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Interactions Between Religion and Science Education: Perspectives of the Sinai and Synapses Fellows

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Context for this Special Issue

Several years ago, at a conference for science educators, we were discussing with colleagues the interactions between science and religion, particularly when it came to the students in our science classrooms. At that time, science educators who were interested in religion really didn't speak out much at academic meetings about their interest; it just didn't seem to be of much interest to the general science education community. In fact, in response to our discussion, a respected colleague said that he really didn't care about students' religious beliefs as they were not relevant to the science he was teaching in the classroom. That exchange led to much more reflection and dialogue over the coming years about how important it really might be for science teachers to consider the religious perspectives of their students; spoiler alert …we think it is important.

Why do we think understanding students' religious backgrounds matters to science educators? Well, consider that since the rise of science as the primary method of learning about the natural world, tension has existed between science and religion. A 2014 PEW study found that 59% of Americans believed science and religion to be in conflict with each other and only 38% believed them to be compatible (Funk & Alper, 2015). Across America, particularly in the South, many Christians view science as conflicting with their religious beliefs; as such, many Christians mistrust science (Alumkal, 2017), avoid pursuing STEM careers (Ecklund & Scheitle, 2018), and lack scientific literacy (Noll, 1994). Religious skepticism of science has more recently taken on political undertones as seen in the struggle to convince much of the U.S. population to wear masks, social distance, or get vaccinated to slow the spread of COVID-19 (Bloom & Quebec Fuentes, 2020). In the rapidly changing societies of the modern world, science plays an ever-increasing role in the lives of everyday citizens. In a democratic society, for example, citizens must have a working understanding of genetic medicine, emerging diseases, species loss, and climate change if they hope to make informed choices for themselves and in the voting booth (Hoezee, 2012). Perhaps, considering how students' religious backgrounds can impact their acceptance of, or willingness to consider, science might be a critical need to achieve science literacy. In the current climate of dangerous scientific skepticism, and worse, outright science denialism, this might be more crucial than ever.

In the years that followed that conference, when we first began engaging in serious discussions about science and religion, we found there was a growing body of science education scholars who shared our interest in how religious beliefs impacted our ability to successfully teach science - and our students' ability to listen and consider accepted science content. It's been great to see our professional community begin to explore science and religion more seriously. Some of the results of such collaborations include *Evolution Education in the American South: Culture, Politics, and Resources in and around Alabama* (Lynn et al., 2017), *Making Sense of Science and Religion: Strategies for the Classroom and Beyond* (Shane et al., 2020), and perhaps a bit less 'on the nose' but worthy of inclusion we think, *Virtues as*

Integral to Science Education: Understanding the Intellectual, Moral, and Civic Value of Science and Scientific Inquiry (Melville & Kerr, 2021).

Also during those years, Ian was selected as a 2017-2019 Sinai and Synapses Fellow and Mark was selected for the subsequent fellowship from 2019-2021. In these fellowships, we have had the privilege of collaborating and learning with some of the brightest, kindest, and authentic thinkers about the intersection of science and religion - big "Thanks!" to Rabbi Geoffrey Mitelman and the Issachar Fund for these experiences! As an outgrowth of Ian's fellowship, he helped create the Down the Wormhole podcast, which explores the "strange and fascinating relationship between science and religion" - we hope you will give it a try. A result of Mark's fellowship is this issue. While COVID-19 did its best to disrupt the 2019-2021 fellowship, the fellowship served as a life raft to keep things intellectually stimulating during the pandemic. Throughout the six Sinai and Synapses meetings (five virtual) of the fellowship, Mark was able to meet 14 other fascinating individuals who explore the worlds of science and religion. As co-editor of EJRSME, he felt these fellows, along with those who came before could offer some helpful perspectives for the readers of this journal. Ian, an associate editor of EJRSME, was happy to join as co-editor of this special issue, which is composed of 10 manuscripts submitted by 13 fellows spanning all four cohorts. The authors represent science educators, clergy, chaplains, doctoral students, teachers, scientists, and other academics. In this special issue, we found several themes that were revealed across the contributions.

Understanding the Psychology Behind Religious Learners Encountering Science

Megan Cuzzolino, Ed.D. in Science Education, begins the issue with an overarching examination of the cognitive, developmental, and sociocultural influences that shape how students learn about science and religion. Jonathan Morgan, Ph.D. in Psychology of Religion, follows this with an explanation of how students bring to the classroom deeply held beliefs and concerns about scientific issues and how these beliefs can impact how they respond to science instruction. His examination into existentially motivated cognition offers some valuable advice to science instructors who teach content that can create controversy with religious students. Ashlynn Stillwell, Ph.D. in Civil Engineering, approaches the psychology behind religious learners in the context of sustainability. Her experiences teaching sustainability education to both secular and spiritual groups exposes three drivers for student learning. Isaac Alderman, Ph.D. in Biblical Studies, and Kendra Holt Moore, Ph.D. Candidate in Religious Studies, share how the idea of Terror Management Theory can inform science education when the content triggers 'death anxiety' as it conflicts with the learner's worldview.

Religious Practices Changing in Light of Scientific Findings

Another theme centering on how sometimes religious practices and/or beliefs can change in light of scientific observations. Rabbi Jonathan Crane, Ph.D. in Religion, shares an article about how 16th century (and earlier) Jewish law was adjusted in light of pandemics emerging from pigs and shows how science can inform and complement religious practices. Fast forward to 2020 and we see how Reverend Casey Bien-Aimé and Reverend Kristel Clayville, Ph.D. in Religious Ethics, adjust their chaplaincy duties in light of a modern COVID-19 pandemic but remain true to the spiritual needs of their patients. Reverend Ruth Shaver, Doctor of Ministry, describes a curriculum she helped create that is intended to expose religious communities to issues of environmental justice and environmental racism demonstrating an effort to adjust the actions and beliefs of religious people in light of scientific facts.

Adjusting Science Communication to Better Achieve Scientific Literacy

John ZuHone, Ph.D. in Astronomy and Astrophysics, shares his strategies of incorporating his religious identity with his scientific presence when communicating astronomy and astrophysics with religious communities as a way of reducing the perceived threat toward their religious beliefs. Matthew Groves, Harpeth Hall upper science and mathematics teacher, similarly describes how his choice of words and his approach to dialogue with learners rather than convert them helps him to better achieve his desired outcomes when teaching climate change science to evangelicals in settings ranging from public school classrooms to church Sunday schools. Closing the issue, Mark A. Bloom, Ian C. Binns, and Lee Meadows (each with a Ph.D. in Science Teacher Education) share strategies they have used to teach religiously and culturally sensitive science content to diverse populations - content spanning climate change, environmental racism, and human evolution.

We hope you will find each contribution as supportive of improving communication with students who hold deep religious beliefs and may be reticent to considering science content in the classroom. Below we share a brief description of each contribution to the special issue.

Rabbi Geoffrey Mitelman – What is the Sinai and Synapses Fellowship?

In a preface to the issue, Rabbi Mitelman explains the history and purpose of the Sinai and Synapses Fellowship. He also extends an invitation for applicants to the 2021-2023 Fellowship. Applications for the fellowship will be accepted through November 16, 2021.

Megan Powell Cuzzolino, Ed.D. – A Unique Way of Knowing: Children's Conceptions of the Nature of Science and its Relationship to Religion

Cuzzolino opens the issue with an overarching exploration into children's ideas about the relationship between science and religion, a largely unexplored topic in most public school classrooms despite the fact that it is a present (and often significant) feature of many students' lives outside of school. Through this review of the literature, she reveals what the extant research suggests are the cognitive, developmental, and sociocultural factors that shape how young learners develop conceptions of science and its relationship to religion and discusses the potential implications for exposing children to instruction that addresses the relationship between science and religion.

Jonathan Morgan, Ph.D. – Overlapping Magisteria: Motivated Cognition and the Places where Science and Religion Mingle

Morgan shares how scientific insights can help us better understand ourselves, others, and the world we share. Such insights can also radically challenge our sense of who we are, our place in the universe, and the very nature of the universe. He explains that when scientific theories venture into this existential terrain they quickly encounter dearly held religious beliefs. Where these two meaning-making systems overlap can often become places of friction as communicators and audiences alike are asked to balance our need for accuracy with our needs for existential security, all while humbling considering the limitations of scientific inference. His article brings together research on existentially motivated cognition and science communication in order to better understand these challenges and to offer a way to navigate this potentially fraught terrain.

Rabbi Jonathan Crane, Ph.D. – Zoonotic Pandemics and Judaism's Early-Modern Turn to Science

In this insightful piece, Crane describes how science and religion can support each other using an example from as far back as the 2nd century. He describes a vignette from the Babylonian Talmud when Rabbi Judah HaNasi connects the pestilence among pigs to similar sickness in humans. He then shares a passage from 16th century Jewish law in which another Rabbi admonishes his people to fast when there is 'pestilence among pigs' as he has evidence that when the pigs get sick so do humans. Crane points out that this shift towards empiricism, experience, and experimentation, so characteristic of the Enlightenment Period, suggests a new legitimate epistemology for shaping Jewish norms and behaviors and represents the Jewish community's acceptance of science, scientific method, and evidence as helpful, especially in regard to personal health and food.

John ZuHone, Ph.D. – Reducing Scientific Skepticism

ZuHone describes how education, public outreach, and popularization efforts in astronomy and space science can provide opportunities for scientists and religious believers to engage with each other, and ideally result in greater public confidence in science. How religious communities, when faced with difficult scientific questions with an open mind, have used the overlap of science and religions to constructively engage and resolve tensions between scientific discoveries and interpretations of the world offered by their faith perspectives. The result is that leaders of these communities, seen as important authorities within them, have been able to project a message of confidence in science, incorporation into their worldview, and a lessening of the perceived threat of science to their belief system.

Ashlynn Stillwell, Ph.D. – Sustainability for Secular and Spiritual Groups: A Framework from University and Community Education

Education around the concept of sustainability, encompassing the environment, economy, and society, presents challenges of context among diverse groups. In this contribution, Stillwell presents a framework for sustainability education based on experience with educating secular groups in a university context and educating spiritual groups in a community context. This sustainability education framework highlights three drivers for student learning: passion, experience, and uncertainty. Examples from education of secular and spiritual groups illustrate the importance of projects, challenges, and dialogue. Sustainability education can reveal common ground between science and religion.

Rev. Ruth Shaver, DMin – Wonder as an Invitation to Engage in Environmental Justice

Shaver shares a curriculum specifically developed for educating religious communities about environmental justice issues and emphasizing that environmental care is an essential part of following one's religious faith. She describes the process in developing this program for communities who typically don't have a strong science background. Her hope is that this program will help participants become involved in environmental justice.

Isaac Alderman, Ph.D. and Kendra Holt Moore – Terror Management and Religious Literacy in the Classroom

Over the past decade, Terror Management Theory (TMT) has been widely studied for its role in conflict management and in shaping the behavior of target populations, including in the classroom. Emerging from research on the importance of self-esteem, TMT submits that much of our behavior is driven by death anxiety and its effects are particularly evident when one's "worldview" is threatened by another, incompatible "worldview." When a student is threatened by learning about a topic that is incompatible with their worldview, their response is more contingent upon their sources of self-esteem and meaning than upon the reception of straightforward information on the topic itself. Their religious identities provide yet another layer of framing for self-esteem and belonging that may or may not interfere with their learning. In this article, Alderman and Holt Moore urge educators to recognize the importance of religious literacy when incorporating the insights of TMT into their pedagogical strategies when teaching topics that may be incompatible with the worldview of many of their students.

Matthew Groves – Communicating with Skeptical Audiences

Groves draws upon his many years of communicating the science of climate change with skeptical audiences in schools, churches, media, and professional conferences and shares the lessons he has learned. His insights into effective communication with climate change deniers are critically important to science teaching in the age of the Anthropocene, especially in light of the current war on science and the politicization of scientific issues so prevalent in the U.S.

Rev. Casey Bien-Aimé and Rev. Kristel Clayville, Ph.D. – Called to Care, Trusted to Teach: The Role of Hospital Chaplain in Educating Patients, Families, and Medical Staff during a Pandemic

Bien-Aimé and Clayville discuss how they advocate for patients, give voice to the voiceless, and facilitate communication between medical providers, patients, and families while navigating challenging situations. They explain how, with care and sensitivity, they translate the technical, esoteric, and oftentimes frightening language of medical providers so that it is understandable by those receiving care. They address how the rapidly changing COVID-19 pandemic, and shifting recommendations, made already difficult tasks even more challenging.

Mark A. Bloom, Ph.D., Ian C. Binns, Ph.D., & Lee Meadows, Ph.D. – Communicating Religiously and Culturally Sensitive Science Content

Bloom, Binns, and Meadows describe distinct experiences teaching content that historically causes discomfort among conservative Christian students in formal and informal settings. Bloom shares his experiences teaching climate change science among conservative evangelicals at a private Christian university in Texas. Binns describes his experiences communicating a wide variety of sensitive topics on a public platform. Finally, Meadows shares his experiences using a hands-on approach to teaching human evolution in Alabama.

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