"Putting God Under the Microscope"
Can There Be a Science of Spirituality?

Eric Kyle

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Introduction

This paper fundamentally seeks to explore the role and relationship of scientific ways of knowing and their accompanying research methods for the field of spirituality in the hopes of gaining greater insights into the nature of the interrelationship between science and religion. In pursuit of such aims, one can ask questions of the following: What are some of the diverse ways of knowing? What are scientific ways of knowing and how do they fit into this broader epistemological landscape? Can there really be a "science" of spirituality? If so, what are its potential contributions? What are the implications for current science and religion dialogues? It is such questions that this essay will be seeking answers to as it engages with literature from some of these various areas. By the end of these explorations, not only will I assert that there can and should be a science of spirituality, but that such endeavors have significant implications for the science and religion dialogue.

In pursuit of these claims, this paper will unfold in the following way. First, I will begin by reviewing some of the diverse and multiple epistemological ways of attaining knowledge and knowing reality. It will be an attempt to briefly sketch a broad epistemological landscape in which scientific ways of knowing might be located. Next, I will provide an overview of scientific ways of knowing and the limited claims that they can make based upon their unique methodologies and purposes. Following this, I will explore some of the possible implications and applications of scientific ways of knowing for the research field of spirituality. This section will explore whether these ways of knowing can be applied towards spirituality and how. Finally, in light of all of these epistemological explorations, I will reflect on some of the potential implications for both science and religion

as well as their mutual interactions. The overall goal of this paper is to explore what some of these implications are for science and religion in our world today.

Multiple Ways of Knowing

Before we can begin to explore what contributions scientific methodologies might have for the field of spirituality, I believe that it is first necessary to have a broad understanding of some of the primary ways of knowing of which scientific knowledge is only one part. In fact, as we shall find in the next two sections, scientific knowing affords us only a very narrow and limited access for our knowledge about the fields of spirituality and religion, and we must therefore draw from these other more diverse ways of knowing in order to gain a fuller and more robust understanding of the nature and dynamics of spirituality. In this section, I shall therefore offer a very brief overview of these other and broader primary ways of knowing. First, I will pursue the question of whether there are diverse ways of knowing besides the claims that science makes. Then, I will review some of these diverse ways of knowing, including internal, external, and specialized ways. Finally, I will offer a brief summary of this section and its implications for religion and spirituality as a transition to scientific ways of knowing.

Are There Diverse Ways of Knowing?

In a word…Yes. In fact, the idea that there are broader and more diverse ways of knowing, than what scientific and research methodologies can offer, is widely recognized. Reflecting on constructivism views, which "assumes that truth and knowledge and the ways in which it is perceived by human beings and human communities is, to a greater or lesser extent, constructed by individuals and communities,"[1] Practical Theologians John Swinton

[1] John Swinton, & Harriet Mowat, *Practical Theology and Qualitative Research* (London: SCM Press, 2006), 35.

and Harriet Mowat assert "that our ability to understand and define what reality is is always filtered through a process of interpretation and construction that is influenced by a number of social, cultural, spiritual, and interpersonal factors."[2] It is the basic assertion that what we know is influenced by a number of factors and on a number of levels. In other words, our sources of knowledge about our world are quite diverse and wide ranging.

Swinton and Mowat are not alone in making such assertions as many other philosophers, educators, and psychologists have recognized multiple forms and sources of knowledge such as tradition, culture, logic and reason, perceptual, scientific, moral, political, religious, cognitive, aesthetic, and many other epistemological bases.[3] Each of these modes of knowing, it is asserted, can either be foundational, or derived from these foundations, and they are intended to help us to open up our internal and external worlds in new and profound ways, with many of them emerging from our evolutionary efforts to solve problems and to survive.[4] These multiple ways of knowing are therefore avenues through which we come a greater understanding and knowledge about our internal and external worlds.

With this said, we can then ask what are these other ways of knowing and what kinds of information do they offer? Surveying some of the literature on this topic, I find there to be at least three broad categories of knowing, each of which may be further sub-divided:

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[2] Swinton & Mowat, 36.

[3] For instance, see: Elliot Eisner, "Aesthetic Modes of Knowing," in *Learning and Teaching the Ways of Knowing: Eighty-fourth Yearbook of the National Society For The Study Of Education*, ed., Elliot Eisner, 23-36 (Chicago: The University of Chicago Press, 1985), 32. Howard E. Gardner, *Frames Of Mind: The Theory Of Multiple Intelligences* (New York: Basic Books, 1983). Paul K. Moser, Dwayne H. Mulder, & J. D. Trout. *The Theory of Knowledge: A Thematic Introduction* (New York: Oxford University Press, 1998), 4-5, 24, 41-2, 52, 60, 77. Nel Noddings, "Formal Modes of Knowing," in *Learning and Teaching the Ways of Knowing: Eighty-fourth Yearbook of the National Society For The Study Of Education*, ed., Elliot Eisner, 116-132 (Chicago: The University of Chicago Press, 1985), 117.

[4] Gardner, 60-1. Moser et al., 86. Dwayne E. Huebner, "Spirituality and Knowing," in *Learning and Teaching the Ways of Knowing: Eighty-fourth Yearbook of the National Society For The Study Of Education*, ed., Elliot Eisner, 159-173 (Chicago: The University of Chicago Press, 1985), 170-2.

Internal, External, and Specialized Ways of Knowing. I shall now discuss each of these in turn. The primary purpose of these explorations is not a definitive categorical framework, but rather to offer enough of an overview to gain a better understanding of some of the metaphorical hills and valleys of the epistemological landscape in which scientific ways of knowing are located.

Internal Ways of Knowing

The first broad category is related to sources of knowledge that have their primary origins *Internally* to each person. In this category, I find there to be at least two sub-categories: Organizational sources and Inner Knowing sources. Organizational sources of knowing, for me, include knowledge that has its origins in such processes as the use of reason and logic, creating and organizing coherent systems, and the learning and use of practical and procedural skills. Each of these is centered on the task of taking data and organizing it in specific and more systematic ways.

Reason and logic have long histories of usage in the western world as being primary and valid sources of knowledge.[5] With two primary types of reasoning being highlighted, that of inductive and deductive reasoning, the primary aim of these modes of knowing are to identify logical, explanatory relationships and order among objects and sets of data.[6] Creating and organizing coherent systems is also another organizational source of knowledge. Here, an emphasis is given to the coherent relationships among information, such as one's personal beliefs for example, as well as to the unification of seemingly diverse

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[5] Moser et al., 101, 129. Cynthia Bourgeault, *The Wisdom Way of Knowing: Reclaiming An Ancient Tradition to Awaken the Heart* (San Francisco: Jossey-Bass, 2003), 28. Jerome Bruner, "Narrative and Paradigmatic Modes of Thought," in *Learning and Teaching the Ways of Knowing: Eighty-fourth Yearbook of the National Society For The Study Of Education*, ed., Elliot Eisner, 97-115 (Chicago: The University of Chicago Press, 1985), 97-8.

[6] Bruner, 97-8. Gardner, 129. Moser et al., 78, 103, 129, 173. Margaret W. Matlin, *Cognition, 6th Edition* (Hoboken, NJ: John Wiley & Sons, Inc., 2005), 403.

and fragmented parts.[7] It also includes semantic memory and cognitive schemas, both of which are organized representations of the world that inform our actions and guide our decisions.[8]

A final Organizational source of knowledge includes practical and procedural skills as ways of knowing. These ways of knowing are related to those that stem from the procedural knowledge and skills that we use in our everyday lives.[9] They are primarily related to our knowing how to carry out a task in an organized, step-by-step fashion, as well as our "body-kinesthetic" intelligences and abilities.[10] These internal, organizational–centered sources are therefore focused on knowing that is derived from our attempts to internally organize data and knowledge in more coherent and systematic ways.

A second set of internal bases for knowledge are what I term, "Inner Knowing" sources. These appear to primarily emerge from processes or abilities that are more naturally inherent, and I find there to be at least three of them: Innate-Intuitional, Consciousness-based, and Wisdom-Transpersonal sources. Innate-Intuitional sources refer to those forms of knowing that seem to already exist within us in an "a priori," innate, or instinctive fashion; i.e., they are somehow already there within us, we just "know."[11] They also refer to those sources that are intuitional in nature, such as common sense or our own intuitive feelings and hunches for what is right and wrong, for what to do, and how to be.[12]

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[7] Eisner, 28. Moser et al., 69, 82, 115, 118, 133.

[8] Matlin, 129, 246.

[9] Robert J. Sternberg & David R. Caruso, "Practical Modes of Knowing," in *Learning and Teaching the Ways of Knowing: Eighty-fourth Yearbook of the National Society For The Study Of Education*, ed., Elliot Eisner, 133-158 (Chicago: The University of Chicago Press, 1985), 134, 136.

[10] Garner, 206. Matlin, 129. Sternberg & Caruso, 143. William Braud, "Integral Inquiry: Complementary Ways of Knowing, Being, and Expression," *Transpersonal Research Methods for the Social Sciences: Honoring Human Experience,* Eds., William Braud & Rosemarie Anderson, 35-68 (Thousand Oaks, CA: Sage Publications, 1998), 49.

[11] Bourgeault, 28. Moser et al., 17, 104-5.

[12] Bourgeault, 34-5. Moser et al., 21-2, 111, 157, 167, 178. Rudolf Arnheim, "The Double-edged Mind: Intuition and the Intellect," in *Learning and Teaching the Ways of Knowing: Eighty-fourth Yearbook of the*

Consciousness-based sources of inner knowing are those that are directly related to the functions of our consciously aware mind.[13] More specifically, they refer to our abilities to know our current internal selves – our "in-the-moment" emotions and affects, perceptions, beliefs, cognitive processes, our sense of "self," et cetera. They also include our experiences of the past via our memory functions.[14] These ways of knowing are therefore those that come from our direct, conscious awareness.

Finally, Wisdom-Transpersonal ways of inner knowing are related to those that seek a deeper insight to and relationship with that which one is interacting with.[15] I categorize this as an Internal source of knowing because these ways are primarily oriented towards identifying a deeper inner experience whereby one has the experience of becoming one with that which one is observing, studying, or contemplating in ways beyond ordinary perceptual senses.[16] Wisdom-Transpersonal ways of knowing are therefore a "whole-being" experience that emerges within an individual. These many different Internal sources are therefore those that are primarily derived from what have been considered to be more internal processes and abilities and are considered by some to be valid and recognizable ways of knowing reality.

External Ways of Knowing

A second broad category of sources of knowledge are those that primarily have their origin *Externally* to an individual. There are at least three sub-divisions of these ways of knowing that I find: Empirical, Interpersonal, and Authoritative sources. Empirical sources of external knowing are primarily related to those sources that find their basis in sense

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National Society For The Study Of Education, ed., Elliot Eisner, 77-96 (Chicago: The University of Chicago Press, 1985), 77, 81-2. Daniel J. Siegel, *The Mindful Brain: Reflection and Attunement in the Cultivation of Well-Being* (New York: W. W. Norton & Company, 2007), 122.

[13] Matlin, 69, 90.

[14] Gardner, 239, 242, 276. Matlin, 99-100, 129, 173, 190. Moser et al., 112, 139. Siegel, 122-3, 208.

[15] Bourgeault, 88. Braud, 47. Huebner, 163-4.

experience.[17] Like some of the organized sources of knowing, these ways have a long acknowledged history in the west and are considered to be a primary and fundamental means of knowing, particularly in scientific endeavors, as we shall see more below.[18] As epistemological philosophers Paul Moser, Dwayne Mulder, & J. D. Trout claim, "there must be some appropriate correspondence between true statements and actual features of the world."[19] These sources of knowledge, for me, would also include the spatial and naturalistic intelligences of Howard Gardner's Multiple Intelligences theory, both of which find their grounding in empirical, sensory reality.[20] These empirical sources of knowledge are therefore rooted in sensory-based experiences.

Interpersonal sources of external knowing are primarily oriented towards the relationships one has and our attunement with them. Being couched as a "relational sense" or a social intelligence, this mode of knowing stems directly from one's relationships with others.[21] It includes our coming to know the emotions, moods, perceptions, et cetera of others just as we do with ourselves internally.[22] In its purer forms, this mode of knowing comes from a sort of "attunement" that we can develop with others wherein we internally experience something of their internal experiences.[23] This source of knowledge therefore not

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[16] Bourgeault, 5, 10, 27, 88. Braud, 51, 53, 64, 173. Dean Radin, *The Conscious Universe: The Scientific Truth Of Psychic Phenomena* (New York: Harper Edge, 1997), 2, 14, 158, 290.

[17] Matlin, 33. Moser et al., 103. Siegel, 122.

[18] Moser, et al., 65, 101.

[19] Moser, et al., 65, 108.

[20] Gardner, 173, 176. Matlin, 208. "Theory Of Multiple Intelligences," http://en.wikipedia.org/wiki/Theory_of_multiple_intelligences [Date Accessed: 13 November 2009].

[21] Gardner, 276. Siegel, 123. Ellen Berscheid, "Interpersonal Modes of Knowing," in *Learning and Teaching the Ways of Knowing: Eighty-fourth Yearbook of the National Society For The Study Of Education*, ed., Elliot Eisner, 60-76 (Chicago: The University of Chicago Press, 1985), 60, 67.

[22] Gardner, 239, 262-3.

[23] Siegel, 123.

only enables us to empathize with others, it also helps to guide our actions in light of our knowledge of them.[24] It therefore comprises a second external way of knowing.

A final external way of knowing are those related to authoritative sources. "Sometimes we must rely on others if we are to be epistemically responsible," assert Moser, Mulder, & Trout, and the authoritative sources we turn to "can take a number of forms: technical expertise based on arcane theoretical information (for example, expertise in physics), practical expertise (for example, in plumbing or farming), and normal perceptual skills."[25] They can also come from any number of other sources, such as: "scientific or religious authorities, scholars, political and military leaders."[26] From these external authoritative sources, people find a basis for what they believe and hold to be true. They therefore constitute yet another important source of knowledge. These diverse external ways of knowing therefore comprise a second major set of ways by which we can know more about reality.

Specialized Ways of Knowing

A third and final broad category of knowing are those that are related to *Specialized* areas, intelligences, or abilities. In the literature, there were at least four examples of these specialized ways of knowing. One example is that of narrative knowing, which is a form of knowing that is "context-sensitive," story-based, imaginative, embracing contradictions, and is viewed by some to be just as valid and important as the Organizational ways of knowing described above.[27] Another and closely related specialized form of knowing is linguistic intelligence. Holding a central place in Gardner's theory, as well as in other theories of

[24] Berscheid, 67. Gardner, 262-3.
[25] Moser et al., 117.
[26] Moser et al., 4-5.
[27] Bruner, 97-8, 99, 104, 112-3.

cognition, these forms of knowing are primarily oriented towards the use of language and its nuances, complexities, and abilities to explain and better know things.[28] Yet another example of these specific sources are musical intelligences, which are also a part of Gardner's theory, and are focused on knowing that derives from sounds, tones, rhythms, and harmonies.[29] These musical sources can guide and inform what we understand about the world and how we know it in certain ways. A final example of these specialized forms of knowing is aesthetic forms. These forms are related to knowledge that is gained by noticing and experiencing aesthetic qualities in the world around us, which then bring us a greater sense of meaning.[30] While these specific sources of knowledge may or may not utilize the other forms of knowing discussed above, I highlight them to note that there can be additional ways of knowing that are specialized in specific areas of our lived experiences.

Summary

These Internal, External, and Specialized ways of knowing, and their sub-categories, comprise many of the very diverse sources of knowledge that the literature asserts we have access to as human beings. Each one of them has the potential to offer us greater insights into the world in which we live. We must therefore draw upon each of these as we seek to know reality in ever deepening ways. Again the purpose of this section was to offer a brief overview of the landscape of some the broader ways of knowing so that we might better understand the location and nature of the scientific ways to which we now turn.

Scientific Ways of Knowing

The Internal and External ways of knowing form sort of a foundational or primary basis upon which some of the Specialized and other more secondary forms of knowing are

[28] Gardner, 76, 78. Matlin, Chs. 9 & 10.
[29] Gardner, 104-5.

built. As we shall see in more detail below, knowledge that is derived from scientific methods do not fall neatly into any single one of the primary categories of knowing outlined above. Rather, as a secondary form of knowing, it draws from a number of them, but with a specific purpose and set of constraints in doing so. In this section, I will offer a brief overview of scientific ways of knowing. First, I will discuss the primary purposes and aims of scientific endeavors as found in some of the literature. Then, I will review some of the scientific views of creation as well as some of the sources and methods from which its knowledge is derived. Next, I will explore some of the limitations that accompany this specific way of knowing. Finally, I will reflect on the possible implications and limits of this way of knowing for the field of spirituality. Overall, the aim of this section is to provide us with a more detailed understanding of these science-based ways of knowing so that when we turn to the field of spirituality, we will be in a better position to gauge whether or not there can be a science of spirituality and what this endeavor might look like.

Some Primary Aims of Scientific Endeavors

One of the primary purposes of scientific endeavors is to develop theories and models about our world, its laws, and the ways that it works. With there being many different kinds of models, their aim is to provide us with a better understanding into the nature of reality. The notion that science's chief purpose is to produce models about how creation works, is widely accepted. "All sciences," asserts philosopher and educator George F. Kneller, "use concrete models."[31] Some, such as world-renowned physicists Stephen Hawking, even go so far as to assert that the only way to understand the universe is through

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[30] Eisner, 28-30.

[31] George F. Kneller, "A Method of Enquiry," in *Science and Its Ways of Knowing*, Eds., John Hatton & Paul B. Plouffe, 11-25 (Upper Saddle River, N.J.: Prentice Hall, 1997), 14.

the use of such models.[32] However, it is noted, we must remember that these theories are not reality; they are instead our attempted constructions of reality; an "interpretative description of a phenomenon that facilitates access to that phenomenon."[33] Nevertheless, it is hoped that these models will provide us with a better epistemological basis that enables us to predict and control the situations that they are derived from and applied to.[34] For instance, the uncovering of "laws" has been and continues to be given a central emphasis in scientific endeavors.[35] The laws that some scientists pursue are intended to be logical, universal, and true.[36] These laws, like all models and theories, must therefore meet certain "scientific criteria" in order to be accepted by the wider scientific community. Some of these criteria include: consistency, unification of data, predictive validity, falsifiability, and causal explanations of phenomena.[37] Science, then, is understood as having a primary aim of

[32] Stephen Hawking, "My Position," in *Science and Its Ways of Knowing*, Eds., John Hatton & Paul B. Plouffe, 63-67 (Upper Saddle River, N.J.: Prentice Hall, 1997), 66-7.

[33] Daniela M. Bailer-Jones, "Models, Metaphors, and Analogies," in *The Blackwell Guide To The Philosophy Of Science*, Eds., Peter Machamer & Michael Silberstein, 108-127 (Malden, MA: Blackwell Publishers, 2002), 108, 124. John Hatton & Paul B. Plouffe, Eds., *Science and Its Ways of Knowing* (Upper Saddle River, N.J.: Prentice Hall, 1997), 59. Charles M. Wynn, "Does Theory Ever Become Fact?," in *Learning and Teaching the Ways of Knowing: Eighty-fourth Yearbook of the National Society For The Study Of Education*, Ed., Elliot Eisner, 60-63 (Chicago: The University of Chicago Press, 1985), 62.

[34] Hatton & Plouffe, vii-viii. Carl F. Craver, "Structures of Scientific Theories," in *The Blackwell Guide To The Philosophy Of Science*, Eds., Peter Machamer & Michael Silberstein, 55-79 (Malden, MA: Blackwell Publishers, 2002), 65.

[35] Craver, 66. Peter Machamer, "A Brief Historical Introduction to the Philosophy of Science," in *The Blackwell Guide To The Philosophy Of Science*, Eds., Peter Machamer & Michael Silberstein, 1-17 (Malden, MA: Blackwell Publishers, 2002), 4.

[36] Craver, 56. Swinton and Mowat, 40-1.

[37] Hatton & Plouffe, vii-viii. Kneller, 18. Henry H. Bauer, "The So-called Scientific Method," in *Science and Its Ways of Knowing*, Eds., John Hatton & Paul B. Plouffe, 25-37 (Upper Saddle River, N.J.: Prentice Hall, 1997), 26. Karl Popper, "Science: Conjectures and Refutations," in *Science and Its Ways of Knowing*, Eds., John Hatton & Paul B. Plouffe, 81-86 (Upper Saddle River, N.J.: Prentice Hall, 1997), 84. Jim Woodward, "Explanation," in *The Blackwell Guide To The Philosophy Of Science*, Eds., Peter Machamer & Michael Silberstein, 37-54 (Malden, MA: Blackwell Publishers, 2002), 50. John Worrall, "Philosophy of Science: Classic Debates, Standard Problems, Future Prospects," in *The Blackwell Guide To The Philosophy Of Science*, Eds., Peter Machamer & Michael Silberstein, 18-36 (Malden, MA: Blackwell Publishers, 2002), 20, 22.

creating and testing these theories, models, and laws that give us "an increasingly coherent picture of the universe."[38]

Scientific Views, Sources, & Methods

Because of these aims, and the criteria by which models are developed and accepted, we can see that science's views of creation are very specific and its methods very precise. Scientific views of creation are captured succinctly by famed astronomer Karl Sagan when he wrote, "It is an astonishing fact that there are laws of nature, rules that summarize conveniently – not just qualitatively but quantitatively – how the world works…so far as we can tell, this is the way the universe is constructed."[39] While spontaneity and novelty are recognized by some,[40] the basic view of creation by many scientists is that it exhibits enduring patterns, regularity, and order. It is therefore the goal of science to capture these regularities and order in creation with its theories and verify them via its rigorous scientific methods.[41]

The primary view of creation from the perspective of science, then, is that creation exhibits enduring regularities, patterns, and order that can be uncovered and verified by the scientific methodologies. Restated differently to help summarize the purpose of scientific endeavors, we can assert: *Science is primarily interested in those dynamics and phenomena in creation that exhibit enduring regularity, order, and structure*. Stating it in this way will be important when we reflect on the role of science's ways of knowing for the field of spirituality below.

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[38] Hatton & Plouffe, vii, viii, x, xi. Worrall, 32. John W. Best & James V. Kahn. *Research in Education, 8th Edition* (Boston: Allyn and Bacon, 1998), 6.

[39] Carl Sagan, "Can We Know the Universe? Reflections on a Grain of Salt," in *Science and Its Ways of Knowing*, Eds., John Hatton & Paul B. Plouffe, 3-7 (Upper Saddle River, N.J.: Prentice Hall, 1997), 6-7.

[40] Hatton & Plouffe, 107.

With this aim in place, we can then ask the questions: What is the nature of scientific methodologies? and, What are the primary sources of science? Scientific methodologies seek to be rigorous and precise in their pursuit of model building and theory verification. Science-based models and hypotheses are constructed based upon such factors as the data one has, the assumptions one makes, and the analogies one draws upon, and these are expected to change over time and with the application of its rigorous methods as our scientific understanding of creation evolves.[42] In effect, the essence of scientific methodology entails theory development, or: discovery, and testing, or validation of theories and models.[43] While in actuality scientific methodologies are much more complex than this, also involving theory consolidations, extensions, reformulations, and the like,[44] the goal of these methods is to collectively and empirically verify a theory's predictive abilities and to ensure, as one scientist puts it, that "Nature hasn't misled you into thinking you know something you don't actually know."[45] Scientific methods, therefore, are intended to support the aims of science in very specific and rigorous ways.

The primary sources that science draws upon in pursuit of these methodologies, as mentioned in the introduction of this section, are very diverse, using many of the primary ways of knowing discussed in the previous section. In light of the multiple ways outlined above, the literature highlights two External and three Internal ways of knowing as being foundational for scientific endeavors. Externally, science relies heavily on empirical data,

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[41] Craver, 55. Sagan, 3, 5. Wynn, 61. G. W. Allport, *Personality: A Psychological Interpretation* (New York: Holt, 1937), 3. Mahlon Hoagland, "Preface from *Toward the Habit of Truth*," in *Science and Its Ways of Knowing*, Eds., John Hatton & Paul B. Plouffe, 118-124 (Upper Saddle River, N.J.: Prentice Hall, 1997), 119.

[42] Bailer-Jones, 108, 110, 114, 118-9. Bauer, 35. Worrall, 18-9, 21, 30. Wynn, 61.

[43] Kneller, 13, 24. Robert Pirsig, "On Scientific Method," in *Science and Its Ways of Knowing*, Eds., John Hatton & Paul B. Plouffe, 7-11 (Upper Saddle River, N.J.: Prentice Hall, 1997), 9.

[44] Hatton & Plouffe, 1. Kneller, 12, 13-4.

[45] Hoagland, 119. Pirsig, 9.

observations, and experimentation.[46] The primary goal of these sources of knowing is to test and verify the theories and hypotheses one has through the acquisition of data that is "objective, reliable and precise."[47] Such criteria therefore imply the necessity of a community who can verify such empirical observations, and the theoretical claims that are derived from them, and this is the second external way of knowing that science primarily draws upon; i.e., communal consensus.[48] One can develop and test a plausible model, but if the scientific community does not accept or even acknowledge it, its impact is likely to be small if not non-existent.

Internally, scientists are expected to apply organizational, innate-intuitional, and even wisdom-transpersonal ways of knowing in their research pursuits. Scientists, it is asserted, must use the means and benefits of logic, in both its inductive and deductive forms, to help guide their theoretical explorations and verifications.[49] These ways of knowing are also intended to aid the researcher in their abilities to see organization in the phenomena they are exploring, to extract the inherent regularities and patterns, and to see connections among diverse sets of data.[50] In addition to this, however, intuition is also highlighted as being crucial for any scientific endeavor.[51] It is necessary because of the ultimate mystery of creation, as asserted by some, and because it can help one to penetrate the phenomena under study more deeply.[52] It has even been asserted, by some, that scientific ways of knowing may also draw upon wisdom-transpersonal ways of knowing wherein the researcher

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[46] Hatton & Plouffe, vii. Sagan, 3-4. Wynn, 61.
[47] Kneller, 16, 19, 21-3. Woodward, 43.
[48] Hatton & Plouffe, viii. Kneller, 16.
[49] Kneller, 20. Pirsig, 8. Woodward, 37.
[50] Woodward, 44, 47.
[51] Hatton & Plouffe, x.
[52] Max Wertheimer, "Einstein: The Thinking That Led to the Theory of Relativity," in *Learning and Teaching the Ways of Knowing: Eighty-fourth Yearbook of the National Society For The Study Of Education*, Ed., Elliot Eisner, 93-105 (Chicago: The University of Chicago Press, 1985), 94.

becomes more at one, more intimately connected, with her or his research.[53] However, it is noted, regardless of the Internal sources from which a researcher's claims come, they must still stand up to the External empirical criteria by which a community of researchers holds as the scientific standard: it must be empirically "falsifiable [it can be verified or falsified in some way], replicatable, and generalizable."[54] In short, because of its core focus on uncovering externally observable enduring regularities in creation, scientific methodologies give a primary emphasis to empirical and communally verifiable ways of knowing from the epistemological landscape I sketched above.

Some Limitations of Scientific Knowledge

It is precisely because of this that the kinds of knowledge that scientific methodologies generate are inherently limited, as are, therefore, their resulting models and theories. In the literature, I find there to be at least three categories of limitations that are highlighted. The first category is related to the kinds of knowledge that scientific methods can generate. As noted, science's primary aim is to generate models and theories about the enduring and regular nature of reality. As such, these theories are widely recognized as being mere approximations, or our interpretations, of the "real" world.[55] As a whole, creation is recognized as being much more irregular and "quirky" than scientific models sometimes lead us to believe.[56] The first category of limitations therefore asserts that the primary focus and methods of science on enduring regularities is an inherent limitation and therefore does not capture either the absolute true nature of reality, or its dynamics in

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[53] Sagan, 4. Evelyn Fox Keller, "A Feeling for the Organism," in *Science and Its Ways of Knowing*, Eds., John Hatton & Paul B. Plouffe, 136-143 (Upper Saddle River, N.J.: Prentice Hall, 1997), 137.

[54] Hoagland, 119. Machamer, 3. Swinton and Mowat, 40-1.

[55] Hatton & Plouffe, 2, 59. Kneller, 14. Sagan, 5.

[56] Machamer, 4-5. James Bogen, "Experiment and Observation," in *The Blackwell Guide To The Philosophy Of Science*, Eds., Peter Machamer & Michael Silberstein, 128-148 (Malden, MA: Blackwell Publishers, 2002), 128.

complete fullness. In other words, scientific theories only offer a narrow, and very approximated, view of creation and its happenings.

A second category of limitations has to do with the perceptual distortions that scientists inherently bring to their research as human beings. Since science is primarily based on empirical data, it is asserted that how we perceive that data greatly influences the inferences that we make about it.[57] "Our perceptions," Sagan writes, "may be distorted by training and prejudice or merely because of the limitations of our sense organs, which of course, perceive directly but a small fraction of the phenomena of the world."[58] The nature of who we are and what we have experienced in the past therefore influences the observations that we make and the conclusions that we draw.[59] Perceptual distortions are therefore a second category of limitations associated with scientific ways of knowing.

A third category of limitations, one that is closely related to the second, are the communal dynamics that influence which theories are accepted and which are ignored, if not rejected altogether. It is recognized that there have been many instances throughout history when a model was set forth and subsequently rejected by the community of researchers for many years, if not generations.[60] Sometimes this happens because of differences in views of methodologies, and sometimes based on ideologies and politics.[61] Regardless of the specific reasons, it is claimed, each occurrence is further evidence that the processes by which scientific theories are communally accepted "is always significantly influenced in a variety of ways by a variety of social, political, and cultural factors."[62] Hence, another limitation of

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[57] Hatton & Plouffe, 1-2, 59.
[58] Sagan, 3.
[59] Bauer, 36. Bogen, 132-5. Popper, 83. Abraham Maslow, *Motivation And Personality, 2nd Edition* (New York: Harper & Row, 1970), 1.
[60] Bauer, 29.
[61] Maslow, 11.
[62] Bogen, 136.

scientific ways of knowing are the processes by which particular theories are accepted, rejected, or ignored.

Summary

Given these limitations, however, scientific ways of knowing still have, I assert, implications for the field of spirituality. To recap, *scientific ways of knowing are primarily focused upon theoretically modeling enduring regularities, structures, and order in creation that are accessible by communally agreed upon and empirically-based research methodologies*. While they may also draw upon many of the other diverse primary ways of knowing outlined above, their primary emphasis is on constructing and verifying theories about these enduring regularities that are "falsifiable, replicatable, and generalizable" via current empirically-based and communally accepted research methodologies.

In light of this, we can then ask the question of whether or not these ways of knowing might have a contribution to the field of spirituality. If they do, as noted above, their contribution will be a limited one from the outset. Nevertheless, such methodologies might help this field. The question seems to hinge on the nature of spirituality and whether or not there are any enduring regularities that may be subjected to empirical observations via specific and currently accepted research methods. If there are, then the scientific way of knowing can contribute much to our understandings about spirituality. If not, then our explorations should end here. It is therefore in the next section that I will explore whether there can really be a "Science of Spirituality" or not, and what the nature of such research might be.

The Nature of Scientific Research into Spirituality

Given the various and diverse primary ways of knowing, and science's contributions to knowledge/truth via its specific assumptions and methodologies, we can ask: Can we actually study spirituality-based fields via scientific and research methodologies? If so, what is the nature of such research and by what methods is it to be carried out? This section will pursue answers to these questions by turning to the fields of Spirituality and Spiritual Care & Counseling research for help and guidance.

Research in these areas is primarily challenged by the assertion that defining the term "spiritual" is no easy task.[63] It has been asserted by one spiritual care researcher, Thomas O'Connor, after reviewing more than 2,300 articles on spirituality in his field, that there is, as yet, no consensus as to what this term means.[64] Others, such as Joann Wolski Conn and Sandra Schneiders, alternatively assert that virtually all definitions of spirituality have "self-transcendence" as the core of their understanding.[65] Regardless of one's views, however, the first challenge to this field of research is to develop clear, unambiguous working definitions and by avoiding those that assert spirituality to be "very complicated, seemingly ineffable, ephemeral, inscrutable, invisible, diffusely interwoven into all human beings and their behavior, and so transcendent that we cannot observe it directly with the human senses upon

[63] Eugene C. Roehlkepartain, "Exploring Scientific and Theological Perspectives on Children's Spirituality," In *Children's Spirituality: Chrstian Perspectives, Research, and Applications*, Ed., Donald Ratcliff, 120-132 (Eugene, OR: Cascade Books, 2004), 121, 128.

[64] Thomas St. James O'Connor, "Research Methods in Spirituality and Health Care," In *Spiritual Care and Therapy: Integrative Perspectives*, Ed., Peter L. VanKatwyk, 141-151 (Waterloo, Ontario, Canada: Wilfrid Laurier University Press, 2003), 151.

[65] Joann Wolski Conn, "Toward Spiritual Maturity," in *Exploring Christian Spirituality*, Ed. Kenneth J. Collins, 355-378 (Grand Rapids, MI: Baker Books, 2000), 356-7. Sandra M. Schneiders, "Theology and Spirituality: Strangers, Rivals, or Partners?," *Horizons* 13, no. 2 (1986): 253-274. See also: Roehlkepartain, 122.

which all sciences rely."[66] In other words, regardless of whether one holds that definitions of spirituality are diverse or succinct, in order to conduct research in this area, one must have a clear and concise definition of what they specifically mean by the term "spiritual."

Achieving this task is particularly challenging for theistically-oriented communities and researchers (such as myself) that define spirituality as a relationship with the divine, and very much depends upon their understanding of and theology about God. In an article on the relation between spirituality and science, Theologian Robert John Russell discusses the relationship between the "laws of nature," which are the subject of science, and divine intervention, which is the subject of theology.[67] Russell wrestles with the core question of whether or not "God's action [can] be consistent with, and not a violation of, science?"[68] While there are theologies that assert God's external, dualistic action on creation, for which there cannot be consistency with science, there are also other "non-interventionist" theologies that assert that "God acts without suspending or violating the scientific laws of nature."[69] In other words, God is viewed as acting through both the enduring laws of nature as well as through novel chance and creativity.[70] This is relevant for our discussion because it suggests that even if one defines the term "spirituality" in theistic ways, they may still be able to do so in ways that are amenable to scientific methodologies if it is defined in a way that is understood as an enduring and empirically-observable phenomenon. Hence, the first challenge for all spiritually-oriented research fields, theistic or not, is therefore related to how one defines the term "spirituality."

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[66] David O. Moberg, "Guidelines for Research and Evaluation," In *Aging and Spirituality: Spiritual Dimensions of Aging Theory, Research, Practice, and Policy*, Ed., David O. Moberg, 211-224 (New York: The Haworth Pastoral Press, 2001), 213.

[67] Robert John Russell, "Spirituality and Science," In *The New Westminster Dictionary of Christian Spirituality*, Ed., Philip Sheldrake, 55-61 (Louisville, KY: Westminster John Knox Press, 2005).

[68] Russell, 57.

[69] Russell, 57.

Once one has surmounted this definitional obstacle, we can then ask what the nature and role of research is into spiritually-oriented fields? Recognizing some of the inherent limits and implicit values that accompany scientific methods,[71] the literature asserts that there are at least two primary functions of research in fields related to spirituality. The first purpose is one of description and exploration. This type of research is primarily oriented towards gaining a greater understanding of the kinds of spirituality that are out there and what their many nuances and details are.[72] The second purpose of research in these fields is related to evaluation. Long-time researcher into the field of spiritual care, David Moberg, captures this view when he writes, "Good research helps to answer administrative and professional questions. Is the program doing both good and harm? What are its mistakes and shortcomings? How can we improve the good that is accomplished? How can mistakes be eliminated or corrected?"[73] It is a purpose that strives to evaluate the effects of one's spirituality on their lives.[74] Both of these purposes characterize the nature of research into spiritually-based fields of study, and all findings/assertions need to be "replicated, extended, and refined" as they do in any scientifically-based endeavor.[75]

Finally, once one has decided upon the purpose of their research project, they then need to decide upon which methods they will use. Fields in spirituality, because of their

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[70] Russell, 57.

[71] Claire E. Wolfteich, "Spirituality and Social Sciences," In *The New Westminster Dictionary of Christian Spirituality*, Ed., Philip Sheldrake, 68-73 (Louisville, KY: Westminster John Knox Press, 2005), 72.

[72] Roehlkepartain, 125, 127, 130.

[73] David O. Moberg, "Research on Spirituality," In *Aging and Spirituality: Spiritual Dimensions of Aging Theory, Research, Practice, and Policy*, Ed., David O. Moberg, 55-69 (New York: The Haworth Pastoral Press, 2001), 58.

[74] Moberg, "Research on Spirituality," 55-7. Moberg, "Guidelines for Research and Evaluation," 211-2. O'Connor, 149-50.

[75] David O. Moberg, "Continuing Challenges," In *Aging and Spirituality: Spiritual Dimensions of Aging Theory, Research, Practice, and Policy*, Ed., David O. Moberg, 225-234 (New York: The Haworth Pastoral Press, 2001), 227.

many complexities, draw upon a number of contemporary methodologies.[76] The methodologies highlighted in the literature include: Historical, Theological, Anthropological & Hermeneutical, Sociological, Psychological, and Political & Economic Analysis methods as well as other Internal, Qualitative, and Quantitative approaches.[77] The goal is to support the aims of the specific research project.

From these very brief explorations, we find that not only can there be a "science of spirituality," but that one already exists. The nature of this kind of research into this field is one that seeks to utilize existing scientific methodologies and ways of knowing to the extent that they can contribute to the aims of this field. In other words, scientific ways of knowing can be used in spirituality to help identify empirically observable enduring regularities that are related to describing, exploring, and evaluating it. For theistically oriented spiritualities, such approaches are still usable if divine action is conceived in scientifically accessible, repeatable, and verifiable ways. However, as I shall discuss more fully in the final section of this essay, spirituality and religion can and do also draw from the other diverse ways of knowing as an epistemological basis for their reality claims. Nevertheless, as this section has asserted, there is much that a "science of spirituality" can contribute to these foundations.

Possible Implications for the Science & Religion Dialogue

Having provided a brief overview of the broader landscape in which scientific ways of knowing are situated within and draw from, as well as what the nature of a "science of spirituality" is at least partly comprised of, we are finally in a position to offer some brief reflections on the current science and religion dialogues and debates that are happening. There are a number of implications that I can see for both science and religion that may be

[76] Roehlkepartain, 128.
[77] O'Connor, 142, 144-5, 148. Schneiders, 4. Wolfteich, 68-71.

derived from the primarily epistemically-focused explorations of this essay. In addition to addressing a few of these, this section will also discuss the possible future of relationships between these communities.

Beginning with the science side of things, I find there to be at least two implications. First, given the assertion that the aims and findings of science are primarily centered on empirically observable enduring regularities in creation, science needs to own these limitations and be more explicit about them. The scientific worldview has displaced religious meta-narratives and has come to be the dominant guiding meta-narrative in many areas of the Western world. It continues to contribute tremendously to the progress of our world in many ways. Medicine, psychology, technology, et cetera are all clear examples of the benefits that the methodologies of science have been an influential part of.

Yet, the findings of this paper suggest that science can only go so far in what it can study, understand, and work with. Can science really study all of the complex and continually varying factors that make up the on-going life of a community? Can it really know why an artist creates a specific piece of art in just the way that she or he does? While some may say "yes, eventually," many of the authors that this essay has explored say "no." However, science still seems to be generally upheld as our ultimate and reliable hope for all areas of life. But if scientific methodologies do have the limits that they have been asserted to have in this essay, such hopes cannot apply to every part of our life. One of the implications for science is therefore that we actually need to rely on alternative ways of knowing, in addition to science, in order for our understandings of reality to have the kinds of robustness that it needs for a continually progressing world. In other words, we need to acknowledge the inherent limitations that science-based truth claims have.

A second implication, which immediately follows from the first, is that perhaps the sciences can and should look to religious traditions for alternative ways of knowing in creating its theories. Such alternative ways may even have the potential to become future approaches to research. An example of this may be found in transpersonal research. Some of its primary methods include wisdom-transpersonal ways of knowing such as "alternative states of consciousness, imagination, and intuition," some of which are based on traditional religious approaches to meditation and contemplation.[78] From the perspective of conventional scientific methodology discussed above, such transpersonal methodologies have several limitations for researchers. The first and foremost is that since these methods are focused on creating subjective experiences that are internal to the individual researcher and are therefore subject to individual distortions. Also, they are not empirically verifiable by a community of researchers. However, such claims raise good questions for the basis of empirical scientific validity. What if, for instance, 1,000 researchers from many different cultures from around the world studying the same phenomena entered into "alternative states of consciousness" and all yielded exactly the same results/experiences? Would this qualify as "scientifically" valid data?

Personally, I think that such approaches would still be problematic for the scientific community. Nevertheless, approaches like these should challenge this community to continually re-think its aims, purposes, and methodologies. Perhaps the great divide between science and religion has gone too far. Many major religions do have a tradition of drawing from a number of ways of knowing in continually formulating and re-making their own meta-narratives and truth claims. Could it be possible that the scientific community could

[78] Rosemarie Anderson, "Intuitive Inquiry: A Transpersonal Approach," in *Transpersonal Research Methods for the Social Sciences: Honoring Human Experience*, Eds., William Braud & Rosemarie Anderson,

learn from these traditions and how they have come to hold and affirm the truths they assert? A second implication for science may therefore be that this community could look more intentionally to religious traditions not only for potential alternative methodologies of inquiry and ways of interpreting data, but also for guidance in how to create theories and models based on additional and broader ways of knowing.

Turning now to religion, there is one major potential implication that I can see, very similar to those that were asserted for science. It is related to religious traditions coming to incorporate the truth claims and findings of science into their on-going meta-narratives. As just stated, many religious traditions draw from many of the epistemological sources of knowledge discussed in the first section of this essay. In the Christian tradition (my own location), for instance, many denominations give precedence to authoritative sources, such as scripture and tradition, but also sometimes to others such as organizational ways as well as to wisdom-transpersonal approaches. The Wesleyan Christian Tradition has found a basis for some of its truth discernment in the "Wesleyan Quadrilateral."[79] This quadrilateral draws on four primary sources: scripture, reason, tradition, and experience (with the most emphasis being given to scripture, and with "experience" being understood as personal experiences of God). This implication therefore seems to suggest that maybe this quadrilateral could be expanded to include scientific findings as a part of its basis. The point here is that as the many religious traditions of the world move forward, they will need to rely, as an integral part of their bases for truth discernment, on the current and ever changing theories and models of science.

69-94 (Thousand Oaks, CA: Sage Publications, 1998) 70, 82, 88.

[79] For a contemporary exploration of these methods, see: John B. Cobb, Jr., *Grace & Responsibility: A Wesleyan Theology for Today* (Nashville, TN: Abingdon Press, 1995), Chapter 8.

From these implications, we can see something of the possible future nature of the relationship between these two socially influential communities. As science, and those who rely so heavily on its findings and theories, comes to acknowledge and accept its own limits, it may turn to broader ways of knowing. In such a turn, it may look to various religious traditions. Alternatively, I have asserted that religious traditions can no longer turn away from or ignore the models of science and must therefore come to incorporate them into their meta-narratives, truth claims, and even practices, which might then influence the works of science. In other words, there is the potential here for a dialectical relationship between these two communities which can be mutually beneficial and transformative for each.

At any rate, whether or not such positive interactions ever constructively come about, individuals and communities must allow such a dialectic to transpire for themselves. The claims of science are inherently limited, and we therefore need alternative and additional ways of knowing to guide the course of our lives and our world. Religious traditions offer such alternative approaches, and though they are not the only ones to do so, they have been and continue to be a central one for the majority of our world's populations. We must therefore, it seems, encourage this dialectical relationship to unfold, if not between these two communities, then in our own lives and communities.

Summary & Closing Reflections

This essay has sought to explore some of the potential interrelationships between science and religion by asking the question, "Can there be a science of spirituality?" Beginning first by offering one way to sketch a broader epistemological landscape, I located scientific ways of knowing in relation to them. It was found, because of its aims and methodologies, that the truth-claims of science are limited primarily to empirically

observable regularities that are accessible by existing methodologies. Turning next to the research field of spirituality, such scientific ways of knowing have applications, even for theistic spiritualities, if "spirituality" is defined in ways that are amenable to the methods of science. In other words, there can be a science of spirituality; we can metaphorically "put God under the microscope" if we do so according to the rigorous standards of science.

This reductionistic image of trying to view the infinite (God) through an instrument (microscope) that is designed to peer more deeply into the infinitesimal is an appropriate one for both science and religion and their mutual interactions. Science, it was asserted, must acknowledge its inherent limitations and continue to explore the possibility of learning from religion in how to blend the findings of its methods with those from alternative sources in the generation and propagation of its theories. Religion, in turn, must come to incorporate science-based findings because sometimes what we see in the infinitesimal has implications for what we believe about the infinite. It was based upon these assertions that this essay came to assert a mutual dialectical interrelationship between these two sometimes widely divided communities. I hope that they might come to see one another as interdependent allies and conversational partners in the quest for how we can all better know and engage the Infinite Reality of which we are all a part.

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