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Using Analogies to Understand "Worldview"

Steven Chisham*

Abstract

This article uses analogies as explanatory aids to systematically understand the concept of worldview, along with its underlying principles and mechanisms. First, a mathematical analogy uses equations to describe the consequences of large-scale data flow in human cognitive processing. Anomalies like autism and extreme intelligence are used to illustrate the analogy's explanatory value. Then, a worldview is compared to advanced modeling and simulation programs to highlight worldview's predictive purpose. Finally, a summary of key findings from my first three papers is presented.

Introduction

This article uses analogy as a method for explaining the dynamics of "worldview," making it easier to conceptualize, evaluate, and understand. Analogy, unfortunately, can present a double-edged sword, for it may not resonate with those less familiar with its example. Consequently, several analogies will be explored to broaden general understanding for readers.

This epistemological exercise differs from classical and modern approaches, which use tools like syllogism and rhetoric to trace the nature of rationality for a given conclusion. Instead, this approach attempts to account for the broad flow of cognitive information (Chisham, 2012). That is, while classical and modern philosophical approaches attempt to answer what it *means* to rationalize, this approach asks what resources and conditions are *required for* rationalization? Since both purport to describe human rationality, neither should preclude the other. Rather, if correct, they should complement and cross-check each other.

Moreover, because this discussion references the Ten Premises of Chisham (2012), Table I lists them again for the reader's convenience.

* Steven Chisham, Wichita, KS, S.Chisham@SBCGlobal.net
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Premise I:	Sense experience, relative to the perceiver, forms the basis of all understanding.	**Premise VI:**	The operation of thinking algorithms described in Premise IV is not the same as instinct.
Premise II:	Raw sense information must usually be interpreted, which is the function of thinking.	**Premise VII:**	Thought requires a logical "error checking" function that also validates meaning. It attempts to answer the question: "What is true?"
Premise III:	A second information category—virtual data—is used in the same way as sense data.	**Premise VIII:**	This function also provokes a parallel validation question: "How can I be certain what I believe to be true actually is?"
Premise IV:	The function and purpose of thought is to interpret sensory and virtual data via rationalization processes (or algorithms).	**Premise IX:**	Belief that something is true also defines what is true about self. Consequently, the search for certainty leads to the question: "How do I understand myself relative to ultimate truth?" Cumulative answers here provide a matrix that defines one's worldview, which defines self-image *and* perception of truth.
Premise V:	Primary sense information is not subjective, but observer bias influences both observation and interpretation of data.	**Premise X:**	Since humans are finite, a worldview is, at best, a self-limiting reflection of truth.

Table I. Ten Premises

Illustrating the Worldview Mechanism via Mathematical Analogy

This analogy borrows from mathematics to illustrate how people process information from within their worldview to reach a conclusion, typically compounding conclusions to reach more complex insights. Since rationality necessarily implies information is being acquired and processed, at its highest level rationality can be seen as *data in motion*, the mechanics of which pivot on Premises I, III, and IV (see Table I). These respectively address the acquisition of sensory data, "virtual" data (information rationally generated from sense data, other virtual data, or a combination), and the rational operations synthesizing new virtual data. A worldview, then, enables processing current circumstances in light of belief, thus *emulating objectivity* (Chisham, 2012, p. 70) to define meaning, with the ultimate goal of predicting proper courses of action in order to achieve correct outcomes.

Plantinga (1993, p. 137) describes this concept of data and virtual data as two levels of evidence: "In the first sort of case we have nonpropositional evidence—the evidence of the senses, perhaps, or of memory." Whereas, the "second-level source of warrant" is a "mechanism or faculty [that] takes beliefs … as input … and yields as output another belief, or a modification of belief." He suggests the first form of evidence (or information) is transformed into the second by way of "perception, memory, induction, reason … and so on." Similarly, Thomistic philosopher Frederick Wilhelmsen (1956, p. 188) suggested that "[Scientific] Method implies two stages: (a) the hunt for meaning; (b) the penetration or judgment of meaning—the search for evidence and weighing of the evidence once discovered. … Induction is of two kinds: experiential and direct; experimental and rational." Thus, we see that people collect sense data and then interpret more basic information toward more complex conclusions.

Just as Craig (2000) utilized Bayes' theorem to examine the probability of becoming a Christian, mathematical analogies could usefully describe a functional worldview. To begin with, thinking implies information is being "processed," for if one has no information about a subject, the likelihood of coming to a conclusion would tend toward zero. Therefore, if thinking

is viewed as "data in motion," intelligence in part represents a time rate of conversion of existing data (sense and virtual) into useful conclusions. For example, we often refer to smart individuals as "quick" or a "quick study" and their opposite as being "slow." Moreover, observation confirms ideas do not generally appear instantaneously or spontaneously; rather individuals generally prefer time to consider important decisions, and the more important the decision, the longer the preference. The popularity of timed tests also confirms this.

One might suggest a standard power conversion efficiency calculation to describe this (i.e., Pout = η * Pin, where η represents conversion efficiency). However, in this case η cannot exceed 1.0 because you never get more power out of a system than you put into it. However, cognition is different because something new is clearly being manufactured, so to speak. Perhaps a manufacturing efficiency calculation might be more appropriate. Note, the goal is not to model how the brain functions *internally* but merely to make the external observation that coming to a conclusion requires the conversion of information and that time and efficiency are contributing components. This might be represented mathematically by a standard conversion rate equation, where information (D) is being converted at some relative efficiency (R_x), which, we will observe shortly, varies among individuals. Thus:

$$C = \Delta t(R_x * D) \quad (1)$$

where:

C = a particular cognitive conclusion

Δt = change in time

R_x = rational algorithms, where X represents different algorithm types used to process information (e.g., R_i = induction, R_d = deduction, etc.)

D = data; i.e., the targeted information to be converted (Chisham, 2012)

Equation 1 can be improved by normalizing R_x to nominal intelligence. For example, a value of 1.0 for R_i or R_d might represent a normal inductive or deductive aptitude. Deduction, of course, draws conclusions from existing data, while induction rationally infers conclusions, effectively "creating" new data by interpolation. If we consider two possible extremes—a mentally handicapped individual and a child prodigy—R_i might vary from 0.2 for the former (converting data toward an inductive conclusion at only 20% of normal), while R_i for the prodigy might be 3.0 (300% above normal).

In a slightly different direction, analogical parallels could also be made between biological rationality and computer microprocessors, both in the types of rational algorithms and the rate that manipulations are performed. For example, microprocessors have sets of "opcodes" (or operation codes) that are "called" to carry out various tasks (e.g., multiplication, division, logarithms, trigonometric functions, and etc.). These opcode sets vary according to the design intent for each device (e.g., digital signal processors [DSP] perform signal processing functions, while laptop CPUs provide a different range of capabilities). Similarly, a human's range of rational algorithms differs from a dog, which in turn differs from a bat or worm, each having unique sensory and data processing capabilities related to their roles. Chisham (2012) noted that while evolutionary iterations might be rationally conceivable for certain limited features, human consciousness, for example, becomes an epiphenomenal challenge by "coincidentally" appearing with rationality for no apparent reason (cf. Stevens, 2009). In addition to different *types* of processing functions, similar microprocessors are compared by speed or efficiency for superiority, usually stated in millions of iterations per second (MIPS). Likewise, some people can do certain rational operations faster and more efficiently than others.

Autism provides a practical illustration of how Premise IV's "rational algorithms" work (see Table I). Dr. Miguel Ángel Romero-Munguía (2008) observed:

> Whereas the ability for inductive reasoning in children with ASD [Autistic Spectrum Disorder] is poor, their deductive reasoning ability is good, but their deductive reasoning ability may appear poor if the correct answers are inconsistent with the facts and it is difficult to disentangle what is more important. This means that fantasy can convert a deductive problem into an inductive problem, perhaps explaining the lack of interest among children with ASD in imaginative activities.

So, while the autistic individual may hypothetically have an R_d of 1.0, his R_i may be far less, with the ratio between R_i and R_d describing the relative efficiency of those mental conversions. Moreover, the unique characteristics of the savant help illustrate Equation 1. Treffert (1989, p. 165) explains:

> Whatever diversity does exist in Savant Syndrome, remarkable memory—of a unique, uniform type—welds the condition together. … Indeed, the linking of special skills with special memory—in the presence of substantial intellectual defect—is Savant Syndrome.

Approximately half of Savant syndrome cases are also autistic (Treffert, 2010, p. 18). As far back as 1887, Dr. J. Langdon Down, who coined the unfortunate term "idiot savant" (from French meaning "unlearned skill"), referred to their characteristically massive memory with the term "verbal adhesion," which others have called "memory without reckoning" (Treffert, 2010, p. 25).

It is not the autistic savant's phenomenal ability to acquire information (Plantinga's first category) limiting an individual who, for example, has memorized a phonebook. Rather, the problem lies in his functional inability to manipulate data he has—in surprising abundance! This paradox demonstrates that

the conversion efficiency of induction (as a function or operation manipulating information) is a key source of Plantinga's second level of information, providing "warranted" beliefs.

Premise III (see Table I) explains how rational conclusions can then be adopted as "virtual data." Indeed, people capable of aggregating long sequences of related information are sometimes called "deep thinkers." Thus, as a chess master anticipating multiple moves, the number of informational cycles one can aggregate is another possible measure of intelligence, illustrating that equation 1's D, for most reasoning activities, should expand to include both sense and virtual data.

$$C = \Delta t\,(R_x * (D_S + D_V)) \quad (2)$$

where:
D_S = sense data (Premise I)
D_V = virtual data (Premise III)

A paradox of human understanding is that finite beings *cannot process* or even *possess* infinite knowledge, but as moral decision makers we *require* context to understand our circumstances in order to assign purpose for future actions. For all we know, missing historical (or future) information may provide crucial context. We are thus forced to *simulate* infinity to fill in context, especially for significant moral decisions. *The essence of a worldview, therefore, is to provide a finite (or "digitized," to use a familiar analogy) reduction of reality that approximates perfect knowledge*. Consequently, a worldview (W) is the practical substitute for omniscience, since human nature precludes it, effectively integrating all known data useful for decision making, which yields the next analogical equation:

$$W = \int_{t=-\infty}^{t=\infty} (D_S + D_V) \quad (3)$$

(Note that because D_S cannot predate the individual, D_V often provides context in the form of accumulated human knowledge.) If we assume R_x is relatively constant over time, equation 2 can be rewritten as:

$$C = R_x * W \quad (4)$$

Worldview answers consist of the totality of known truths, with individual truths naturally weighted according to conviction, while tentatively positing questionable conclusions for validation. Again, the best test of a person's conviction of a "truth" is whether or not he believes it true of himself (Premise IX). This weaving of data with virtual data yields an information superstructure emulating reality in the mind (the *worldview structure* of Chisham, 2014).

Equation 4 shows how one's worldview directly influences cognitive conclusions (C). Each conclusion then becomes new virtual data (D_V) whose certainty is tested through the standard validation process, affirming some conclusions and rejecting others in the light of new data. In this way, an ever-expanding truth matrix forms, driven by the thirst for information, which simulates perfect knowledge. Unfortunately, this expansion can cascade the wrong direction toward falsehood if a series of conclusions are built on a key but false virtual datum premise. A wise old saying (variously attributed to Will Rogers, Mark Twain, and others) humorously summarizes this common cognitive catastrophe in saying, "It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so."

This cascade effect is particularly important regarding origins because one's entire worldview rests on Aristotle's narrowest of questions: "What was the first cause?" Fracturing one's rational answers to that creates uncertainty in numerous related issues. Consequently, a person may respond defensively when caused to doubt his own answers (regardless of his view) because it unhinges fundamental matters he previously considered settled. Emotive *ad hominem* attacks, rather than on-topic discussion, are a common response. Only resolution of the question can restore internal stability. Creationist debaters meeting unexpected personal attacks or off-topic questions, for example, must recognize this as the source of conflict, addressing it with grace to move the discussion back on track. One way of defusing such responses is to accept the accusation(s) for the sake of argument and ask what difference that makes to the subject, exposing the red herring. This is a human condition, to be sure, so Christians are not immune and should be ready to admit the need for further research where appropriate.

These equations also touch on certainty. Since any given D_V consists of aggregates of D_S and D_V, "objective truth" is often viewed as the aggregate ratio of (D_S/D_V). For example, if $D_S >> D_V$ for any given conclusion, many regard it as "objectively true" because it consists primarily of sense observations and, thus, open to verification. Conversely, in the opposite case the item under consideration may be viewed as rationally or morally true but not scientifically valid.

Applying the Mathematical Analogy

To illustrate how these equations apply to worldviews, consider again the autistic savant able to memorize a phone book but unable to use acquired information to draw significant rational conclusions. As R_i approaches zero (remember induction is problematic for autism), the value of C goes to zero regardless of how much D is present. Mental retardation, by contrast,

tends to see R_x and D decrease equally but with the same effect on C. Thus, equation 2 shows that any situation where R_x is severely limited also limits the creation of new virtual data (D_V).

This raises an interesting question: can an autistic savant form an effective or robust worldview? Equations 3 and 4 indicate the answer is no, based on his inability to create new D_V. Intelligent, creative persons in contrast are naturally able to form more comprehensive views of reality (hence the terms "intelligent" and "creative"). Treffert noted:

> The inability of the savant to think abstractly, with reliance almost exclusively on concrete patterns of expression of thought, is well known and seen often in savants. For some researchers, the inability of the savant to think abstractly has been viewed as an interesting but incidental finding. However, others have defined concrete thinking as the central defect in the savant and they propose that that phenomenon explains the condition. … These researchers concluded that the limitation of concrete thinking … [was] the only way he can come to terms with the *world* [emphasis added] beyond his grasp. … It seems an almost universal symptom or trait. So it is probably best approached as that—a symptom rather than a cause, and a description of what occurs in savants rather than an explanation. As a theory, impaired ability and a limitation to concrete thinking thus *describes* the savant, but does not *explain* him or her. (Treffert, 2010, pp. 41, 42)

Notice Treffert's use of "world" intuitively acknowledges restriction of the individual's worldview in comprehending reality. Treffert's analysis agrees with our equations. Neither explains *why* the savant cannot rationalize effectively. One must look elsewhere for causes. Both, however, predict the consequence of a worldview truncated by the inability to develop significant virtual data (D_V). Furthermore, those familiar with autistic spectrum disorders recognize this "concrete thinking" applies to persons other than savants. Certain jokes, for example, are simply unintelligible to many with ASD who are mentally confined to a literal world, unable to project second- and third-order meanings using innuendo, insinuation, ambiguity, or allusion. Conversely, intelligent individuals are often observed using just such means to demonstrate intellectual prowess.

This is not to suggest intelligence necessarily correlates to a more *realistic* view, however. Per Occam's razor, less complicated views are often correct. Consequently, "simple" people (e.g., children) occasionally surprise us with their clarity of insight. More convoluted solutions, however, are often inaccessible to people with difficulty rationalizing.

Since a worldview significantly exists to address (among other things) moral dilemmas, another question one might be tempted to ask is whether intellectual superiority might be a measure of personal worth? This presumes a prior question: In whose eyes? Those who contribute less financially are often devalued by modern society. The Judeo-Christian standard of human value, of course, is our *Imago Dei;* that is, we are image-bearers of God. Moreover, "handicapped" persons may provide many invaluable lessons to those socially less self-absorbed. Since humans construct worldviews and thus learn by analogy to self (Chisham, 2012), brokenness in others can teach the elegance in our own design, for observation of malfunctioning often demonstrates the complexity required for correct function. Furthermore, in God's purposes the "less fortunate" may help the "more fortunate" with self-realization of the giftedness of "normality," appreciation that our own existence is likewise contingent on humble social means, and understanding that our value derives from God. This is philosophically untrue, however, with a utilitarian, mechanistic, "privileged" or "elite" class, which we have seen gain prominence in recent centuries.

Taking this mathematical analogy further, another step can be taken by expanding the data in Equation 3 into a matrix (the *worldview structure* of Chisham, 2014). In it, each data point is assigned a force multiplier (F_m) to weight specific data:

$$W_V = \begin{bmatrix} Fm1 * Ds1,\ Fm2 * Dv2,\ Fm3 * Ds3,\ Fm4 * Dv4 \\ Fm5 * Ds5,\ Fm6 * Ds6,\ Fm7 * Dv7,\ Fm8 * Ds8 \\ etc. \end{bmatrix} \quad (5)$$

While this equation breaks out force multipliers (F_m), sense data (D_S), and virtual data (D_V), an even more descriptive matrix would include dimensions of time, as well as categorical dimensions like politics, religion, art, science, etc. In this way the worldview mechanism dynamically responds to a person's experience and interests by adjusting the force multipliers (F_m). This allows dynamic rational focus in an on-demand fashion toward any problem under consideration, providing focus, much as the iris and muscles controlling the thickness of the cornea coordinate, bringing dynamic focus over a range of distances and brightness levels.

Computer Modeling Analogy: The Worldview Mechanism as a Truth Simulator

Good decision making is critical to both individual and social progress. Decision making is enabled by one's worldview, which is created by rationality. Decisions require prediction to guide moral and practical action. Like scientific theories, the quality of human decisions are judged on how successfully they anticipate reality. Notice that this presumes the correspondence theory of truth (i.e., truth is that which corresponds to reality).

Thomistic philosopher Henry Veatch reminds us:

> For never should it be lost sight of that in the view of Aristotle and Aquinas all human knowledge must proceed from our perceptual experience. … Accordingly, for such a rational understanding in the fullest sense, our beliefs could well be said to need to be either self-evident in themselves, or else derivatively evident from truths that are thus self-evident. (Veatch, 1988, p. 56)

A primary principle of knowledge (and therefore worldview) is that literally every fact one can possibly know is either directly sensed or derived from sense information. Thus, our worldview perspective consists solely of sense and virtual data acquired during our lifetime and believed to be true. As Chisham puts it:

> A worldview … serves to interpret information and correct for observational distortions and/or limitations, providing the reference tool for emulating objectivity in determining truth. … [This is] perhaps best expressed as answers given to the question "how do I understand myself relative to ultimate truth?" (Chisham, 2012, p. 70)

Moreover, although worldviews *function* as a historic database establishing current truth claims, their *purpose* is predicting and guiding future courses of action. As such, one could say it functions like a software navigation tool—simulated future-vision, so to speak. In fact, if we are not careful, this simulation is often so convincing we can sometimes mistake reality for our fabrication of it. (Solipsism commits this error.)

The worldview mechanism exists to simulate or predict future reality, given certain proposed courses of action. More than simply providing understanding of past reality, it incorporates ethical value into decision making, trying to determine what one *ought* to do. Borrowing from Francis Schaeffer, it asks, "How *then* shall I live?" This is the normal learning process, the scale varies from tomorrow's activities to future life goals, but the decision process is the same.

The ever-entertaining Magic Eight Ball® (Mattel Inc.) makes decision making much simpler. Each of its polyhedron's twenty faces is etched with general answers; ten are positive, five neutral, and five negative. Shake it up, ask any yes/no question, wait a few seconds, and a face will float into the observation window revealing a (oversimplistic) plan of action! Its comic value provides stark contrast with real decision making. Similarly, however, rationality calls on one's worldview to predict true consequences, much like a programmatic subroutine weighing options. Perhaps our closest human equivalent to this is computer aided design (CAD) modeling. What CATIA®and AutoCAD® are to mechanical flow and 3D simulation, what Microwave Office® and SPICE are to radio frequency (RF) and analog electronic design, the worldview mechanism is to human truth simulation and prediction. In each case the goal is to make decisions in virtual reality before actual choices have to be made and valuable resources expended.

Surprisingly, given its decision-making role, the actual, practical value of a worldview is more about truthfully predicting future consequences than defining the present or past! While we validate our predictive models against known data, we *use* our worldview to identify optimal future actions. Because human finitude precludes obtaining "perfect" objectivity, a worldview *simulates* it, just as these programs use data in their attempt to create virtual predictive prototypes to achieve certain design choices. A familiar truism to CAD users, however, is that simulations are only as good as (a) the data that was collected and (b) the accuracy of the simulation model. The same is true regarding one's worldview; if a person is not careful in collecting data or accurate in his worldview simulation, poor decisions are predictable. Unlike the Magic Eight Ball®, however, worldview predictions ought to be more than loosely worded yes/no/maybe responses or educated guesses regarding real-life problems. Worldviews ought to provide predictive responses to existing conditions, producing decisions reasoned with compassion, honesty, justice, and truth. While admitting many and notable failures, human engagement with the future would be rationally impossible without a worldview.

While they are more than a guess, we should be careful to note that worldview predictions are not the same as actual reality. Solipsism, for example, commits this categorical error by insisting our mind's existence is the only knowable reality, mistaking a condition of the mind (consciousness) for a condition in the world. Indeed, this article is discussing how we synthesize knowable and unknowable aspects of reality! While worldviews functionally *emulate* absolute truth, they often fail in reality—which is part of the learning process. Our finite predictions are bound to fail at some time, but a wise person attempts to correct his assumptions, while the fool attempts to redefine reality. For the same reasons it would also be a mistake to dismiss worldview as simply perspectivism or perspectivalism, which again confuses truth with human perception of it. Worldview is not about rationally defining truth; it is about rationally discovering it and predicting how to respond to it.

However, while worldviews are not reality, they do regularly affect reality as a consequence of the people who hold

them. For good or bad, personal and social behaviors follow personal and social beliefs. We have only to reflect on the behavior of Mother Theresa as opposed to Hitler's to see the difference.

The Limits of Objectivity

Some will object to this simulated reality idea processing necessarily limited data because it inherently implies that our finitude naturally prevents achieving absolute objectivity. To the opposite extreme, a contemporary *reductio ad absurdum* and *non-sequitur* is the false dilemma that, lacking *perfect* objectivity, humans cannot know to even a reasonable certainty (e.g., post-modern rationalism). Though unable to know all but the narrowest of things with complete certainty, we clearly know many things with functional sufficiency to operate at fairly high levels daily. We obviously do know with human certainty, but what does that mean? Where do we draw the line between equivocation and reasonable certainty? Radical skeptics will deny we can know things we obviously do know (e.g., David Hume), so how can we judge when we are being objective and to what levels of certainty?

In a practical sense, though we have epistemological limitations, we routinely acknowledge and work within them and expect others to do likewise. Indeed, our sense of fairness rises in protest to situations we feel are not fair. Both biblical and social practice acknowledge and accommodate human epistemic limitations. For example, Romans 2:12–15 indicates that God held individuals responsible only for things they should have known, not things they could not possibly have known. Paul assures us in 1 Corinthians 10:13 that God is not capricious but provides a potential way of escape with *every* temptation, again suggesting accommodation to human finitude. This is further supported by James 1:2–5 and 12–18, which teach that God has no intent to secretly trick us in order to accuse and/or punish us, which would be contrary to His loving nature (1 John 4:7). Having said that, we must acknowledge that God is also perfectly just and righteous and makes no claim that our trials will necessarily be easy or seem fair from our limited perspective. For example, an innocent death is not the worst thing that could happen to a person from God's vantage point, but it usually seems that way from ours. Furthermore, the Old Testament did acknowledge culpability for sins committed in ignorance, but the sacrifice for such sins was *after* the individual came to *understand* his error (e.g., Lev. 4:14). Furthermore, criminal and civil law place high value on knowledge of and intent regarding potential accusations. Reality is the only immediate and unforgiving agent, while rational judgments implicitly require due process to ensure charges are understood and fairly made. Consequential judgments are also expected to be fair and impartial. When these conditions are not complied with, cries of unfairness are expected, giving basis for appeals—that is appeals for justice, which implies an absolute standard for truth.

Regarding the matter of equivocation and certainty, Evans saw this truth validation process as a "critical dialog" (in context, regarding evaluation of one's philosophy of religion):

> How does one go about testing one's beliefs? Simple beliefs about particular matters of fact are subject to fairly direct experiential tests. More general and comprehensive scientific theories can only be tested indirectly. One looks for theoretical coherence, a predictive power, the ability to illuminate what was previously unintelligible. Usually a theory must be tested relative to its rivals. A scientific theory which explains a great deal will be accepted even if it faces serious objections as long as there is no viable alternative. Sometimes the decision to continue to accept a theory requires one to discount or reinterpret what purport to be facts; at other times it seems more reasonable to accept the fact and reject or modify the theory. In short, the testing of theories is a complicated affair, requiring an element of good judgment as well as honesty and concern for truth. … Such a process cannot be guaranteed to work successfully, of course. Finite, fallible, human beings cannot survey all the alternatives or assess those they do examine with total accuracy. And the process of reflection cannot be extended indefinitely. (Evans, 2010, p. 119)

Hume attacked Locke's *tabula rasa* ("blank slate") for denying innate knowledge by claiming experience and perception to be the only sources of human knowledge. Most accepted Hume's critique. Though Locke no doubt overstated his case, his theory does address human epistemological finitude (which many later philosophers missed, focusing on Locke's mistakes rather than intent). The Veatch (1988) quote above also engages this human limitation. Knowledge and even one's very language base derives from sensory experience. Rationality and one's worldview framework then operate as overlays on this acquired language base. Note that language here is meant in the broadest sense, which includes all sensory information the mind can use as symbols. Limiting language to written or spoken words or symbols is too restrictive and cannot account for how the mind uses information. For example, the fact that water runs downhill is an observation not requiring words. The phrase "water seeks its lowest level" is a linguistic expression sometimes used as a euphemism to indicate a broader principle, but it is grounded in experience, not those particular words. The mind observes much that it converts directly to principles. For example, being a good mechanic is as much about observation as knowing the names of components. Consequently, rationality is based in sense, not the reverse.

This is why humans form worldviews as an ideological simulation test environment. Resolution of broader, complex ideas about reality require more assumptions, more thought, and greater trust in one's intuition. How well the simulation

predicts reality, however, can be validated only after the fact. Wrong yet convincing paradigms may obscure truth. Thus, if possible, it is helpful to begin with an accurate paradigm based on existing eyewitness accounts, which demonstrate the historical development of ideas rather than starting from scratch. This, in fact, is what Christianity finds in the Bible.

Two Types of Certainty

If a worldview cognitively simulates reality, it follows there are two major certainty categories—that created within the simulation and that acquired directly from the environment. Because rational certainties (e.g., theoretical, mathematical, or Cartesian) are generated *within* a worldview, at least some *can* be known with perfect certainty. Examples include the laws of logic, without which rationality would be impossible, and mathematical certainties; e.g., two plus two always equals four. Also, some rational certainties are true by definition. These are all examples of *a priori* certainty in most philosophical traditions since Hume and Kant. *A priori* is distinguished from *a posteriori* certainties, which draw on sense experience. Analytic Platonist Plantinga (1993, p. 15) clarifies: "*A priori* beliefs … are not, as the denomination mistakenly suggests, formed prior to or in the absence of experience." And Cartesian foundationalist Lawrence Bonjour (2013, p. 308, brackets added) explains: "*A posteriori* reasons are based on or derived from experience … *A priori* reasons are [or are able to be known] independent of experience"; i.e., strictly through rationalization.

Descartes (1596–1650) found his "way of doubt" convincing *because* rational certainty could be known perfectly. However, beyond certifying his existence ("I think, therefore I am"), reaching any physical reality was difficult without relying on sense perception, which he eschewed in search of perfect certainty. He missed, however, that his entire linguistic structure was sense-based and served as the underlying fabric his rationality was manipulating. Descartes necessarily expressed his rational doubts linguistically, creating them from within his worldview simulation of reality using his language base, having acquired it through thousands of sense experiences. Thus, his use of linguistic arguments to doubt reality was self-defeating and absurd. His "way of doubt" could not validate truths in physical reality without referencing it. Unfortunately, this error propagated through much of modern philosophy, suggesting that rationality *defines* rather than *discovers* truth. Ironically, his problem had been solved centuries prior in the Aristotelian/Thomistic tradition, which acknowledges rationality's fundamental dependence on sense, as reiterated by Veatch (1988) above.

In contrast to rational certainties, physical *a posteriori* certainties cannot be humanly absolute; they can only be known to some level of approximation. Evidential apologetics and scientific "proofs" fall into this category. Consequently, "scientific certainty" cannot be as perfect as many currently believe since science deals with probabilities. As mentioned, however, conclusions or "virtual data points" tend to be regarded as objectively true if they consist primarily of sense observations ($D_S >> D_V$) because of being more open to independent verification. Conversely, when the ratio of sense data drops off, a fact may be viewed as rationally or morally true but probably not scientifically valid. The fact that neither *a priori* nor *a posteriori* knowledge leads directly to perfect certainty regarding the external world has led to existential skepticism in most philosophical traditions since Descartes (e.g., nominalism of Hume, idealism in Kant and Hegel, etc.). The classical or scholastic (Aristotelian/Thomistic) tradition resolves recognition of existential reality through the acknowledgement of forms and essences to assist rationality in the classification of things in the world.

Nonetheless, thinking nearly always involves a mixture of *a priori* and *a posteriori* reasoning, though discerning the role of each is often difficult. Additionally, they explain some aspects of human epistemological finitude. For example, many assumed Newton's gravitation theories to be absolute truth, having solid *a priori* mathematical reasoning and a preponderance of supporting sense data. Later work eventually produced evidence identifying the limiting conditions in his mathematical model; what looked very much like "objective truth" was limited to a specific set of circumstances. Furthermore, Einstein's general relativity model has the same problem, lacking absolute certainty as a universal explanation. At its best, each new scientific discovery pushes the boundaries of human finite knowledge closer and closer to the actual truth.

The so-called "Gettier" examples, in honor of Edmund Gettier's famous paper (1963, pp. 121–123), suggest that even if one accepts forms and essences, a certain minimum threshold must be reached before a thing can be correctly recognized. For example, suppose you see three cows standing on a distant hill. Notwithstanding whether Gettier's obligatory third cow might be lurking just out of sight, upon closer approach, you discover one of the three is a very convincing plywood sign advertising milk and cleverly shaped like a cow. Much has been written about such examples, but the mistaken identity really points to the fact you identified the third "cow" to the best of your abilities (while the advertiser and circumstances did their best to deceive). Plantinga comments on these "Gettier examples" saying,

> So the designer's overall aim [for human understanding] is at truth, but [must be] within the constraints imposed by these other factors; and this may require trade-offs [in His design of the human finite being]. It may not be possible, for example, to satisfy these other constraints and also have a system that (when functioning as it is designed to function) produces true beliefs in *every* sort of situation to be encountered in the

> cognitive environment for which it is designed. There are an enormous number of different situations arising within the cognitive environment for which the system is designed; and it might be impossible, given the constraints, to handle them all in the most desirable way. … the thing to do would be to trade-off some accuracy for efficiency (and the satisfaction of these other constraints). You would want to design a system that worked well (that is, produced true beliefs) over as large a proportion as possible of the situations in which its owners will find themselves, consistent with satisfying those other constraints. (The other constraints could be absolute and nonnegotiable, or they might also be subject to negotiation.) In this way you will wind up with a system that works well in the vast majority of circumstances; but in a few circumstances it produces false belief. (Plantinga, 1993, p. 39)

Plantinga is using "designer" generically here, although he personally holds a Christian perspective and sees the natural tie to his faith.

For broader conclusions, human knowledge is inherently limited. That is why some things can only be "known" by faith (Hebrews 11:1). Moreover, as Chisham (2012, p. 70) noted, while Christian doctrine requires the believer to come to Christ in faith, "careful examination … reveals the fact that all worldviews—theistic, pantheistic, or atheistic—at their most basic levels are arrived at by faith, regardless of view" (because each assumes things that cannot possibly be known by natural human experience). This is not at all to suggest faith should be blind, or devoid of evidence. Evidence can effectively support rational aspects of faith by opposing fiction and error, which by example is why evidential apologetics has value.

Conclusion

In its most comprehensive sense, *a worldview functions as the mechanism by which humans process a finite reduction of an infinite reality*. This is not solipsism but a human means of coping with the limitations of finitude in comprehending unlimited reality. The universe is not bound by our inability to understand it. Rather, the human imagination struggles continuously, often with great difficulty, to perceive what is real as a basis for action. The fallacy of solipsism, indeed, is confusing reality with one's worldview simulation of it, reversing their proper roles. Rationality does not *define* reality; rather, rationality *seeks to realize* what reality has defined.

Since humans are finitely constrained, thinking may be viewed as "data in motion" or a time rate of change in information toward desired conclusions. As such, a mathematical analogy was constructed illustrating how the worldview mechanism relates data with rationality in order to comprehend reality. This is an iterative process where conclusions can be reused as "virtual data" in order to build even more elaborate conclusions. One's worldview perspective forms from this over time, creating an aggregate matrix of sense and virtual reference information.

Mental aberrations were then used to illustrate how this data-flow process correctly predicts consequences, such as limiting the rational efficiency of induction, which causes the worldview simulation to stifle, unable to aggregate consequences over time. Hume wrongly disparaged induction, failing to see where the "missing" data originated. His objections are answered by understanding the worldview's function, which fills the gaps through interpolation. Philosophers like him who wrongly try to invalidate induction as a *principle* fail to see it as simply a *function* that processes existing information. The actual truth or falsity of the inductive conclusion depends on the variables in the equation. And, since induction projects outside its existing information, how reality matches up to prediction also involves some probability and, therefore, uncertainty.

Another analogy to CAD modeling (a class of computer software) was examined, by which designers predict outcomes based on existing data. Worldviews, unfortunately, share a common weakness: the worldview simulation is only as good as (a) the data available and (b) the accuracy of the simulation. Like CAD applications, humans must collect good information and predict carefully in their decision making.

The issue of certainty was further clarified by recognizing that while rational certainties can be known perfectly, physical certainties cannot without some rational mechanism for classification. Classical or scholastic (Aristotelian/Thomistic) philosophy uses forms and essences for this. Moreover, rationality is based in sense, not the reverse. This idea is validated in that we receive our vocabulary to speak about reality by way of interacting with it. Thus, discerning the difference between our cognitive simulation of reality and actual observed information is a subtle but important critical thinking skill, particularly in divining the difference between facts and our worldview's interpretation of those facts.

Along with previous papers (Chisham, 2012, 2014), this paper hopefully provides a solid foundation for understanding the concept of worldviews by defining the principles regarding their operation, function, and purpose. In addition to defining "worldview" more precisely, we have also sought to understand what it entails. This need arises because "worldview" typically has been used intuitively, missing its positive contribution as a systematic mechanism for comprehending reality, understanding truth, and making decisions. As such, our worldview allows us to operate in the domain of truth despite our finite understanding of reality. In summary:

1. We cannot define meaning and purpose without understanding what is true—ultimately *unbounded by time*. But finite humans cannot know infinite reality, leaving us with the paradox that although we cannot possess this kind of

truth, we require it daily as the context for making crucial real-life decisions.

2. Consequently, a worldview serves as a "digitized reduction" or approximation of "absolute reality," thus providing context for decision making.
3. A worldview is built from existing knowledge, which includes sense and higher order "virtual" data being manipulated via rational processing toward conclusions. Storage and retrieval of this information, *particularly for higher-level concepts*, is primarily linguistically based. This serves as the media that rationality manipulates. Thus, rationality is based on sense perception, not the reverse.
4. A worldview is a natural and necessary by-product of rationality that continuously expands over our lifetime toward infinite knowledge in order to simulate perfect objectivity.
5. Therefore, a worldview is far more than a "truth matrix" or a "comprehensive view of reality" or the "glasses we see the world through," for it serves as a fully functional *truth prediction simulator*, allowing evaluation of choices before committing to a course of action. Thus, people justify actions by thinking, "If I do X, I believe Y will happen," where Y is the consequence of their worldview prediction.
6. To make judgments, defining one's reference—truth—is a first-order task for a worldview. Defining who "I" am in relationship to that truth calibrates "my" personal observation vantage point. Before I can make clear judgments about anything other than myself, I must first be certain of what is true about myself, thus defining my self-identity as a consequence. Therefore, things "I" view as *most* true are *first* true about "me," in terms of philosophical order. Judgments are then made by analogy to self.
7. Thus, one's *worldview perspective* can be reduced to answers to the single question: "How do I understand *myself* in relation to ultimate truth?"
8. Contemporary usage of "worldview" includes four different meanings:
   a. The *worldview mechanism* consists of the overall principles supervising the rational processes described in the previous seven points.
   b. The *worldview structure* is the cognitive "container" into which each human will insert his worldview answers (e.g., "everyone's got a worldview").
   c. One's *worldview perspectives* are the specific truths or answers inserted into that worldview structure.
   d. A *social worldview* is an individual's worldview perspective within his social context, usually stated in reverse as the aggregate opinion of a group, expressing a Gaussian distribution around some mean; e.g., religions, political and moral philosophies, nationalities, etc. Worldviews are first and foremost personal, so social worldviews are second-order expressions of views accepted by individuals.
9. To date, many attempts have been made to define "worldview" that we have argued to be incomplete or even invalid in some cases. From the preceding, then, it seems a reasonably accurate definition for worldview *in toto* would be:

   > The mechanism by which finite beings perceive, assimilate, evaluate, and respond to infinite reality. Moreover, it is what it means for a being to be both *finite* and *rational*, which involves synthesizing a working model of reality of a size he can comprehend and, as a consequence, also defines him to be a *moral* being.

10. Since a worldview approximates infinite knowledge, only one actually possessing perfect knowledge would not need a worldview. Traditionally, this has been a monotheistic characteristic of God, which Christianity embraces. Though God can have opinions and viewpoints as a "person," He is not of this world and therefore does not have a "worldview." Rather, He would necessarily have a *perfect* view, without gaps in His knowledge of reality.

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