that respondents do not view the three definitions as mutually exclusive, but rather that respondents agree or disagree with all of them simultaneously. These three are also associated with defining the Imago as capacities, but not by defining the Image as a relationship with God and other humans. This could be because of the similarity between viewing the Imago as capacities and the traits definition of the human. While this factor analysis is only exploratory, future scholars considering developing survey questions in this area should consider whether these questions are tapping into latent theological concepts.

Associations with Approval of Human Enhancement

The central empirical question in this article is which theological debates are associated with different positions on enhancement. To analyze this structure I begin by evaluating a measure of bivariate associations called Spearman's Rho. Two variables are associated with each other if a person who selects a high score on one tends to also have a high score on another (and a person who selects a low score on one also selects a low score on another). If the association is perfect the reported value is 1. If there is no relationship at all the value is 0. For those readers interested in the impact of one theological idea controlling for levels of the others, I also report Ordinary Least Squares (OLS) regression models for the two dependent variables with all of the independent variables.[9] The best way to think of this analysis is that it shows the effect of a variable within a response category of another variable. So, to take one example, the program just looks at the women in the sample—i.e., "controlling for" gender—and calculates the effect of believing we are co-creators on enhancement. It then looks at the men. It then does the same for every level of every other variable and creates a summary effect for the co-creator variable. This is important because if women are more likely to hold a particular theological belief and

Table 3. Spearman's Rho and OLS coefficients, American Scientific Affiliation Human Enhancement Survey

	Trait enhancement		Ideological Enhancement	
	Spearman	OLS	Spearman	OLS
Demographic Variables				
Female	−.075	−.476	−.013	−.485
Older age categories	−.086	−.256$^{\#}$	−.227***	−.319**
Conservative political views	.023	.123	−.127$^{\#}$	−.068
Humans as Co−Creator				
Co-Creators with God	.204**	.172*	.331***	.220***
Humans as Creatures				
Humans are vulnerable and limited	.081	.691*	−.025	−.219
Good that humans vulnerable and limited	−.198**	−.877*	−.199**	−.592$^{\#}$
More intelligent would be happier	.207**	.482$^{\#}$	.137*	.224
Theosis	.247***	.343$^{\#}$	.213***	.321$^{\#}$
Eschatology				
Humans bring the Kingdom	.081	−.011	.249***	.081
Technology will bring the Kingdom	.176**	.138	.220***	.116
Definition of Humans				
Definition of humans: DNA	.083	−.017	.044	.052
Definition of humans: Traits	.136*	.087	.021	−.062
Definition of humans: Image of God	.078	.171	−.049	.107
Image of God: Capacities	.072	−.232	−.073	−.310
Image of God: Relationship	.083	−.025	−.001	−.090
Human mind like a machine	.105	.198	.254***	.435*
Mastery over Nature				
Nature should remain mysterious	−.114$^{\#}$	−.307	−.149*	−.302
Not in control of my own success in life	−.094	−.537*	.023	−.066
True, Authentic Self	.114$^{\#}$	.521$^{\#}$	.037	.513*

Note: $^{\#}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$ (two-tailed).

a particular conclusion about enhancement, we mistake a theology effect for what is really an effect of gender if we do not hold gender constant in the model.

The first two rows of Table 3 show that there is no effect of gender and that younger respondents are generally more supportive of both types of enhancement. For ideological enhancement, in the third row the bivariate results show that those who identify as being politically conservative are more opposed. In general, older age is the only demographic variable consistently associated with opposition to enhancement. If this is a period or cohort effect, where people are influenced by particular historical eras,

as the older people leave the debate the position of the group will become more pro-enhancement. If this is the result of age itself, then the debate will not change over time.

Turning to the theological variables, we see that the more a respondent believes that humans are co-creators with God, the more they approve of both the trait and ideological versions of enhancement. These relationships hold in the regression models. Thinking that creation is incomplete, and that we humans need to complete it, apparently makes the respondent see that enhancement is part of that completion.

Viewing humans as limited creatures is also associated with supporting enhancement. The fact claim of whether humans are vulnerable and limited is only associated with enhancement in the trait enhancement version of the regression model. In retrospect, opposite responses to this question would both be predicted to be associated with higher values of the dependent variable, so the lack of a significant result is not too surprising.

However, the normative version of the question *is* associated with both trait and ideological enhancement, for both bivariate and multivariate models. Those who think that it is *good* that humans are vulnerable and limited are less approving of either trait or ideological enhancement. Moreover, thinking that if humans were more intelligent they would be happier is also associated with approval of trait and ideological enhancement in the bivariate models, but that relationship is seriously attenuated in the multivariate OLS models. In general, belief that our vulnerable nature is good will apparently be a strong determinant of views of human enhancement among this type of mediator.

The eighth line of Table 3 shows that the respondents who believe more strongly in theosis are more supportive of both trait and ideological enhancement, and these relationships hold in the multivariate OLS models. This theological divide will apparently structure views in the future, with support for enhancement associated with the possibility of becoming more like God.

On the continuum of perspectives on eschatology within Protestantism, the view that we humans will create the Kingdom on Earth is associated with support for enhancement, in the ideological but not the trait bivariate model, suggesting that for those respondents enhancement would be one way to bring on the Kingdom. This interpretation is bolstered by the fact that the specific question about whether *technology* can bring the Kingdom is also associated with support for both types of human enhancement. However these eschatology variables are strongly attenuated in the multivariate models, suggesting that another variable, such as the co-creator measure, is the actual explanatory variable. The co-Creator idea is then more central than is eschatology in this debate.

In contrast to the myriad associations described above, and contrary to expectations, the respondent's definition of a human is generally not related

to their view of enhancement. One exception is that people who see the human as machine-like are much more approving of the ideological but not the trait version of enhancement. This may be because the machine metaphor suggests design and the ideological version of enhancement concerns designing a new human. The other exception to the general null findings is that defining a human by traits is associated with supporting trait enhancement. This is probably because the components of the trait enhancement scale all ask about traits, so people who are used to thinking of the human in terms of traits will find it easier to accept manipulating particular traits.

The third to last line in Table 3 shows that those who resist the Baconian project and do not want to fully control nature are also less supportive of human enhancement. In the bivariate analyses, this relationship was found in the "mystery" question, but not in the question that asked about control of one's own success. In retrospect, the latter question may have many interpretations inconsistent with the purpose intended for it. These variables are generally not significant when controlling for the other variables, suggesting it is the other variables that have explanatory power.

Finally, those respondents who thought that people have a true, authentic self were more likely to approve of the trait but not the ideological version of enhancement in the bivariate analyses. In the multivariate model the relationship also exists for the ideological version of enhancement. This suggests that respondents tend to think enhancement would allow the release of the true self.

Conclusions

There are a number of obvious limitations of this study. First, it is a case study of one mediating organization—albeit a group with a prominent history and potential future influence in discussions within evangelicalism. It is of course possible that studies of other such organizations could generate different results. Second, due to logistical reasons the survey was quite brief. Third, due to the nature of this group there were only 243 cases for the bivariate analyses, and 197 for the multivariate analyses. While we can be confident about the statistically significant relationships that were identified, with such a small N the lack of such a relationship may reflect either the actual absence of a relationship or the small N.

What evangelical and conservative mainline Protestant laity learn about the theology of religion and science will at least partly come through mediating organizations. The ASA members' interpretation of these theological concepts seems to largely lead to the same conclusions about human enhancement as we find among the academic theologians. Presumably exposure to an idea like humans as co-creators would lead a lay person to a similar conclusion about human enhancement as that found among ASA

members and the academic theologians. As public debate about enhancement grows, we can expect lay persons to seek out more of the theology of religion and science. A study of mediating organizations like this is an important adjunct to the study of existing public opinion.

Established survey questions reflect the concerns of the time of their creation, and given the post 1970s concern with science and the human it is time for new survey questions. A second contribution of this study was to design a set of theological belief survey questions that are particularly relevant to debates about the human body and nature more generally. This study shows that most of these questions have a good amount of variation in responses and are largely associated with the substantive issue of human enhancement. Perhaps other scholars will find they are associated with other issues. Factor analysis shows that some of the questions are related to each other, but the patterns are not strong. This suggests that they are largely measuring independent concepts.

We can anticipate a future debate within Western religion about human enhancement. The debate among theologians has begun, and there are a few studies of the views of the laity. Studies of mediating organizations such as this round out our understanding of the debate and any future influence of theology on the laity.

Notes

1. For an archive of such religious belief questions, see http://www.thearda.com/MaWizard/single.asp
2. https://network.asa3.org/page/ASAAbout
3. https://network.asa3.org/page/ASAAbout
4. The survey gave the options of Fundamentalist Protestantism; Evangelical Protestantism; Mainline Protestantism; liberal Protestantism; Catholic; Other Christian (write in); Other Non-Christian Religion (write in). Twenty-five respondents (10.3%) selected "other Christian." The "other Christians" were all Protestants who presumably thought their tradition was not represented in the given categories. Seven wrote in "non-denominational;" three Pentecostal or charismatic; three a specific Anabaptist tradition; three Reformed; three Lutheran; one Anglican; and one Presbyterian. Five were blank or uninterpretable.
5. The survey gave the following categories: Biology; Physics/Astronomy; Geology/Earth Science; Engineering; Math; Medicine; Chemistry; Other (write in). 37% selected other, so I coded these responses into both the existing categories plus the additional categories described in the text.
6. This question was taken from Jonathan Hill's National Study of Religion and Human Origins. See http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.671.5411&rep=rep1&type=pdf
7. The index has a Chronbach's alpha of .833. While the alpha would increase to .918 if the disease question was eliminated, the index with all four components is well above standards for a cohesive index.
8. More technically, I conducted a principal components analysis and a varimax rotation. Initial analysis revealed that there is not a lot of structure in the data with the Eigenvalues for extracted components being 2.07, 1.88, 1.80, 1.26, 1.18, 1.01, and down to .381 for the 16th factor. A scree test suggested a discontinuity in the series after the third, so I limited the analysis to three components. Thirty-six percent of the variance is explained in these first three factors.
9. Given that all of the variables in this analysis are ordered categorical variables, the most appropriate measure of bivariate association is the Spearman's rho, which can be interpreted like

a Pearson's correlation coefficient. Since that there are only 243 cases in the analysis, I will use $p < .10$ (2-tailed) as a threshold. Due to missing values, the regression analyses only have 197 cases, so the reader is cautioned against assuming that the lack of a statistically significant effect means that there is no effect.

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