

Metaphilosophical Criteria for Worldview Comparison

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Abstract: Philosophy lacks criteria to evaluate its philosophical theories. To fill this gap, we introduce nine criteria to compare worldviews, classified in three broad categories: objective criteria (*objective consistency, scientificity, scope*) subjective criteria (*subjective consistency, personal utility, emotionality*) and intersubjective criteria (*intersubjective consistency, collective utility, narrativity*). We first define what a worldview is and expose the heuristic used in our quest for criteria. After describing each criterion individually, we show what happens when each of them is violated. From the criteria, we derive assessment tests to compare and improve different worldviews. These include the *is-ought*, *ought-act* and *is-act* first-order tests; the *critical* and *dialectical* second-order tests; the *mixed-questions* and *first-second-order* synthetical third order tests; and the *we-I*, *we-it* and *it-I* tests. Then we apply these criteria and tests to a concrete example, comparing the Flying Spaghetti Monster deity with Intelligent Design. As another application, we draw more general fruitful suggestions for the science-and-religion dialog.

Keywords: cognitive values, cognitive axiology, evaluation standards in philosophy, philosophical criteria, worldview assessment, worldview comparison, coherent worldview, comprehensive worldview, scope of philosophy, mission of philosophy, definition of philosophy, task of philosophy, philosophical method, Flying Spaghetti Monster, Intelligent Design, science-and-religion dialog.

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1 Introduction

Philosophers disagree. As the saying goes, philosophy is the field of unresolved controversies. There is no comparable progress in philosophy as there is in science. Agreements do not replace disagreements. Given the wide diversity of philosophical schools and traditions, it is indeed very difficult to point out why or how two philosophers disagree.

Broadly speaking, philosophers have tried to understand the relation between humanity and the cosmos. But this enterprise is not philosophy's sole prerogative, it overlaps with science and religion. For this reason, the situation is even worse. Not only do philosophers disagree among themselves, but their answers to the biggest questions compete with answers provided by science and religion. The result is that humans use philosophical, scientific or religious insights -or a combination of them- to handle this quest for understanding, leading to very different kinds of worldviews. Instead of tackling the difficult task of synthesis, there is a trend of overspecialization which leads to a fragmentation of knowledge. The communication between worldviews becomes at best delicate and knotty and at worst, impossible. Can we compare and assess such different worldviews? How can we test their relative strengths and weaknesses? What criteria and tests can we use for arguing that such and such worldview is "better" than another? Furthermore, can we use those criteria to construct synthetical worldviews?

The solution of synthesis can not come from science, which is empirical; nor from religion, which often relies on traditional dogmas. It must come from philosophy, whose very nature is reflexive. Indeed, this understanding of the relationships between different domains of knowledge is itself a (meta)philosophical dimension. There has been previous work in philosophy of science to assess the quality of scientific theories. Even this effort of finding clear criteria in science is not as easy as it seems (see e.g. Kuhn 1977; McMullin 2008). Surprisingly very few similar attempts have been made in philosophy. Indeed, finding criteria for a "good" philosophy or worldview seems even more difficult than in science. Why is this so? Even more than in science, there are in philosophy radically different aims, methods, schools and dimensions. This contributes to the richness of philosophy, but also to its confusion.

More specifically, philosophers disagree on the *agenda* and thus can not even agree on philosophy's task (Rescher 2001, chap. 3). In that sense, rather than saying that philosophers disagree, it is more accurate to say that philosophers *rarely disagree*. For they are beginning from different starting points and thus are simply talking past each other (Adler 1965, 165). This is a unique situation in the landscape of knowledge domains. To progress, one thus needs to propose a direction in the form of a philosophical agenda. Constructing a coherent and comprehensive worldview is such an agenda (Vidal 2008a).

Taking this worldview agenda as a starting point, we propose here a list of criteria and tests for worldview comparison. We hope to contribute to one of the five conditions which Mortimer Adler (1965, 147) said would give philosophy a promising future: "philosophical theories or conclusions should be capable of being judged by a standard of truth, to which appeal can be made in adjudicating disagreements."

Respectable disciplines of knowledge such as empirical sciences, mathematics or history solve disagreements by reference to common standards. By proposing explicit standards for philosophical theories, my aim is to contribute to making philosophy a more respectable intellectual branch of knowledge. Defining such standards also offers the promise to conduct philosophy as a public enterprise (Adler 1965; 1993). In this way, there is hope for philosophical progress, which is greatly accelerated when an enterprise is conducted in a public manner. But there is more. The criteria and tests I propose help to understand not only philosophical worldviews, but also the various emphases given by different scientific, philosophical or religious worldviews. They also help to construct worldviews which are coherent and comprehensive objectively, but also beneficial subjectively (at an individual level) and intersubjectively (at a societal level).

We first present six dimensions of philosophy together with an agenda, expressed through five "big" questions. The responses to these questions form a worldview. We then outline how we reached our list of criteria, define each individual criterion, and show what happens when they are violated or abused. We derive concrete assessment tests, dealing with worldview components, philosophical dimensions and the interaction of objective, subjective and intersubjective realms. Finally, we test and apply the criteria in two concrete ways. First, by comparing the Flying Spaghetti Monster deity with Intelligent Design; second, by discussing aspects of the science-and-religion dialog.

2 What is a Worldview?

2.1 The Six Dimensions of Philosophy

While defining what a worldview is, it is useful to distinguish six dimensions in philosophy, as depicted in figure 1. We distinguish between first- and second-order knowledge (Adler 1993, 13-16). *First-order knowledge* is about "reality", and *second-order knowledge* is about knowledge itself. We add a third-order *synthetical* dimension, which is the integration of first- and second-order dimensions of philosophizing. Dimensions (1) and (2) correspond to Adler's (1993) *metaphysical* and *moral* dimensions. Dimensions (4) and (5) partially overlap with Adler's *objective* and *categorical* dimensions. Dimensions (4), (5) and (6) are inspired by Broad (1947; 1958) who calls them *analysis*, *synopsis* and *synthesis*.

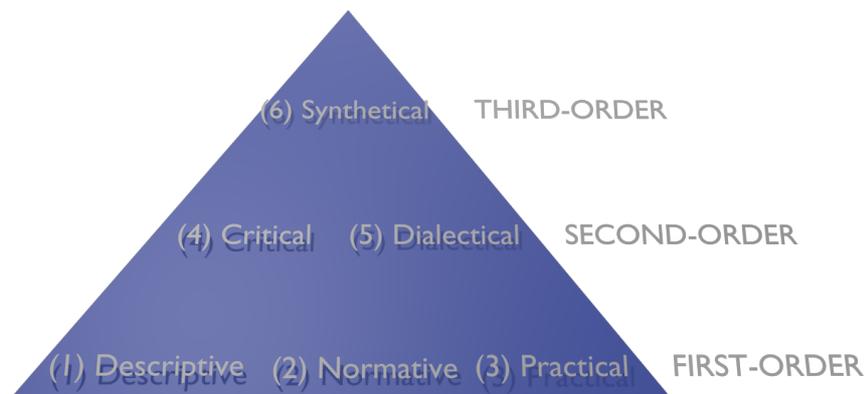


Figure 1. The Six Dimensions of Philosophy.

2.2 First-Order Questions

A philosophical agenda defines the range of problems and issues that are addressed by a philosophy. What are the most profound questions of existence? Those questions, *not their answers*, are surprisingly enduring throughout the history of philosophy (see e.g. Passmore 1961, 39; Rescher 2006, 91). The worldview approach developed by Leo Apostel elegantly makes them explicit (Apostel and Van der Veken 1991; trans. in Aerts et al. 1994):

- (a) What is? *Ontology* (model of being);
- (b) Where does it all come from? *Explanation* (model of the past);
- (c) Where are we going? *Prediction* (model of the future);
- (d) What is good and what is evil? *Axiology* (theory of values);
- (e) How should we act? *Praxeology* (theory of actions).

Those questions together form an enduring philosophical agenda. Each question corresponds to a first-order knowledge branch, in italics above. It is important to recognize that starting with this agenda is already a philosophical choice. We will discuss the agenda more in depth when describing the *scope in agenda* criterion. Although the six dimensions of philosophy are more general than this worldview agenda, I introduce it because it makes our metaphilosophical framework more concrete.

Let us clarify how this worldview agenda typifies three of the six philosophical dimensions. Dimension (1) attempts to describe the world as it is and thus corresponds to worldview questions (a)-(c). Dimension (2) is the normative or axiological dimension of philosophy (worldview question (d)), whereas dimension (3) matches with worldview question (e), or praxeology.

The descriptive dimension (1) concerns “is-questions”. Tackling this dimension is the task of an ontology, explanation and futurology. Describing or modeling the world is an enterprise overlapping with science. The precise formulation of these first three worldview questions will thus vary from epoch to epoch. For example, current problems related to the ultimate constituents of matter (question (a)) highly depend on available scientific theories. It is thus mandatory to reformulate and define precisely those “big” questions in the context of a certain epoch. Such purely philosophical questions become *mixed questions* in the sense that they require scientific knowledge to formulate and to solve them (Adler 1993, 67). Such mixed questions invite us to conduct “philosophy with” other disciplines, rather than the more common second-order “philosophies of” other disciplines (Hansson 2008). Anticipating what follows, considering mixed-questions is already part of the synthetical dimension (6) of philosophy.

The normative dimension (2) tackles “ought-questions”, typified with the fourth worldview question: “what is good and what is evil?”. Answering it is the task of axiology. It can be summarized in two salient questions: “how to live a good life?” and “how to organize a good society?”. Here again, the questions are mixed. For example, the question of how to live a good life is mixed with the psychology of well-being; the question of how to organize a good society is mixed with political philosophy, sociology, etc.

The practical dimension (3) addresses “act-questions”. Given our model of the world and our axiology, how can we act? It is the domain of praxeology (worldview question (e)) and is mixed with fields like operational research, problem-solving methods, management sciences, etc. Adler (1993) did not explicitly include this

important dimension. It is however a notable kind of philosophizing, namely, philosophy as a way of life.

Apostel's definition of a worldview is thus broader than just a representation of the world because it also includes theories of values and actions (questions (d)-(e)). The proposed answers to each question constitute the *worldview components*, which, articulated together form a worldview that we define as a coherent collection of concepts "allowing us to construct a global image of the world, and in this way to understand as many elements of our experience as possible." (Aerts et al. 1994, 17).

Most of today's philosophers would disagree that philosophy's task is still in dimensions (1) or (3). This is mainly because those questions which were once philosophy's territory gave birth to various modern sciences (James 1987, 993). But the point is that they were once at the core of the philosophical enterprise, and the fact that they are not anymore today is arguably only a historical accident (see Adler 1965, 1993). Let us now turn to second-order philosophizing.

2.3 Second-Order Questions

Apostel added two other questions:

(f) What is true and what is false? *Epistemology* (theory of knowledge);

(g) Where do we start to answer those questions?

They invite us to become aware of our current worldview, and to also ponder where our knowledge comes from. Yet these questions are of a different nature than the five others.

The five first worldview questions are first-order in the sense that they question directly our world and how to interact with it. By contrast, the sixth and seventh questions are about the origin of our answers to those first-order questions; they are thus of a second-order nature. Let us now characterize the second-order dimensions more precisely.

The second-order critical dimension (4) is like an intellectual acid, which can attack anything. It has two traditions, *continental* and *analytical*. The two are critical approaches to philosophizing, yet in two very different ways. Continental philosophizing includes movements such as phenomenology, existentialism, critical theory, hermeneutics, structuralism, deconstruction, and postmodernism. First and foremost, it takes subjective and intersubjective perspectives as starting points. By contrast, analytical philosophy is mainly focused on objective aspects and emphasizes the use of precise definitions, sound arguments wrapped up in a rigorous logical analysis.

A third aspect of critical philosophizing is "philosophies of X", where X can be almost any discipline. Those efforts which exploded in recent years are of a critical and second-order nature, contrasting with "philosophies with", which are synthetical or first-order. Epistemology, typified with worldview question (f), is also a second-order inquiry, which is critical. Second-order philosophizing mobilizes a critical and reflexive attitude, typical to the philosopher. This paper itself is of second-order nature, about the "philosophy of philosophy".

Yet, even second-order questions are not disconnected from first-order ones. Answers to first-order questions, whether implicit or explicit, determine second-order analysis (Adler 1965, 45). For example, reflections in philosophy of mathematics, investigating what mathematical objects are, have implications in our epistemology (question (f)) and therefore on how to model and predict the world (questions (a)-(c)).

Most lively debates are likely to be motivated by first-order questions. Platonists or constructivists disagree on the ontological nature of mathematical objects, and are thus ultimately busy with question (a). With this worldview agenda, we insist on reconnecting with first-order questions, whose corresponding dimensions are often neglected in contemporary philosophy (Adler 1965, 42-48).

The dialectical dimension (5) in second-order philosophizing describes different and sometimes contradictory positions on issues. Worldview question (g) requires that this dialectical dimension is properly answered. The concept of dialectic has a rich history in philosophy, but here, its etymological meaning will suffice: “the art of debate”. I do not use it in a Hegelian sense, nor in the derogatory sense of rhetoric or sophistry. The goal of dialectical philosophizing is to remain “point-of-viewless”. This philosophical activity consists in stating or reconstructing issues and a variety of positions towards them. Here, *dialectical* is opposed to *doctrinal*.

This can be illustrated by three great examples in the history of philosophy. In Antiquity, Aristotle in the first book of his *Metaphysics* describes in detail the positions of his opponents before developing his own. In the middle ages, Thomas Aquinas in his *Summa Theologica* (1265-1274) also represented other positions as objections. In modern times, with the two index volumes of “The Great Ideas: A Syntopicon of Great Books of the Western World” Adler and his team (1952, xxx) also had this ideal to remain position-neutral. They provided outlines and indexes of positions related to 102 great ideas in 443 books. Such a gargantuan work could be called a “Summa Dialectica” of the twentieth century (Adler 1952, xxxi).

As useful as it is, dialectical philosophizing alone still remains categorization, an exercise maybe not much more difficult than philately. As Rescher (1985) argued, the temptation of *syncretism*, namely to accept all positions distinguished, is an insufficient philosophical accomplishment, since a mere conjunction of contradictory positions is of course self-contradictory. Syncretism stems from a confusion between first and second-order philosophizing.

A final dimension of philosophizing is needed to fully exploit this dialectical effort in a doctrinal way. As Broad (1947) noticed, philosophers doing such a dialectical investigation, what Broad calls synopsis, are most often motivated by synthesis.

The synthetical dimension (6) is the climax of philosophizing, but also its most arduous dimension. To be successfully conducted, it requires mastering and juggling with all other five dimensions. The great philosophers' feat is in providing a comprehensive and coherent synthesis of their time. It is so challenging that it is rarely attempted (Broad 1947). When we speak about “worldview synthesis”, we refer to this dimension of philosophy.

This paper falls within the critical dimension (4), concerned with “the philosophy of philosophy”. Nevertheless, my motivation in proposing the coming evaluation standards and tests is to help answer first-order questions and to encourage synthetical philosophizing. Faithful to the spirit of this synthetical dimension, there is a clear connection between my first and second order philosophizing. This is why at heart my analysis cannot be neutral, it can not be separated from my first-order philosophical position outlined in the appendix.

Even if synthesis remains an ideal, it is very important to note that each dimension of philosophizing can be pursued relatively independently. What is dangerous and ridiculous is when one of the dimensions claims to be exclusive, or the

only “real” or “true” way of philosophizing. For example, an historian of philosophy does very valuable work in dimension (5) when he clarifies, puts in perspective or corrects some misinterpretations of a great philosopher. The position of that philosopher is then faithfully represented. But this effort, however useful, remains at best one sixth of philosophizing. In section 5.2 we will examine the interactions of the six dimensions, by proposing tests across each of them.

2.4 Implicit and Explicit Worldviews

Most people adopt and follow a worldview without much thinking. Their worldview remain implicit. They intuitively have a representation of the world (components (a)-(c)), know what is good and what is bad (component (d)) and have experience on how to act in the world (component (e)). And this is enough to get by. Every one of us is in need of a worldview , whether it is implicit or explicit. (Vidal 2008a).

But some curious, reflexive, critical, thinking or philosophical minds wake up, and start to question their worldviews. They aspire to make it explicit. Articulating explicitly one's worldview is an extremely difficult task. It is so difficult that philosophical schools have tried to escape it, remaining in the comfortable armchair of second-order philosophizing. Two extreme positions are then possible; either to accept no philosophical doctrine at all (skepticism) or to accept them all (syncretism). Such positions are not tenable if we commit to answering first-order philosophical questions (Rescher 1985). At best, skepticism or syncretism can be useful philosophical critiques or dialectical descriptions.

The worldview questions propose an explicit and enduring philosophical agenda (see Vidal 2008a for more details). Yet, having a clear agenda is still not enough. What about the answers? Answering first-order philosophical questions explicitly is an enterprise which was traditionally philosophy's task. This took the form of comprehensive and coherent systematic philosophical treatises. Regrettably, this trend seems to have fallen out of fashion, since most of today's philosophy addresses second-order problems (see e.g. Adler 1965; Ricoeur 1979).

Before agreeing or disagreeing with someone, we need to explicitly understand our respective positions. Making explicit one's first-order *position* is extremely valuable to present one's philosophy immediately and truthfully. Unfortunately, this practice is not common amongst philosophers. But I choose and invite you to go against this trend. For intellectual transparency and honesty in this metaphilosophical paper, I make explicit my current first-order position in the appendix. Having a clear position on basic philosophical issues is the philosopher's identity card. Every thinker should have one, and be able to show it when entering the Agora of philosophical dispute.

I have chosen only to state my *positions*, not to give *arguments*. Instead, I give main references to the works which most influenced me, where the curious reader will be able to find many detailed arguments. I also make explicit which criteria I value most to work out my position. Certainly this is not as satisfactory as a fully developed philosophical system (see e.g. the impressive work of Bunge 1974; or Rescher 1992). Yet, I am confident this effort will facilitate debate and critique of the (meta)philosophical positions presented here.

3 A Quest for Criteria

3.1 “Meta-” philosophy

“Meta-” disciplines push reflection to another level. In mathematics for example, this gave rise to metamathematics and completely new kinds of insights. Indeed, proof theory which was initially called metamathematics, uses mathematical methods to study mathematical proofs. This leads to qualitatively new kinds of results, for example that a mathematical proposition is *not* provable in a particular axiomatic system. Such a proof is qualitatively distinct from the traditional mathematical activity consisting in proving statements. Another example can be found in historiography, which is the history of history. It asks “how is history written?” and leads to a new kind of reflection about history as a discipline.

In philosophy, this “philosophy of philosophy” endeavor is since a few decades explicitly studied (see e.g. Adler 1965; 1993; Rescher 1985; 2001; 2006; 2010 and the Journal *Metaphilosophy*). This questioning concerns the nature, scope, mission of the philosophical enterprise, and its relation to other knowledge domains. Our aim here is descriptive, to find and define criteria as much as possible independent of philosophical positions. This is why it is a work of metaphilosophical nature. This is of course an ideal, since no metaphilosophical approach is free of philosophical assumptions (c.f. Pepper 1945; Rescher 1985, chap. 8.1).

Our main philosophical assumption behind the criteria and tests we are about to propose is the endeavor of synthetical philosophizing (6). That is, to construct coherent and comprehensive worldviews, answering the philosophical agenda constituted by the five worldview questions. We call such a worldview which is both coherent and comprehensive, *synthetical*.

3.2 The Big Three

There are three perspectives we take into account to structure our criteria. We call them *objective*, *subjective* and *intersubjective*. In broad terms, they correspond to three aspects that many philosophers have distinguished. Let us take a bird's eye view.

The term "worldview" itself comes in three different flavors and emphases:

- (1) a world conception, systemic or objective;
- (2) a life world, experienced, or subjective;
- (3) a world view, social or intersubjective.

In flavor (1) we find the rational scientific endeavor to construct a “world conception” (*Weltauffassung*), as did the logical empiricists of the Vienna Circle (Carnap, Hahn, and Neurath 1929). Another comparable concept is the “world picture” (*Weltbild*) which insists on remaining consistent with scientific results. For example, Dilthey (1957, 25-27) speaks about an objective *Weltbild*. By contrast, a worldview (*Weltanschauung*) is based on this *Weltbild* to form values, ideals and norms for action, for individuals and society (i.e. subjective and intersubjective aspects). More on the definition and need of a worldview in this flavor can be found in (Aerts et al. 1994) and (Vidal 2008a).

Flavor (2) explores the “lifeworld” (*Lebenswelt*) with existential-phenomenological philosophies, which emphasize subjective experiences. The lifeworld stresses the personal aspect of a worldview. The inquiry is centered at the individual level, like in the existentialist philosophies of Kierkegaard, Heidegger, Jaspers, Sartre, or Merleau-Ponty. The drawback is that it does not emphasize higher

levels of organizations (e.g. family, society, planet, universe). This is why it is crucial to go beyond the individual level, and answer those worldview questions with a wide *scope*, a criterion we will detail later.

In flavor (3) “world view” is used in a social and cultural sense, often in anthropology or social sciences (see e.g. Kearney 1975 for a review). The term then parallels “ideology”, “symbolic order”, “cultural code”, etc. “Worldview” is also widely used in christian theology, generally between flavor (2) and (3). For a more thorough study of the concept, see (Naugle 2002; Koltko-Rivera 2004).

Speaking about "worldviews" can thus have at least these three possible nuances, depending on our emphasis in either objective, subjective or intersubjective aspects. This will become clearer and more detailed in section 4. Our avowed bias goes towards flavor (1), but we will try to do justice to the two other flavors as well.

Turning to Kant's three critiques, we find them highly reflexive, epistemological and therefore second-order in approach. Yet, their themes concern three different philosophical realms. The *Critique of Pure Reason* concerns the possibility of objective judgments, the *Critique of Practical Reason* deals with intersubjective morality, and the *Critique of Judgment* is partly concerned with subjective aesthetic experiences.

In an attempt to go beyond monism or dualist philosophies, Karl Popper (1979) also proposed a three worlds pluralism. World 1 is "the world that consists of physical bodies"; world 2 is "the world of mental or psychological states or processes, or of subjective experiences" and world 3 is "the world of the products of the human mind." This world 3 is a wide category, including languages, myths; scientific theories and works of art such as songs, paintings and sculptures. He saw worlds 2 and 3 as successive evolutionary products of world 1. But he emphasized the difficulty of understanding interactions between the three worlds, because of the feedback processes going on between them (for a modern approach on the three worlds, see e.g. Hall 2003). For a critical discussion, and the limitations of this ontology from a sociological point of view, see (Habermas 1981, Vol. 1., 76-84).

Max Weber saw the birth of modernity with the distinction of several cultural spheres of value: science and technology (objective), law and morality (intersubjective), as well as art and criticism (subjective). As Habermas (1981, Vol.1, 340) describes, this leads to cognitive, normative and aesthetic validity claims.

In his influential theory of communicative action, Habermas (1981) took inspiration from Popper's three worlds and Weber's cultural spheres of values to define three validity claims. Actors evaluate their speech acts against three worlds (Habermas 1981, Vol. 1, 100):

1. The objective world (as the totality of all entities about which true statements are possible);
2. The social world (as the totality of all legitimately regulated interpersonal relations);
3. The subjective world (as the totality of the experiences of the speaker to which he has privileged access).

Those three worlds correspond to what we called objective, intersubjective and subjective worlds. Interestingly, this framework also inspired multimethodology research methods in information systems (Mingers 2001; 2003).

Ken Wilber (1995) made this tripartition popular, relating it neatly with grammatical pronouns. The objective world corresponds to the "it", the subjective to

the "I" and the intersubjective to the "we". He stressed the importance of taking perspectives from *inside* these quadrants and not only describing them in an objective manner. It means, for example, that instead of striving to describe the subjective experience in a detached universal way, we can also experience it deeply from the inside. This makes a connection with meditative traditions which seek to explore the nature of inner experiences, as science tries to understand the nature of the external world. Ken Wilber (1995, 211 and 538-539) also pointed out that integrating the "big three" is the central problem of postmodernity.

In cultural evolution studies, objective, subjective and intersubjective criteria to fit knowledge are also distinguished (Heylighen 1997; Heylighen and Chielens 2008). Further developing the insights of Donald T. Campbell, these two papers distinguish three main classes of criteria to select "fit" knowledge. The selection concerns:

- (1) Objective criteria – the object that knowledge refers to
- (2) Subjective criteria – the subject who assimilates and remembers it
- (3) Intersubjective criteria – the communication process used to transmit the knowledge between subjects.

3.3 Bootstrapping the Criteria

Are the criteria descriptive or prescriptive? The best way to answer this questions is to apply the "Meta-" philosophy to the criteria themselves. In other words, to bootstrap the criteria. This leads us to three principal applications of the criteria.

First, '*objectively*', the criteria can help the dialectical dimension of philosophy (5), by describing characteristics of different philosophical approaches and positions. This is partly the mission of the comparative history of philosophy, when it aims at what Rescher (1985) calls *descriptive metaphilosophizing*.

Second, '*subjectively*', the criteria can be used to develop a clear substantive position. It is very insightful to recognize one's own cognitive values, and thereby *giving weights to the criteria*. In this paper, I have tried to restrict my use of criteria in an 'objective' and dialectical manner. However, I do take a first-order position in (Vidal 2011), where I give weight to the criteria. The criteria can also be used as a self-critical checklist, to improve one's worldview, when one try to maximize a number of criteria.

Importantly, when a philosopher says "philosophy should value only this criterion and not that one", he is just expressing his philosophical position. There is no absolute metaphilosophical position from which he could justify such a statement. *Prescriptive metaphilosophizing* is simply philosophizing (see Rescher 1985, chap 14).

Finally, the criteria can be used '*intersubjectively*', to compare worldviews, conduct debates and clarify disagreements. We emphasize this application in this paper. Importantly, even two thinkers adhering to the same descriptive metaphilosophical criteria list will certainly reach different conclusions. Indeed, they will most likely give different 'subjective' weight to different criteria.

To summarize, the criteria can be seen as tools for philosophers to describe the history of philosophy, to work out their own philosophical position, or to clarify disagreements.

3.4 Relativity, not Relativism

Of course it is possible to critique this tripartition. As Popper pointed out, there are many feedback loops between those three worlds. Yet, once we acknowledge them, it helps to understand the different nature of various knowledge domains and traditions.

Taking into consideration the history of ideas as well as cognitive, social and communicative mechanisms, it is clear that knowledge and representations evolve. There is thus no “true” worldview, and it is fundamental to constantly criticize and improve our worldviews. There is therefore a fundamental *relativity* in our approach, in the sense that *we can only compare one worldview with one other*. To compare means exploring and assessing the strengths and weaknesses of different worldviews. There are thus no absolute criteria, nor any intrinsic “goodness” or “truthfulness” of a worldview, as there is no “sound” or “true” language. The French language may have some qualities to express emotions and convey poetry, but a formal mathematical language is indispensable to solve complicated financial problems. It would be vacuous to argue which of mathematics or French is a “better” language. A worldview pluralism is imperative.

This *relativity* does not imply *relativism* however. From a dialectical and second-order perspective, a philosopher can explore and understand a plurality of worldviews. But to elaborate his first-order philosophical position, the same philosopher will still consider that some worldviews *are* better objectively, subjectively or socially than others. The problem is to define what lies behind the word “better”. When we use it, we implicitly use *cognitive values*. The role of our criteria is precisely to make them explicit.

For example, a scientist might argue that *objective* criteria are far more important than *subjective* and *intersubjective* ones, whereas a theologian would argue the opposite. This simple remark will lead us to suggest two directions in which the science-and-religion dialog can be enriched (see section 7).

How can we start to formulate criteria for “good” worldviews? A typical set of criteria would be to recommend good features for each of the worldview components. For example, we can ask: what is a true model of the world? what are the features of a good axiology or praxeology? These questions test worldview components and are certainly necessary to build a well-thought worldview (see section 5.1). However, this would not guarantee that the resulting worldview would make sense as a whole. For example, what if our representation of the world is in contradiction with one's values? We will discuss this *is-ought* assessment problem and other tests in section 5.2.

In formulating the criteria, we focused on *transversal* ones, as much as possible applicable to different worldview components. Also, let us mention that this criteria list is a starting point, to be further refined and elaborated by other philosophers, possibly with different or more criteria. Now, which criteria can we use to compare worldviews?

4 Criteria for Worldview Comparison

Nicholas Rescher (2001, 31) proposed an appealing list of evaluation standards for philosophical theories. Inspired by this list and the “big three” distinction, I propose in Table 1 below a list of criteria. I further explain and illustrate them in the following way. After a short description, for each of them, I attempt to answer: “what if this criterion is violated?”. I then point out abuses and limits of each

criterion; and, where possible, suggest contrasting criteria. This balanced questioning will help us to better delineate both the importance and limitations of each criterion.

<p>Objective criteria</p> <p>Objective consistency - It exhibits internal and systemic consistency.</p> <p>Scientificity - It is compatible with science.</p> <p>Scope - It addresses a broad range of issues and levels, in breadth and in depth.</p>
<p>Subjective criteria</p> <p>Subjective consistency - It fits knowledge and experiences individuals already have.</p> <p>Personal utility - It promotes a personally rewarding life-outlook.</p> <p>Emotionality - It evokes emotions, so that it is more likely to be assimilated and applied.</p>
<p>Intersubjective criteria</p> <p>Intersubjective consistency - It reduces conflicts between individuals.</p> <p>Collective utility - It encourages a life-outlook and mobilizes for what is socially beneficial.</p> <p>Narrativity - It presents its messages in the form of stories.</p>

Table 1: Criteria for worldview comparison.

One worldview is "better" than another, when, other things being equal, it better fulfills objective, subjective and intersubjective criteria. When I refer to a criterion in what follows, I italicize it.

4.1 Objective consistency

Objective consistency requires us to hold a consistent worldview with the use of logic and rationality as a general way to understand, value and act in the world. This includes theorizing, a problem-solving attitude and arguments devoid of anomalies and contradictions. Applied to a worldview, this criterion makes us realize that answers to the different questions are interdependent, and cannot contradict each other.

Argumentation theory helps in classifying and assessing arguments (see e.g. Weston 2000). Reading and producing complex arguments can greatly benefit from argumentation mapping techniques, which present an argumentation in a clear and accessible visual format, instead of a sometimes confusing lump of text (see e.g. Scheinkopf 1999; Twardy 2004; and the annex in Vidal 2008b).

If this *objective consistency* is violated, the result is an invalid or self-contradicting worldview, which is unacceptable. Adler (1965, 158-160) gave examples of self-contradictory theories in Lucretius, Descartes, Berkeley, Hume. In pure logic, the *ex falso quod libet* rule allows to derive any proposition from a contradiction. But even that rule has two sides. First, it shows that the theory at hand is trivial, since it can derive anything and this is why logicians abhor contradictions. On the other hand, a contradiction, precisely because it allows anything to happen next, can be seen as a great opportunity to question deeply rooted assumptions, and to try out radically new hypotheses or theories.

Yet, even if the worldview is perfectly self-consistent, one also needs to start with solid premises. The soundness of premises is as important as the reasoning. When consistency is taken too far, for example if we follow too closely the mathematical ideal, creative problem solving in broader contexts may be frozen by the requirement to comply to the formalism. To avoid this we need to maintain a wide *scope* (see this criterion). Abusing *objective consistency*, we are naturally drawn into more formal thinking, and therefore into narrowing our creative potential. It seems

that more supple tools for thinking are needed as this point (see e.g. the Dialectical Thought Form Manual by Laske 2008, 443-655).

4.2 Scientificity

Taking into account the advances of science is nowadays mandatory. A modern worldview is therefore expected to be compatible with all natural sciences. The modeling of our world (questions (a)-(c)) is now mostly a scientific matter. A worldview respecting the *scientificity* criterion constantly needs to be updated according to scientific progress. This criterion can also be seen as an *external* consistency criterion, while *objective consistency* was only an *internal* consistency criterion. By internal, we mean a logical and systemic consistency, and by external, we mean accuracy with the external world.

Ignoring this scientific criterion leads to unscientific worldviews. This happens when we can study a subject with scientific treatment, but nonetheless treat it ignoring scientific methods and results. Importantly, Broad (1958, 103) distinguished between *nonscientific* and *unscientific*. Philosophy is certainly nonscientific, but this does not imply that it is unscientific. Indeed, philosophy, in contrast with science, is not an investigative enterprise; it does not question the world with observational or experimental methods. It is therefore nonscientific. However, it is possible and suitable to conduct the philosophical endeavor in harmony with scientific progress, and thus avoid the unscientific pitfall.

What happens when *scientificity* is abused? Most likely, we fail to make this unscientific and nonscientific distinction, dismissing both unscientific and nonscientific areas of knowledge. Such a worldview falls into *scientism*, as it displays an excessive trust in the power of scientific knowledge and techniques, applied to all areas of investigation.

Three general scientific approaches are keys for building synthetical scientific worldviews (Vidal 2008a). These are *systems theory* for an attempt towards a universal language for science; a general *problem-solving* perspective on scientific issues, and *evolution*, broadly construed. To contrast and properly extend a scientific worldview, one needs to take into account the normative dimension of philosophizing in the agenda (e.g. worldview question (d)) as well as considering and integrating *subjective* and *intersubjective* criteria.

4.3 Scope

This criterion is particularly rich and vital. We can subdivide it into three: *scope in agenda*; *scope in level breadth* and *scope in level depth*.

Scope in agenda. Other criteria being equal, a worldview is “better” than another when it has a larger *scope in its agenda*, tackling a wider array of issues. We already mentioned that the philosophical agenda is a topic of critical importance and therefore of huge dispute. This dispute often remains implicit and therefore confusing. The worldview agenda covers the most important first-order questions. Here we used five worldview questions as a prototypical first-order starting point, but more related philosophical questions might be added. To this end, it would be worth doing a history of philosophy based on a comparative analysis of philosophical agendas.

If the *scope in agenda* is violated, specific and narrow issues are considered, which leads to sectarianism and overspecialization (Bahm 1953, 423). What often happens in philosophy is that an intellectual conceptual world is built, criticized,

refined, discussed again, etc. With time, more and more complex distinctions emerge and the initial motivation for those distinctions is forgotten, as is the connection with first-order philosophical issues. This is precisely what has happened in modern philosophy when it insists on second-order questions and knowledge. For example, American analytical philosophy after World War II tends to have a good internal consistency and a scientific aspect, but a very narrow scope in its agenda (Rescher 2001, 38). The *scope in agenda* is narrowed-down to second order problems (Adler 1965). It is remarkable that, according to Adler (1965), the commitment to first-order philosophizing is the only condition which is missing from analytical philosophy to become a respectable way of philosophizing.

Of course, the wider the agenda, the more difficult the synthetical integration. Such an integration has always been the achievement of a single philosopher. Those philosophical systems turn into unrevisable, untouchable personal constructions. At that point, there is no more common standards of truth applicable, and philosophizing becomes a personal enterprise, instead of a public one (Adler 1965, 55-56). Adler (1993, xx) describes this mode of validation as *poesis*. The mode of validation is *non-exclusionary*, where two philosophical systems are not more comparable than two poems. Ironically, this grand rational enterprise contrasts with a logical and rational approach, which uses an *exclusionary* mode of validation in which two contradictory propositions can not be true at the same time. We thus need to build *revisable* philosophical systems, open to comparison and criticism. Having a list of criteria or explicit cognitive values is a key ingredient to progress in that direction.

Even a wide *scope in agenda* is not enough. For example, Carnap (1928) had initially a very wide scope in his agenda. But it was reduced and translated in a very narrow way. It looked at every philosophical question solely from logical and empirical viewpoints. To avoid such reductionism, we also need to consider the *scope in levels*.

Scope in levels' breadth. A worldview with a wide scope extends across many if not all domains of human experience. This synoptical dimension is fundamental to the philosophical enterprise (Broad 1947). Philosophical principles then apply to a wide variety of scales and aspects. Such philosophizing aims at unifying otherwise separate phenomena.

When the *scope in level breadth* is violated, philosophizing is restricted to one aspect. Such reductionism starts from a universal intuition such as “everything is composed of atoms”; or “everything can be analyzed logically”; or “all our thinking is embedded in language”, etc. When such and such insight is pushed only in one particular direction, thinking becomes reductionistic. The history of philosophy is full of such cases. For example, materialism assumes that everything is composed of atoms, which leads to difficulties. For example, how can we define what is beautiful, or what is a morally good action if everything is determined by interactions between atoms? In the case of language, even if every expressible thought and idea go through language, does that mean that we can reduce every problem to language problems?

There is however an equally important danger in *abusing* a broad *scope in level breadth*. The worldview risks to become too holistic, and might fall in vague new age intuitions like “everything is one field” or too abstract and useless theories. Accordingly, a delicate balance has to be found between *objective consistency* and the *scope in level breadth*. For example, Hume's work can be seen as mainly analytical, with *scientificity* and *objective consistency* as his main criteria; while Hegel's work is

mainly synoptical, aiming at the widest possible scope (Broad 1947). Yet, Hegel's scope has a tendency to be too large. Some utility and pragmatic criteria can balance the holistic aspect (c.f for example the *subjective* and *intersubjective* criteria). Let us now mention one antidote to reductionism, Dooyeweerd's aspectual framework.

In his unique philosophical approach, Herman Dooyeweerd (1984) introduces fifteen aspects through which we can make sense of the world. The aspects are quantitative, spatial, kinematic, physical, organic, psychic, analytical, formative, lingual, social, economic, aesthetic, juridical, ethical and "pistic". Pistic means a deep-seated faith, a kind of ultimate vision. This framework is very promising, and has already lead to applications in information science (see e.g. Winfield 2000; Basden 2007). If we systematically consider such different aspects, it is indeed difficult to fall in any kind of reductionism.

Scope in levels' depth. A worldview with a wide scope extends across not only to a wide diversity of levels, it also extends across the extreme possibilities of each level. This is to be found in the idea that great philosophers go to the extremes by seeking the most universal issues, principles, theories and answers (Jaspers 1957, intro).

If we maintain an eclectic worldview, taking into account many different levels, it might still be reductionistic if all these levels are not pushed to their extremes. Let us take two examples violating the *scope in levels' depth*. If the *space* level is violated in its depth, the worldview applies only to a very limited geographical area. How seriously can we take a philosophy based only on the life of a small village, and then claims to be universal? Similarly, when the *time scope* is violated in its depth, the worldview applies only to a very particular era. How seriously can we take a philosophy considering *only* what happened in the last ten years of human history?

We need to consider the trade-off between depth-first or breadth-first in the *scope in levels*. Either we go in depth into a subject, with a particular methodology, aim, etc.; or we explore a wide variety of levels, aspects and perspectives.

Even assuming we reached the broadest range of levels, and their deepest capacity, a fundamental issue remains. It is the *scalability* of the worldview, or its logical and scientific consistency *across* different levels. Scalability requires a dynamical hierarchical understanding of the world. We need to switch from *static* to *dynamical* hierarchical levels. Although Dooyeweerd proposes aspects to distinguish and to take into account, he doesn't explain convincingly their origin, nor their complex evolution and interrelations.

The dynamical and hierarchical understanding of different levels is key to understand complex systems (see e.g. Salthe 1985). It is the ability to both analyze issues closely, and to have a broad perspective analyzing micro- *and* macro- scopic issues. In fact, even the micro- macro- terminology is misleading because we do not want to restrict the analysis to two levels only. We need to look at *n* relevant levels. If we consider seriously the relativity of scales, all scales might be equally important. Understanding the transitions between different levels of complexity arguably generates the hardest challenges in contemporary science. For example, how did space-time emerge at the Big Bang era? How did life, language, consciousness, society, etc. emerge?

4.4 Subjective consistency

The *subjective consistency* requires the worldview to fit the broader knowledge, or common experience individuals already have. It is an important theme in philosophy which is called with some variance “common sense” (Descartes), “immediate experience” (Whitehead), “macroscopic experience” (Dewey), “public experience” (Santayana) or “common experience” (Adler).

If an idea does not connect to existing knowledge, it simply cannot be learnt. If *subjective consistency* is violated, knowledge becomes esoteric. Whatever its manifold benefits, if a simple and transmissible version of a worldview is not available, its qualities will not benefit large numbers of people.

There is a continuum between every individual's common experience and special experiences undertaken by empirical sciences. The scope of common experience is however sometimes much wider than the scope of the tightly controlled special experiences performed in science. So, even if one holds the position that common experience is not reliable for philosophical and scientific knowledge, we can't ignore it and need to interpret it somehow.

As with objective contradictions, subjective contradictions can generate a cognitive dissonance at the heart of a growth process. Radically new problems, ideas or theories hurt our basic expectations. For example, quantum mechanics is at odds with many of our ideas such as objectivity, causality, etc. and many scientists work hard to interpret this theory consistently with our macro-world intuitions. If my worldview is not challenged by any experience, theory or person I encounter, I have no reason to change it. A contradiction with common-experience is a driver to the quest of knowledge.

The *subjective consistency* criterion alone has some limits. What might be obvious and consistent for a particular subject might not be so for another. This limits theorizing to particular events and subjects, not general theories and objects. Not surprisingly, it is in contrast with *objective criteria*.

4.5 Personal utility

A worldview satisfying *personal utility* provides goals, values, or at least some preference heuristic to choose between alternatives. It requires having a well functioning implicit or explicit theory of values (question (d)), which connects with ways to act (question (e)).

Life satisfaction research has shown that having clear goals or a personal vision is one of the key factors of happiness (e.g. Emmons 1986; Csikszentmihalyi 1990). In our time of information overload, we can easily get overwhelmed by a flow of possibilities. To navigate in this flow, many self-help books encourage to make one's “vision” explicit (e.g. Nanus 1992; Covey 1999). In fact, even when a clear vision is found it requires a lot of courage and discipline to be faithful to it. Without a vision, one tends to be reactive instead of proactive. As Covey (1999, 72) puts it, reactive people “are driven by feelings, by circumstances, by conditions, by their environment. Proactive people are driven by values -carefully thought about, selected and internalized values”.

A vision alone remains idealistic and sterile if it does not help with day-to-day functioning. The challenge is thus to have practical means for coordinating one's personal actions in harmony with one's vision. Concretely, this can be achieved if the vision mobilizes for action.

In terms of real-world actions, what we need is a good action management method, answering question (e). Problem solving methods, insights in operational research, management, logical decision trees, criteria lists, etc. are all well known tools to help us in complex decision making. The “Getting Things Done” method proposed by David Allen (2001) is also a key building block for a praxeology. It is nowadays widely used among knowledge workers, and its principles are supported by insights in cybernetics and cognitive sciences (Heylighen and Vidal 2008).

The doctrine of utilitarianism centrally meets the criterion of *personal utility* -and its companion, *collective utility*. An action is right insofar as it promotes happiness. So *personal utility* could also be called “personal satisfaction” or simply “happiness”. Yet, it is well known that you can be very happy and yet stupid. In Bentham's (1789, chap iv) felicitous calculus, the *purity of pleasure* is essential to ensure further pleasures, and not to have a pleasure which could lead to a pain. This encourages us to build a good model of the world, using *objective criteria* to anticipate future pleasures or pains, within a wide time *scope*.

If we abuse this criterion, this leads to individualism. Everything becomes centered on the individual's gain in pleasures and decrease in pains. We want the pleasures to be not only personal, but also *sharable* with individuals and larger systems. That is why we also need to take into account a larger *scope*, at least with an intersubjective or social perspective, as we will see later with *collective utility*.

4.6 Emotionality

The rational attitude is unemotional (Bahm 1953, 14). It might then be surprising to include *emotionality* as a criterion for a good worldview. The trouble is that emotions often remain poorly recognized and discussed in many human interactions, even if their influence can be immense. Merely suppressing or leaving emotions unacknowledged is letting them intervene in more subversive and unconscious manners (e.g. Freud 1899). It would be foolish to dismiss their power and impact on every aspect of our lives and worldviews. We definitely need a framework and tools to deal with them.

Emotional states of mind can be triggered by the environment or by interacting with others. It is therefore a criterion better categorized as both *subjective* and *intersubjective*. The interplay of emotions with higher cognitive functions, culture, education, personality is complex and intricate. It is the object of affective science to study motives, attitudes, moods, and emotions, and their effect in personal and collective behavior. Here we only outline their importance from an individual perspective.

Emotions are basic cognitive mechanisms inherited through evolution. They can be viewed as basic survival “values” passed on *genetically* and *not culturally*. They have been successful during millions of years of evolution, to achieve survival and reproduction (e.g. C. Darwin 1872; Ledoux 1996).

For example, they are indispensable to maintain basic bodily functions (see e.g. Denton 2005). Such homeostatic emotions are feelings triggered by internal body states. Thirst, hunger, or feeling hot are all feelings engaging us to restore balance in bodily systems, by drinking, eating or moving into the shade. They can be distinguished from classical emotions triggered by external stimuli. Lust, anger and fear motivate us to copulate, fight or flight. More generally, beyond their original survival and reproductive merits, emotions are etymologically what moves us.

Emotions direct our attention, motivate our behavior, resulting in mobilizing us for action.

Finding a good emotional balance is fundamental for an individual to be in good health and to be socially integrated. If not, he will experience emotional and behavioral disorders. Having too few emotions, like a psychopath; or having too many, like some forms of neurosis, are both pathologies. In extreme cases, modern medicine and psychotherapies can help in dealing with such situations.

If *emotionality* is violated, it means that few emotions are involved (or only negative and low-energy emotions such as depression). Our worldview becomes bland and not engaging, whatever its other qualities are. No motivation is found to accept or act according to a certain worldview rather than another. Not addressing emotions in psychological, social, educational and philosophical efforts leads to insufficient theories, missing a major aspect of our cognition.

What if we abuse *emotionality* in expressing or communicating a worldview? To take an example in philosophy, Nietzsche has a writing which is at the edge of philosophy and poetry. The result is a work of a great depth and beauty, which is very inspiring to many readers. His work is like a work of art, open to many different interpretations and ambiguities. This emotional or artistic approach to philosophy suffers from downsides, namely that it does not use an argumentative approach (Rescher 2001, chap. 6.3). We thus need to balance *emotionality* with *objective consistency*, to also include a logical and argumentative attitude.

What are the limits of *emotionality*? The main problem is that emotions can take over our rational thinking mode (however, for a balanced discussion about cognitive and affective cognitive processes, see e.g. Damasio 2000; Davidson 2000). Reacting quickly, strongly and thoughtlessly was once an evolutionary advantage: you better be scared and react if you see a hungry lion running after you. In modern citizens' day-to-day life, this emotional reactivity is more and more a burden than an advantage. Uncontrolled strong negative emotions can have devastating effects in all kinds of social relationships, so that it seems worth learning how to tame them. On the other hand, positive emotions are crucial to creativity, which requires a relaxed, tolerant and open-minded attitude (see e.g. Fredrickson 2004).

4.7 Intersubjective consistency

Intersubjective consistency calls for the reduction of conflicts between individuals. In other words, it is an effort towards social peace. It requires interactions between individuals which flow without flaw. Moral philosophy, economics, ethics, politics and jurisprudence are mainly concerned with this criterion.

When *intersubjective consistency* is violated, conflicts between individuals and states occur and interactions are difficult. Yet, moments of high frictions can be occasions for in depth reforms and social learning. For example, too much friction in a society often leads to revolutions, along with a whole new way of functioning. A form of social learning occurred after World War II when states learnt from their failures and set up new agreements and social bonds.

Abusing this criterion by avoiding at all prize any conflict would only promote traditional ways of thinking and acting. This would hinder creative ways to reorganize societies, because new ways of thinking necessarily imply friction with older ways. Fortunately, conflicts need not to be physical. As Karl Popper (1963, conclusion) wrote eloquently: “the role of thought is to carry out revolutions by means of critical

debates rather than by means of violence and of warfare; (...) it is the great tradition of Western rationalism to fight our battles with words rather than with swords.”

It is therefore important to balance *intersubjective consistency* with objective criteria, conducting conflicts on an Agora rather than on a battlefield. If communication is difficult, it may also be time to seriously take *emotionality* into account to unlock dialogue. It is also both difficult and important in social matters to maintain a wide *scope*, considering a variety of levels from the individual to the ecological.

4.8 Collective utility

Collective utility is a natural extension of *personal utility*. It encourages a life-outlook and mobilizes for what is socially beneficial. We saw the importance of having a personal vision. Yet, if the vision is centered on the individual it runs the risk to be individualistic and opportunistic. Thus, the personal and collective visions should as much as possible be meaningfully integrated with a wide *scope*, leading to a personal life-outlook also beneficial for larger organizations. Those organizations operate at different levels, ranging from the family, the social network, the country, to humanity as a whole, the planet as an ecosystem, or even the entire universe. It is of course a difficult challenge to integrate *personal* and *collective utility*.

The concept of *coordination* is central in this discussion. It can be defined as the organization of actions so as to maximize synergy and to minimize friction. To work properly, an organization needs individuals to coordinate their actions. Such coordination mechanisms can emerge more or less naturally, for example with cultural norms, linguistic conventions, traffic rules, etc. Robert Wright (2000) argued that cooperation increased through history, leading to more and more win-win situations, or non-zero sum games.

However, for more elaborated purposes, the coordinating endeavor is much more difficult to achieve. How can we promote order and mobilize for collective actions, so that they are done smoothly and cooperatively? A promising compromise between individual freedom and collective interest is to design choice architectures that nudge people towards desired actions (Thaler and Sunstein 2009). Additionally, information and communication technologies make this collective coordination endeavor technically workable on large scales (see e.g. Watkins and Rodriguez 2008). A famous illustration of collective coordination is the well-known Wikipedia encyclopedia, which coordinates millions of users to collaboratively write the largest encyclopedia ever.

The open-source software development community already functions with advanced collaborative coordination tools (Heylighen 2007). They use job-ticketing systems to stimulate the community to act. A user who finds a bug or a feature to implement leaves a message on a forum, to which other have access. Other users can then work on this initial stimulus. Inspired by this success, and extending *personal utility*, personal action management systems could be extended to the collective, hinting at the possibility of a collaborative version of “Getting Things Done” (Heylighen and Vidal 2008). Collective problem solving through collaborative argumentation mapping methods also promises to significantly promote large scale rational decision making (Baldwin and Price 2008; Iandoli, Klein, and Zollo 2007).

If *collective utility* is violated, people strive to fulfill individualist values or basic needs. *Collective utility* can be interpreted as a consistency criterion, not on a

theoretical level, to stay contradiction-free, but on a practical level, to achieve mutually beneficial actions. Idealized consistent systems are useless if they can not be applied in the real world. *Collective utility* is thus a strong pragmatic criterion to complement theoretical reasonings and constructions. Nonetheless, focusing on *personal* or *collective utility* leaves normative problems open. We need to find, define and refine what we deem is the most useful, personally and socially. An axiology is needed.

4.9 Narrativity

Narrativity calls for presenting the worldview's messages with stories. A story can be defined as a connected sequence of actions that follow from one to the next. Stories are everywhere, in every culture. Religious texts, newspapers, gossip, literature, movies and theater plays all use a narrative form to tell stories, real or imagined. Overall, stories constitute the vast majority of humanity's bookshelves.

Narrativity and *emotionality* go hand in hand, because both have a double subjective and intersubjective aspect. Subjectively, *narrativity* is essential because it makes the worldview emotional, motivating and easy to assimilate (see e.g. Oatley 1999; Heath 2007). Intersubjectively, it is also crucial to relay messages effectively. Love stories are typically much easier to spread than mathematical theorems.

Stories are very efficient to pass messages on, because our very thinking process works with stories. We are constantly constructing stories where we are the hero... or the victim. Even analytical philosophy applies *narrativity* when it presents moral dilemmas in the form of short stories. This is partly why it is so exciting to try to solve them.

When *narrativity* is violated, we are confronted with theoretical material. Theories are not only insipid emotionally, they are also hard to learn, hard to understand and hard to remember. Theories are disconnected from human dimensions. At the extreme of theorizing is mathematics, often painful to learn. A simple way to overcome difficulties in learning theoretical disciplines would be to include history of science in curricula more systematically. This would reestablish our natural tendency to be motivated and to better learn with stories. Philosophy and mathematics are not popular because *narrativity* is constantly violated. Notable popular exceptions such as *Sophie's World* (Gaarder 1994) or *Fermat's Last Theorem* (Singh 1998) both use a narrative form to make those disciplines widely accessible.

But leaving aside *narrativity* is also the price of good theorizing. Indeed, telling stories is antithetical to theorizing. Literary and scientific are two different cultures, very hard to bridge (Snow 1959). Stories require a long message to convey a short idea, which may not be universally valid. Science and philosophy, because of their theoretical nature, seek generalities and *explicitly* avoid *narrativity*. Science aims at finding universal laws, supposed to be certain, independent of time, contexts or individual subjects; whereas stories narrate a sequence of actions at a particular time, in a particular context and with an uncertain outcome (Heylighen 2010a).

5 Assessment Tests

The simplest applications of the criteria are as a checklist to compare or improve worldviews. Yet, such a worldview assessment is not to be understood as an issue-resolving algorithm. Rather, the criteria are cognitive values which influence the preference of one worldview over another. As Kuhn (1977) and McMullin (2008)

underlined, the incentive behind such criteria lists is to maximize *simultaneously* each of them. Rather than a mechanical process, constructing worldviews is an art to balance contrasting and sometimes conflicting criteria.

Individually, criteria are also imprecise. Individuals may differ about their application in concrete cases (Kuhn 1977, 322). For example, philosophers of science have shown that even if scientists are in principle driven by objective criteria, subjective (is the theory simple to understand?) or intersubjective (do authorities believe in this theory?) considerations play equally an important role in constructing and assessing scientific theories (e.g. Kuhn 1970; Feyerabend 1993).

Can we derive more criteria from the nine we proposed? Surely. For example, *sustainability* requires a wide time scale (*scope in level depth*) as well as *collective utility*. *Synthesis* requires a wide *scope* in agenda and levels, coupled with the striving of *objective consistency*. And so on, and so on.

Let us now turn from our criteria to evaluation tests and first recover some of Adler's (1965; 1993, 31). He argued that there are three families of tests: *empirical*, *pragmatic* and *logical*. First, *empirical* tests, such as Popper's falsificationism are clearly included in *scientificity*. Furthermore, if we follow Adler's distinction between special and common experience, *scientificity* would be useful to assess the special experience that science conducts, whereas *subjective consistency* assesses the common experience that we undergo. Second, *pragmatic* tests are represented by *subjective* and *intersubjective utility* criteria. Thirdly, the *logical* tests are included in our *objective consistency* criterion.

Using each criterion individually is relatively easy, but the outcome of such a use is limited. How can we use *several* criteria at the same time? Combining more and more criteria, we face a combinatory explosion, especially as we enlarge our *scope*. Let us see why.

5.1 Testing the Components

A natural use of the criteria is to test the worldview components (ontology, explanation, prediction, axiology and praxeology). Let X be a worldview component and C_n , criterion n . The general question is then:

“What is a good X according to $C_1, C_2, \dots, \text{ and } C_9$?”

For example, “what is a good explanation according to *scientificity*, *scope*, *subjective consistency* and *collective utility*?” Arguably, the most important combination to keep in mind is the *scope in levels*. As we argued when describing the *scope* criterion, its use is fundamental to grasp complex realities and to avoid reductionism.

So, the criteria can be used analytically, to improve each worldview components. But the comprehensiveness ideal urges us to think about several worldview questions and components *simultaneously*. So, if X_n is component n , the problem becomes:

“What are good $X_1, X_2, \dots, \text{ and } X_5$ according to $C_1, C_2, \dots, \text{ and } C_9$?”

In other words, “what are a good ontology, explanation, prediction, axiology and praxeology according to every objective, subjective and intersubjective criteria?” Or more simply, “what is a good worldview according to all criteria?” The task is daunting. The purpose of the following assessment tests is to identify the most salient and useful tests from the most significant combinations. Please note that some tests partially overlap, which can be a way to double-check one's worldview.

5.2 Testing the Dimensions

We now describe first-order (*is-ought*, *ought-act* and *is-act*); second-order (*critical*, *dialectical*) and synthetical or third-order tests (*mixed questions*, *first-second-order*) operating across the six dimensions of philosophy. When there is an effort to cohere descriptive and normative dimensions, we are in the domain of the *is-ought* test. Similarly, combining normative with practical dimensions is covered by the *ought-act* test. Finally, coupling descriptive and practical dimensions leads to the *is-act* test. Key questions summarizing these tests are to be found in table 2 below.

The *is-ought* problem (Hume 1739) reminds us that philosophy is a unique discipline concerned with both questions about what is the case, as well as what ought to be. In other words, it is busy with both descriptive and normative issues. Combining descriptive and normative theories leads to the *is-ought* problem, "the central problem in moral philosophy" (Hudson 1969, 11).

Let us illustrate the *is-ought* problem with the classical issue of determinism and freedom. If we assume at a descriptive level that everything is completely determined, then can we defend on a normative side that there is such a thing as human freedom? This is a typical complication of the philosophical doctrine of determinism. Until this *is-ought* problem has received an adequate answer, the doctrine is not satisfying (see also e.g. Adler 1965, chap. 11; 1993 for more details on the *is-ought* test).

Even if the worldview under consideration successfully passes the *is-ought* test, it tells us nothing on how to act in concrete situations. How well are the normative and practical dimensions holding together? How are moral principles and ethical theories applied in practice, individually and collectively?

The *ought-act* test concerns consistency between values (worldview question (d)) and actions (question (e)). Philosophy as a discipline is rarely considered busy with this problem. In the *ought-act* test, efficiency in action is not primarily what matters. What matters is that individual or collective actions are in line with normative principles. How can we apply normative theories in specific cases and contexts? This is the central problem of *applied ethics*. For example, fields like medicine, business, engineering or scientific research are all confronted with difficult ethical choices to perform (see e.g. LaFollette 2007). To act meaningfully, a normative theory is largely insufficient. To act we also need practical realizable and concrete means consistent with normative rules. More realistically, to tackle complex moral decision making, applied ethics has developed sophisticated models such as case-based reasoning or Rawls' (1971) reflective equilibrium. In such an endeavor, the philosophical enterprise is mixed with the moral and political one, and needs insights from strategic action, management theories, etc. to conduct it.

Let us illustrate a failure of the *ought-act* test with Kant's (1785, 4:421) categorical imperative, "Act only on that maxim through which you can at the same time will that it should become a universal law." Beautiful. But how are we supposed to apply it in practice? This normative imperative doesn't take into account any real-world complexity in decision making. It doesn't help much to act. For example, it doesn't help a young doctor to decide if this 14 years old girl who is pregnant should abort or not. Another example is the value of bringing world peace. Almost everybody would see it as a valuable enterprise. But what are the most urgent and important actions to do now to achieve this as soon as possible? To stop famine? To

fight corruption? To provide all world citizen energy by building more nuclear power plants? etc. A lot of deliberation will be needed to reach agreement.

Often, philosophers are reluctant to go on the action side, notably because they feel more comfortable with second-order philosophizing. The theory of action, or praxeology is largely neglected. A notable exception is Karl Marx who famously wrote to Feuerbach that "philosophers have hitherto only interpreted the world in various ways; the point is to change it" (Engels 1888). Mises (1949) also developed a theory of action, which is sometimes considered as the capitalist equivalent of Marx's *Capital*. The problem is that abuses of applying a philosophical theory in the moral or political sphere easily occur. Therefore, it is worth asking if the philosopher should not be more worried and present when this critical transition from value to action occurs. The *ought-act* test aims to cohere values with concrete actions and is as crucial to address as the *is-ought* test.

Passing the *is-act* test successfully is essential for effective and efficient action. From a cybernetic viewpoint, this is obvious. The more accurate the model is, the more precise and effective will action and control operate (Conant and Ashby 1970). This test entails an engineering attitude, and is of a technical utility. When the *is-act* test is neglected, action doesn't work. In fact, in science and engineering there is a constant feedback between modeling and experimenting (acting). An action which does not produce good results will not be selected. A good model of the world enables us to make predictions of our actions' outcomes.

However, considered alone, the *is-act* test short-circuits the normative dimension. The *only* implicit value here is efficiency. We might call such a shortcut the "normative fallacy", where the normative dimension is simply dropped. This is very important to acknowledge, because if we want to bring in our values, we need other dimensions of philosophizing. The most obvious solution is to combine this test with the *ought-act* or *is-ought* test.

Let us now turn to second-order tests. First, with the *critical* test. The key question is: "did you critically analyze your worldview with objective, subjective and intersubjective criteria?" We can use both analytical and continental traditions to perform these tests. The analytical will foremost use *objective consistency* and *scientificity* to perform its critique; while the continental tradition will focus on *intersubjective* (social) and *subjective* aspects of the worldview in consideration. Failing to pass this test, philosophizing is unreflective and possibly self-contradictory if a minimum of rigorous analysis, definitions and arguments are not set in motion.

The *dialectical* test is summarized with the question: "*did you review all major positions on this issue?*" All good academic research starts by reviewing as impartially as possible all positions and related issues on a certain topic or idea. The Syntopicon is a very advanced and useful example of such an effort. Once a wide review is made, it is possible to precisely define and join issues. When this dimension of philosophizing is skipped, we are likely to generate naïve theories, to develop a position on one's own ignoring the history of ideas. But this dialectical work ultimately helps philosophers busy with first-order questions, to synthesize different conflicting positions, or to show why their position is "better" than others.

Synthetical tests are crucial for anyone concerned about synthesis, or third-order philosophizing, gluing together the previous five dimensions. In synthetical philosophy, we can distinguish -at least- two tests: the *mixed question* test and the *first-second-order* test.

The *mixed question* test asks: “is your worldview consistent with and working with other branches of knowledge?” It asks for coherence between different disciplines, when each of them can make a contribution to the issue at hand. It requires an awareness of relationships between disciplines, their subject matter and their limits. For example, a mixed question test involving historical or scientific knowledge can discredit philosophical theories. Adler (1965, chap. 12) described the *mixed question* test in operation, by comparing our common experience of material objects with the scientific description of elementary particles. He concludes that one “measure of the soundness of a philosophical theory or doctrine is its ability to (...) reconcile what truth there is in a scientific theory with what truth there is in a common-sense opinion and in the philosophical elucidation of that opinion, when these several truths appear to come into conflict.”

All first-order philosophical dimensions are nowadays mixed with other disciplines. To conduct such an interdisciplinary effort, we need to master mixed questions. We must know which disciplines we involve to solve which problem. This is essential in our complex world, and this is why the *scope* criteria are fundamental. Such synthetical philosophizing is more than the “philosophies of” typical of its *critical dimension* (4). The synthetical dimension connects to first-order dimensions, which are successfully conducted by doing *philosophy with*, side by side with other knowledge branches (Hansson 2008). If the *mixed question* test is violated, it leads to monodisciplinarity, a naïve approach to complex problems or inconsistencies between disciplines.

The *first-second-order* test asks “Is your second-order philosophizing ultimately working for first-order philosophizing or synthesis?” Critical philosophizing most often fails to connect with first-order issues, and thus leads to esoteric knowledge. For example, when studying epistemology, is our goal strongly committed to the effective production of knowledge, to explain, predict and control our world? Or are we engaged in a debate amongst second-order knowledge experts? It is easy to lose sight and sense of the traditional first-order philosophical enterprise. When this second-order philosophizing is overly developed, several things happen. First, the *scope in agenda* is considerably narrowed down. Second, no connection with common-sense is found, i.e. it violates *subjective consistency*. Third, only one philosophical dimension out of the six is carried out. A similar reasoning holds for the dialectical dimension. It needs at some points to reconnect with first-order issues to be of any use. In summary, the second-order critical and dialectical dimensions of philosophy work in the last instance for operating a synthesis between descriptive, normative and practical philosophy.

Both continental and analytic philosophies fail this test. In continental philosophy, first-order philosophizing is ignored or drawn in an inaccessible conceptual vocabulary. Today's analytic and linguistic philosophies are focused on a technical second-order philosophizing and will most often fail to connect their analyses to first-order dimensions. In both cases, philosophy becomes an esoteric practice, reserved to a few intellectuals.

Test	Question
<i>Is-ought</i>	Is your description of the world consistent with your values?
<i>Ought-act</i>	Do you connect your values with concrete decision making and action?
<i>Is-act</i>	Is your model for action efficient?
<i>Critical</i>	Do you critically analyze your worldview with objective, subjective and intersubjective criteria?
<i>Dialectical</i>	Do you join issues and review all major positions on ideas related to your worldview?
<i>Mixed question</i>	Is your worldview consistent with and working with other branches of knowledge?
<i>First-second-order</i>	Is your second-order philosophizing ultimately working for first-order philosophizing or synthesis?

Table 2: Summary of worldview assessment tests across the philosophical dimensions.

5.3 Testing the Big Three

We now turn our attention to the three worlds. How are they interacting? How to deal with this tension between the objective, subjective and intersubjective - not merely as independent sets of criteria, but in their systemic interaction? Here we present tests to tackle this issue of integrating the three worlds.

Let us take a bird's eye view on our criteria. Humans are involved in three kinds of conflicts: against nature (objective), against ourselves (subjective) and against others (intersubjective). We want to minimize those conflicts, or at least we want tools to deal with them. More precisely, *objective criteria* require the worldview is not in friction with the outside world; *subjective criteria* require the worldview is not in friction with an individual's common knowledge and actions; *intersubjective criteria* require the worldview to minimize friction between individuals, and maximize their synergistic interactions. In comparative philosophy, Huston Smith (1957, 8) recapitulated that, generally, the West has emphasized the natural problem (objective); India the psychological (subjective) and China the social (intersubjective). This indicates that comparative philosophy can be regarded as a pivotal starting point to satisfy criteria in the three worlds.

A worldview which fits well in the three worlds has more chances to be accepted, appealing and useful. Ideally, it would give rise to the following benefits. A consistent conception of the world (objective benefit); a lifeworld providing a meaning of life, useful to live a good life (subjective benefit) and a world view whose foundations are fit for a well-organized society, where few conflicts arise (intersubjective benefit). Most importantly, those three worlds would be synthesized as much as possible in a coherent and comprehensive framework.

If we sum up the use of the three-perspectives criteria, we come to the thesis of *minimizing friction: a good worldview has a minimum of friction within and between objective, subjective and intersubjective worlds*. Can we specify more precise and concrete tests towards this ideal? Similarly as we did for the philosophical dimensions, we propose here tests across the three worlds. This leads to three main tests: *we-I*, *I-it* and *we-it*.

In the *we-I* test, we ask: “is your worldview compatible or in friction with the interests of society?” This question raises a classical problem in political philosophy, namely the conflicting interests of the individual and the collective. Ideal solutions of such conflicts do not reach compromise (zero-sum game), but cooperation and synergy (non-zero sum game). To reach cooperation, we can develop empathy with our neighbor and our society. But applying the *scope in level breadth*, we need not to stop to society. Larger systems can also be embraced, from the whole planet to the entire universe.

There are two caricatural ways in which the *I-we* test is violated. First, if the subjective world dominates, it leads to individualism and its downsides. Second, if the intersubjective world and values dominate, there are risks of surrendering to a political system, such as communism. There is no obvious solution to this tension and a delicate balance between the two needs to be found.

We can not build empathy for systems we are not even aware of. With the *it-I* test, we can assess the extent of this awareness: “is your worldview compatible or in friction with the most up-to-date scientific models?” This test requires the integration of subjective and objective worlds.

When the *it-I* test fails, I live in an unscientific illusion, or with a very limited objective view. Such a narrow awareness might work in the short-term of a single life-span, but is likely to fail on larger time scales. Interestingly, it might be beneficial to work both on our inner subjective awareness -or *involution*-, and on the outer objective *evolution* of systems (Smith 1976).

With the *we-it* test we ask: “is the society we are developing compatible or in friction with the objective world?” Here, we combine *objective criteria* to serve *collective utility*. But, as the *is-act* test showed us, we need to be sure that our values are not short-circuited in such an endeavor. If we emphasize too much *intersubjective criteria*, we might hamper the quality of our world models. On the other hand, relying exclusively on *objective criteria* to take decisions leads to a scientific worldview, ignoring the will and values of individuals, societies and larger organizations.

Test	Question
<i>We-I</i>	Is your worldview compatible or in friction with the interests of society?
<i>It-I</i>	Is your worldview compatible or in friction with the most up-to-date scientific models?
<i>We-it</i>	Is the society we are developing compatible or in friction with the objective world?

Table 3: Summary of worldview assessment tests on the big three

To conclude, we can ask the following question. Can we combine our tests? Certainly. For example, the *is-ought* and the *we-I* tests can be combined. This invites to join the description of the world from a individual and collective perspective, with normative values generating less friction for myself and for society.

Comparing in details two philosophical systems or worldviews is obviously outside the scope of this paper. For example, comparing Whitehead and Spinoza's philosophies is a huge scholarly enterprise. Nevertheless, our criteria and tests should be useful to clarify concrete issues. This is why we now turn to two applications.

First, we examine the conflict between Intelligent Design (ID) and Flying Spaghetti Monsterism (FSMism); and secondly, some aspects of the science-and-religion dialogue.

6 Intelligent Design vs Flying Spaghetti Monsterism

In 2005, The Kansas State Board of Education required the teaching of ID as an alternative to biological evolution in public schools. Astonished by this decision, Bobby Henderson protested against it. He created a satirical deity, The Flying Spaghetti Monster (FSM), supposedly at the origin of our universe. In an open letter to the Kansas School Board, he then proposed that science classes should include: “One third time for Intelligent Design, one third time for Flying Spaghetti Monsterism, and one third time for logical conjecture based on overwhelming observable evidence” (Henderson 2005). The purpose of this action was to show that it does not make sense to teach ID in schools, at least not more than teaching FSMism.

With the help of our criteria, let us see whether we can confirm our intuitive idea that FSMism is still “less valid” than ID. Accordingly, both theories are not presented as worldviews, but they underly very different worldviews. Our criteria and tests can thus be applied if we look at FSMism and ID in such a broader context.

6.1 Testing the Components

Regarding *objective consistency*, ID and FSMism are comparable: they postulate a designer-of-the-gaps which can solve any contradiction. Concerning the *scientificity* criteria, ID and FSMism are equally bad: no scientific evidence supports either, which is the main point of this FSMism satire. Both are *unscientific* theories: biological evolution is most effectively researched with the available scientific evidence, theories, conjectures, methods, etc. Still, ID arguments are more subtle than the FSMism ones (e.g. using the notion of “irreducible complexity”, instead of the FSM showed to be not very bright in his unintelligent design).

The *scope in agenda* criterion tests the breadth of worldview questions tackled. FSMism tells us about how the world came about (question (b)), and maybe where we are going (question (c)). However, the ramifications of ID are much richer. It originated from creationism and thus has clear links with the God of monotheists. Therefore, implicitly, supporters of ID have a religious agenda, which makes the theory appealing. However imperfect and self-contradictory they sometimes are, religions are full of recommendations and rituals concerning values (question (d)) and actions (question (e)). FSMism does not propose comparable values or ways to act, which were gradually gathered by religious traditions during centuries. Both FSMism and ID are feeble in answering questions (a), (b), (c), but FSMism has not much to say about questions (d) and (e). Therefore, ID has a greater *scope in agenda*.

In terms of *subjective consistency*, ID also scores much better than FSMism. Indeed, in ID, the identity of the designer is even not systematically related to a God. The designer is thus a fuzzy concept, open to many possible interpretations, and such vagueness can contribute creating a mysterious “guru effect” (Sperber 2010). In contrast, the Flying Spaghetti Monster is a very specific entity, with “His Noodly Appendage” and his meatballs, which defies common sense. In this respect, ID is more subjectively consistent than FSMism. No enriching *personal utility* is offered in FSMism, except maybe to fulfill a need for humor. It would rather be scary and

disgusting to think that the world really originated from such a monster. This disgusting aspect of FSMism triggers a negative emotion, and makes it score low on the *emotionality* criterion. In contrast, ID claims that science has some limits. This is precisely the connotation behind terms such as “irreducible”, which contributes to give a feeling of mystery and awe. Of course, this applies only to people not sensitive enough to *objective criteria*.

Regarding *intersubjective consistency*, it can be argued that FSMism is better than ID, because it has “never started a war and never killed others for their opposing beliefs” (Henderson 2006, 65). Concerning *collective utility*, both are quite good, although for different reasons. ID, because of its links with religions, which can potentially weave the social web. However, even if FSMism has some success because of its satirical, humorous and provocative aspects, its potential for *collective utility* is far behind ID. Both ID and FSMism use stories and thus apply *narrativity*. Yet ID can rely on hundreds of well known biblical stories to convey its messages, whereas FSMism has just a few freshly elaborated stories.

Summing up, both score equally low on *objective criteria* (except for the *scope*, which is larger in ID). Otherwise, ID generally scores better on *subjective* and *intersubjective criteria*. Therefore, from this analysis, we can conclude that ID underlies a “better” worldview than FSMism. I have few doubts that Pastafarians, the devoted members of the FSM Church, will work hard to improve this situation.

6.2 Testing the Dimensions and the Big Three

Both ID and FSMism score low on the *is-ought* test. FSMism because it is still in its infancy to provide values and moral principles guiding day-to-day life. ID because the oughts derived from creationism are often inconsistent and unscientific, which violates two objective criteria, *objective consistency* and *scientificity*.

The *ought-act* test succeeds better in ID, because social structures are already in place since more than two thousands years with Churches, priests, rituals, etc. supporting its values with practices. By contrast, FSMism is only six years old and needs more time to seriously compete with ID. Because they are not really busy with *objective criteria*, both ID and FSMism ignore the *is-act* test, which leads to inefficient acting.

ID and FSMism are likely to argue which is better regarding the *We-I* test. What is in the best interest of people and society? To believe in ID or in FSMism? However, both fail the *it-I* and the *we-it* test, because they are not compatible with scientific theories, and will therefore keep a naïve world conception.

All second-order and synthetical tests fail, or, are rather not even applicable since both ID and FSMism have no ambition to be that thoughtful.

7 Towards a Fruitful Science-and-Religion Dialog

This brisk comparison between ID and FSMism shows that worldviews inspired by religions score high on many criteria at the same time, and this helps to explain their success. Of course, most of the time, they score very low on *objective criteria* and fail second-order tests. By contrast, scientific and -some- philosophical worldviews score the highest on *objective criteria* and most philosophers seriously appraise second-order tests.

We now turn to the science-and-religion debate, which is arduous, complex and multidimensional. We do not pretend here to go in the depth of it, but to show how our criteria and tests can help to enlighten it.

7.1 Testing the Components

Religions excel both in *personal* and *collective utility* by offering ways to resolve internal conflicts or to improve social bounds. The *emotionality* criterion is central, with major concerns for the subjective emotional experience and the religious experience. *Narrativity* is also a key elements of all religions, which, by contrast, scientists tend to avoid. Exploiting or not those last two criteria is traditionally seen as a major distinction between a scientific and a religious attitude.

Complementarily, the scientific culture will focus only on *objective criteria*. A scientist telling stories of his personal emotional experiences is not taken seriously. However, it is important to acknowledge the limitations of purely scientific worldviews. The traditional mission of science is to model the world, by answering worldview questions (a), (b) and (c) in an objective manner.

A religious worldview is often weak when attempting to answer those three worldview questions because it is generally more concerned with questions about values (question (d)) and actions (question (e)) both from a subjective and intersubjective point of view. The result is that *objective criteria* are much less central than the *subjective* and *intersubjective* ones.

7.2 Testing the Dimensions and the Big Three

Let us now discuss our worldview assessment tests. The *is-ought* test rarely succeeds in popular religions, because they do not allow novelty and adapt very slowly to new scientific discoveries. They maintain that they don't change essentially. They value more tradition and authority (intersubjective), or personal experiences (subjective), rather than scientific progress (objective).

The *ought-act* test succeeds quite well in religions, which are indeed quite focused on concrete actions and practices. At the individual level, there are rituals like prayer, meditation or confession helping to deal with difficult cognitive or emotional situations. At the social level, people go on pilgrimages or benefit from the wisdom of religious authorities to make sense of day-to-day life.

Because science is not busy with ought questions, both the *is-ought* and the *ought-act* tests fail. Some normative principles need to be developed to complete a scientific worldview, if only to explicit its commitment to efficiency values only, that is to admit that it is only interested in the *is-act* test. An axiology, whether philosophical or religious, is thus an indispensable complement to a scientific worldview.

Since science and religion both focus on first-order questions, the *critical*, *dialectical* and *synthetical* tests will only be attempted by philosophically-minded scientists or professional theologians.

Out of the big three tests, the *I-it* and *we-it* test are directly applicable in a scientific worldview. By contrast, in a religious worldview, the most important test will be the *we-I* test and more rarely concerned with the *we-it* and *it-I* tests.

7.3 Two directions for the science-and-religion dialogue

Given our short analysis, a fruitful open discussion between scientific and religious worldviews should ideally lead to either:

- (1) A religious worldview more objective, consistent with scientific findings.
- (2) A scientific worldview completed with subjective and intersubjective perspectives, with a larger *scope in agenda* to include an axiology and a praxeology.

The direction (1) is taken by theologians working towards integrating science and religion to build a comprehensive worldview. They invite to higher levels of spiritual intelligence. Notable examples of such developments are the religious philosophies of Teilhard de Chardin (1955) or Whitehead (1930). A similar modern attempt in this direction was proposed by Michael Dowd in his book *Thank God for Evolution* (Dowd 2007) where proposes an accessible integration of science and Christianity. His directive line is to reinterpret Christianity in the light of evolutionary theory. The result is very inspiring, because it provides a synthesis of *objective*, *subjective* and *intersubjective* criteria. The same interpretative effort to integrate modern evolutionary thinking would certainly greatly benefit other world religions.

What about the other option (2)? It is interesting to note that scientific popularization is part of the solution. Indeed, at best, it will make science meet some of the *subjective* and *intersubjective* criteria. Typically, science popularizers trigger emotions by telling fascinating stories around scientists, their lives and theories. But questions of values and actions will remain unanswered. How can we build a naturalistic worldview on rational grounds? This is normally the task of non-theist philosophical systems. One could start from a scientific worldview and extend it philosophically to integrate more philosophical propositions involving the nature and meaning of values and actions (respectively worldview questions (d) and (e)). For example, Laszlo (1972a, chap. 13) develops a framework for normative ethics, which fits in with scientific knowledge. The praxeological component could certainly be enhanced by integrating insights from problem-solving, management sciences, operational research, etc.

In the opinion of the author, it is urgent that efforts are coordinated to build such philosophical worldviews, firmly based on *objective* criteria, and yet taking seriously into account *subjective* and *intersubjective* criteria. Such a philosophical approach would be based on a scientific worldview, but that time successfully passing the *is-ought* and *ought-act* tests, also helped with second-order dimensions of philosophizing, in a spirit of synthetical philosophy.

Both directions (1) and (2) aim at constructing more comprehensive and coherent worldviews, which then become synthetical worldviews. More precisely, this leads to two kinds of worldviews, a “comprehensive theological worldview” and a “comprehensive philosophical worldview” (Carvalho IV 2006, 123). In this view, these two endeavors have surprisingly a similar aim, they just use different starting points, means and criteria.

8 Conclusion

Without navigation tools, it is difficult to choose a philosophical direction or to compare the pros and cons of two opposite philosophical theories. To navigate the rich and complex philosophical landscape, we proposed four key metaphilosophical concepts: a set of philosophical *dimensions*, a philosophical *agenda*, a list of *criteria* and a battery of *tests*.

We first distinguished six dimensions of philosophy, composed of three first-order ones (*descriptive, normative, practical*); two second-order ones (*critical* and *dialectical*) and one third-order (*synthetical*).

We then introduced a clear, explicit and enduring philosophical agenda constituted by seven big questions, which define what a worldview is.

Next, we started our quest for criteria from previous work in philosophy, cognitive sciences and cultural evolution and ended it up with the finding of nine major criteria. We saw that the criteria can be used in three different manners. First, to describe the history of philosophy; second, to describe one's own position by giving more or less weights to the criteria; and finally to clarify disagreements between different worldviews. We then discussed the criteria one by one, pointing out both their strengths and weaknesses.

To ease the comparison of different worldviews, we finally identified from the criteria and philosophical dimensions various assessment tests: the *is-ought, ought-act, is-act* first-order tests; the *critical* and *dialectical* second-order tests; the *mixed-questions* and *first-second-order* third order tests; and the *we-I, we-it* and *it-I* tests.

We showed the effectiveness of the criteria and tests by comparing the Flying Spaghetti Monster deity with Intelligent Design. We confirmed in details the intuition that the later scores better than the former in a number of respects. More generally, we showed that our criteria and tests have the potential to make the science-and-religion dialog more fruitful. The outcome is that two undertakings can be pursued: either building a religious worldview consistent with scientific findings; or building a philosophical worldview based on science, but completed with an axiology and a praxeology.

Recognizing a set of philosophical dimensions, a common agenda, a shared criteria list and a battery of tests is essential to encourage communication and debate amongst philosophical schools and thus make philosophy a public enterprise.

Specifically, we see the six dimensions, the worldview agenda, the criteria and tests as a metaphilosophical apparatus to understand, improve, compare and constructively criticize different worldviews. Such tools are vital for the demanding endeavor of constructing together comprehensive and coherent worldviews, in the spirit of synthetical philosophizing.

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10 Appendix - A cosmic evolutionary worldview: short responses to the big questions

Introduction

Across centuries, humanity has been wondering about its existence and place in the universe. Humans employed insights from myths, religions, art, philosophy and science to make sense of the world around them.

However, in the current era of accelerating scientific, cultural and social developments, all the old certainties are put into question. The confusion and fragmentation associated with this often lead to pessimism and uncertainty, and the need for psychological guidance in the form of a clear and reliable system of thought.

This is why it is important to have a **coherent** and **comprehensive** worldview, by answering today the big questions of this quest for understanding. Answering them explicitly is an enterprise which is traditionally philosophy's task. This took the form of comprehensive and coherent systematic philosophical treatises. The great philosophical systems are of this sort. Regrettably, this trend seems to have fallen out of fashion, since most of today's philosophy is busy with second-order problems (Adler 1965).

In contrast to most of contemporary philosophy's practices, below are tentative and provisional responses to first-order philosophical questions. The answers to these questions together determine a worldview, i.e. a comprehensive philosophical system, a coherent vision of the whole. A worldview gives meaning to our life, and helps us to understand the world around us.

Each worldview question would need at least a book to be properly answered. More than that, the most appropriate way to answer them is with a systematic philosophical system (e.g. Bunge 1974; Rescher 1992). I don't have that objective here. Instead, I provide below very short responses as *positions, not arguments*. I give some main references to the works which influenced me, where the curious reader will be able to find many detailed arguments. It is worth reminding the many advantages of explicitly stating one's philosophical position.

First, these short responses will obviously let the reader **quickly grasp my position**. The position is stated transparently, straightforwardly, with a few technical concepts involved.

Secondly, the task of answering those questions is a daring effort. I balance this **great ambition** with **great caution** in answers I provide. They are non-dogmatic, provisional, revisable and falsifiable. The responses proposed here are mixed philosophical and scientific conjectures to make sense of the world. Accordingly, some of them are speculative. They are of course not definitive. In such a short format, I also do not make justice of the pros and cons of alternative positions (the dialectical dimension of philosophy). It doesn't mean that I'm not aware of them. Still, if you think I've missed something important, or a position clearly better than the ones presented here, please contact me. As every good philosopher and scientist, I very much value and warmly **welcome criticism** and further reflection you might have reading this text.

Thirdly, this transparency in responding to basic questions allows **efficient debate and communication**. Many debates and disagreements get lost in details, without touching the heart of issues at stake. This practice of answering first-order

questions can save an enormous amount of time in confusing debates, because enduring disagreements always end up in disagreements about such fundamental questions. I invite you to do the same exercise!

0. Where to start from?

Before proposing responses to those big questions, here are some preliminary considerations, laying bare how I start this enterprise. The (meta)philosophical framework and method are mainly inspired by the works of Adler (1965; 1993), Rescher (1985; 2001; 2006) and Bahm (1979).

If I had to choose a philosophical stream, I would say I am mostly influenced by *systems philosophy* (esp. Laszlo 1972b; Heylighen 2000; and 2010b on which this text is based). To summarize it in one sentence, its "data come from the empirical sciences; its problems from the history of philosophy; and its concepts from modern systems research" (Laszlo 1972a, 12). We may add to **systems theory** an interdisciplinary **problem solving** approach and **evolutionary-developmental theory**, applied on many scales (Vidal 2008a).

The worldview agenda

We start with the philosophical agenda described in section 2.

The metaphilosophical criteria

Once the questions are asked, we obviously need to answer them and use evaluation standards to assess their strength. In this paper, we developed nine criteria and a battery of tests to compare and assess different worldviews. The aim was descriptive. Now, how do I use the criteria prescriptively to answer the agenda? Here, I use in priority **objective criteria** (*objective consistency*, *scientificity* and *scope*) to construct a coherent and comprehensive worldview. In this cosmic evolutionary worldview the *scope in level depth* is maximally wide in time and space, concerning the whole universe.

When those objective criteria are maximally satisfied, we turn to **subjective** and **intersubjective** criteria to make the worldview successfully applicable in the conduct of a good life and in the organization of a good society. The pursuit of a good life and a good society is then harmonized with cosmic evolution.

1. What is?

As a preliminary remark, we are generally skeptic with reductionistic ontological statements. Reality is complex, evolving and multi-layered, and different ontologies are more or less appropriate to analyze and solve different problems. Dooyeweerd's (1953) fifteen aspects, although static and not dynamic, offers an example of a non-reductionistic ontology.

Our ontological commitment goes towards systems theory, which aims to offer a universal language for sciences (e.g. von Bertalanffy 1968; Boulding 1956). It is also very fruitful for philosophizing (e.g. Laszlo 1972a). It is best combined with evolutionary reasonings, which gives rise to an evolutionary-systemic approach (Heylighen 2000).

We choose an ontology of actions and agents, i.e. elementary processes and relations, not independent, static pieces of matter (in the spirit of Whitehead (1930), Laszlo (1972), Jantzch (1980), etc). Out of their interactions, organization emerges. Through evolutionary processes, these systems become more complex and adaptive,

they start to exhibit cognition or intelligence, i.e. the ability to make informed choices.

2. Where does it all come from?

Modern science explains -at least in parts- the harmony within nature, connecting physical, chemical, biological and technological evolution (e.g. Chaisson 2001; De Duve 1995). Regarding the origin of the universe, although Big Bang models are a success of modern cosmology, the initial conditions remain mysteriously fine-tuned (e.g. Leslie 1989; Leslie 1998; Rees 2000; Davies 2008). Whatever possible explanation we favor, we need to cope with difficult metaphysical choices (Vidal 2011). The scenario of "Cosmological Artificial Selection" (CAS) connects the origin and future of the universe with the emergence of intelligent life (Vidal 2008b; 2010; 2011).

3. Where are we going?

Modern science has shown that there are two trends at play in the "big history" of the universe. First, a tendency to produce **more order**, with the emergence of more and more complex systems, from galaxies, stars, planets, to plants, humans and our technological society (Chaisson 2001; Kurzweil 2006; Morowitz 2002; Livio 2000). Secondly, the second law of thermodynamics applied to the universe as a whole implies that in the far-future the universe will irreversibly go toward a state of **maximum disorder**, or heat death (e.g. Adams and Laughlin 1997). The outcome of those two opposite trends remains unsettled.

The discovery of the heat death generated a widely spread pessimistic worldview which sees the existence of humanity as purposeless and accidental in the universe (B. Russell 1923; Weinberg 1993). With Darwin (1887, 70), we estimate that "it is an intolerable thought that he [man] and all other sentient beings are doomed to complete annihilation after such long-continued slow progress".

Hopefully, the first trend is more promising. The process of on-going complexification and adaptation can reasonably be extrapolated towards the future. This allows us to predict that in middle course, conflict and friction within human society will diminish, cooperation will expand to the planetary level, individual and collective intelligence will spectacularly augment.

Generally, more advanced biological organisms build more and more sophisticated representations of their surroundings (P. Russell 1995). The scenario of "Cosmological Artificial Selection" pushes this trend to its limit, to the point where intelligent life constructs a model of the whole universe. This modeling capacity can be used to understand not only our own universe, but also other possible universes. The radical proposal of CAS is that in order to avoid the effect of the second law of thermodynamics, those toy-universes could become a blueprint for a new universe (Vidal 2008b; Vidal 2010; Vaas 2010; Vidal 2011). However, this scenario has more than a scientific aspect. Since it involves a role for intelligent life, its success depends on our conscious choices for the future of cosmic evolution. It thus requires an axiological dimension.

4. What is good and what is evil?

The inner drive or implicit value governing all life is fitness, i.e. survival, growth, development and reproduction. From a human perspective, this fundamental

value includes a sustainable quality-of-life, well-being or happiness. Evolutionary, psychological, and cybernetic theories allow us to derive a number of more concrete objectives from this overarching value, i.e. properties that are necessary for long-term well-being. These include openness, diversity, intelligence, knowledge, cooperation, freedom, personal control, health, and a coherent and comprehensive worldview.

In the longer term, fitness implies increasing adaptiveness and evolvability beyond human society as we know it. Actions that promote these values with the less friction as possible are intrinsically good, actions that suppress them are bad.

As our worldview goes beyond the egocentric stage, we make sure our values do not conflict with higher evolutionary systems. Not only do I try to improve my happiness, but my happiness becomes more and more tightly linked with my family, my country, society, humanity, the planet, and the cosmos. Ultimately I should act being aware and trying to respect such a hierarchy, combining the values of my own life with the sustainability of larger and larger evolutionary systems.

At heart, humans long for a kind of immortality (e.g. Turchin 1990; Lifton and Olson 2004). In our worldview, it takes the form of an endless, infinite cosmic evolution. Indeed, the metaphysical and speculative part of Cosmological Artificial Selection translates this will for immortality in an infinite process of evolution, producing intelligence-driven reproducing universes (Vidal 2008b; 2010; 2010; esp. Vidal 2011).

5. How should we act?

To maximally achieve these values in real life, we will need to overcome a variety of problems and obstacles. Cognitive sciences, cybernetics, and complex systems science suggest various tools and strategies to tackle complex problems, and to stimulate self-organization so as to be as efficient as possible. These methods include feedback control, anticipation, hierarchical decomposition, heuristic search, stigmergic coordination, extended mind and memetic engineering.

At the level of society, these methods define a strategy for effective governance, for the maximization of collective intelligence, and the minimization of friction and conflicts.

There is a trend in cosmic evolution to do ever more with less energy, space and time (Smart 2009). Using less energy and resources to achieve more is also at the heart of productivity principles. On a personal productivity side, The Getting Things Done method combines high productivity with low-stress (Allen 2001; Heylighen and Vidal 2008).

6. What is true and what is false?

Let us note that this is a second-order question which concerns knowledge about knowledge. Also, the domains of epistemology and ontology are closely related. We can divide this question in the following two questions (Heylighen 2000, 15):

- What is knowledge? This question defines the domain of epistemology.

Science can be seen as a natural outcome of the more general evolutionary pressure to get more and more accurate knowledge (Campbell 1974). Knowledge is the existence in a system of a model, which allows that system to make predictions, that is, to anticipate processes in its environment. Thus, the system gets control over its environment. Such a model is a construction, not an objective reflection of outside reality (Turchin 1993; Heylighen 1997).

- What is truth?

There are no absolute truths. The truth of a theory is merely its power to produce predictions that are confirmed by observations (Turchin 1993). The scientific enterprise is one of conjectures and refutations (K. R. Popper 1963) and there is a natural selection of ideas, theories, which give more power, i.e. prediction and control (Campbell 1974).

Ultimately, what is the meaning of the phenomenon of science in this pragmatic, constructive and evolutionary epistemology? We do not seek an ideal "truth". There is a pragmatic goal of acquiring knowledge. In the scenario of CAS, it is to build a model of our and other possible universes that could become, with some variation, a blueprint for a future universe, thereby escaping the predicable heat death of the universe.

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