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## ***Resolving Three Key Problems in the Humanities***

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**Description:** *The disarray in the humanities reflects their sensitivity to the problems of objectivity, unobservables and induction. Resolving these problems could set a new direction.*

**Keywords:** Philosophy of Science, Epistemology

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# **Resolving Three Key Problems in the Humanities**

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## ***Main Description***

The intellectual disarray in the humanities is well-known and longstanding. Recent articles have noted this disarray (section 1). While post-modernism and cultural relativism may be involved, the lack of objective standards for ideas concerning the human condition seems to provide a more fundamental explanation for this disarray (section 2). The problem of objectivity is argued to include the problem of unobservables: the Achilles' heel of the social sciences despite their insistent focus on observables to obtain objectivity (section 4). The lack of objectivity and the problem of unobservables are argued to affect the physical sciences (section 5) and to involve the problem of induction (section 6). This paper argues that Popper's falsifiability approach to objectivity and Kuhn's view of scientific progress may inadvertently undermine scientific literacy and elevate pseudo-science (section 7). The paper recommends reviewing the use of induction involving unobservables in the observational hard sciences and using their approach as a model for objectivity and valid induction in the humanities (section 8). The humanities are argued to be like the 'canary in the coal mine' because they are more sensitive to the problem of unobservables, the lack of objective standards and the failure to solve or resolve the problem of induction. This paper argues that a solution to the triple-crown problem of cognition – the problems of objectivity, unobservables and induction – could bring about a new direction in the sciences and the humanities and a second renaissance (section 9). A call for support is issued.

## ***Short Description***

The disarray in the humanities reflects their sensitivity to the problems of objectivity, unobservables and induction. Resolving these problems could set a new direction.

## ***Keywords***

Philosophy of Science  
Epistemology



## 1. The Disarray in the Humanities

The humanities – the disciplines that analyze the human condition – are said to be in intellectual disarray. Spacks (2002) cited this disarray as a reason for forming the American Academy of Arts and Sciences.

To address this disarray, Monash University organized International Conferences on New Directions in the Humanities. Their Humanities Conference brochure (2004) says,

*To the world outside of education and academe, the humanities seem at best ephemeral, and at worst esoteric. They appear to be of less significance and practical 'value' than the domains of economics, technology and science. This conference examines, and exemplifies, the inherent worth of the humanities.*

*The Humanities Conference aims to develop an agenda for the humanities in an era otherwise dominated by scientific, technical and economic rationalisms. What is the role of the humanities in thinking the shape of the future and the human? The conference's conversations range from the broad and speculative to the microcosmic and empirical. Its over-riding concern, however, is to redefine the human and mount a case for the humanities.*

*At a time when the dominant rationalisms are running a course that often seems to be drawing humanity towards ends that seem often less than satisfactory, this conference will reopen the question of the human – for highly pragmatic as well as redemptory reasons.*

Papers presented at the 2004 conference documented this disarray. Gontarski (2004), Professor of English at Florida State, reviewed the famous Sokal Hoax. Alan Sokal, Professor of Physics at New York University, presented his essay 'Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity,' to 'Social Text' in 1996. The essay was a farce; the submission was a hoax. See [www.physics.nyu.edu/faculty/sokal](http://www.physics.nyu.edu/faculty/sokal). Gontarski noted, "Its publication and the subsequent furor it generated offered the most serious challenge to research in the humanities in the past half century." Gontarski's paper explores "the lingering after-effects of that hoax essay on the seriousness with which research in the humanities is viewed (particularly by scientists) and, as important, is funded."

Ann Murphy (2004), Assumption College, argued that "current graduate school training and critical theory often focus on arcane or disembodied methodologies far removed from the human realities.... Contemporary students desperately need to explore connections between the texts they read and themselves and their world. But they can only learn to do this if their teachers begin to explore new (and old) ways of teaching literature and of helping their students to read with passion and intelligence."

Payne (2004), professor of English at Bucknell University, noted, "Because of the critical assault on humanism by such theorists as Lacan, Derrida, and Foucault, humanism would seem to be in disarray."

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Huron (2004) elaborated on the nature of this disarray in the humanities:

*Postmodernism has been a dominant paradigm in many humanities disciplines over the past two decades. The most successful achievements of postmodernism have been in drawing attention to the power relations that exist in any situation where an individual makes some claim. [Post modernism says] it is the most powerful members of society who are able to establish and project their own stories as so-called "master narratives." These narratives relate not only to claims of truth, but also to moral and artistic claims. The "canons" of art and knowledge are those works exalted by, and serving, the social elites. [In post-modernism,] truth ought to be understood as a social construction that relates to a local or partial perspective on the world. Our mistake is to assume that as observers, we can climb out of the box which is our world. There is no such objective perspective. Postmodernism assumes that there is no absolute truth to be known. There are, rather, a vast number of interpretations about the world. In this, the world is akin to a series of texts. As illustrated in the writings of Jacques Derrida, any text can be deconstructed to reveal multiple interpretations, no one of which can be construed as complete, definitive, or privileged. From this, postmodernists conclude that there is no objective truth, and similarly that there is no rational basis for moral, esthetic or epistemological judgment.*

One prima-facie consequence of post-modernism is to demote its own conclusions to being just one of many readings of the text of life. In embracing relativism or egalitarianism, post-modernism may be committing epistemic suicide.

Another element in this disarray is anti-intellectualism. Hofstadter (1966) described three pillars of anti-intellectualism -- evangelical religion, practical-minded business, and the populist political style. Religion was suspicious of modern relativism, business of regulatory expertise, populism of claims that specialized knowledge had its privileges.

The recent push in the US to teach creationism (or Intelligent Design) over evolution may be seen as an example of anti-intellectualism. This religious anti-intellectualism has a long history. See Tertullian (d ca 220) in Carthage, who asked, "What has Athens to do with Jerusalem?" and said, "I believe because it is foolish." But religion has no monopoly on anti-intellectualism. Conservatism, nationalism, Maoism, populism, anti-elitism, egalitarianism, pragmatism, utilitarianism, romanticism, feminism, environmentalism, the rise of popular culture and even common sense may all be presented in ways that support anti-intellectualism. Even the 'self-made man' and the 'slow-witted naïf with a heart of gold' (cf. Forrest Gump), can be viewed as being anti-intellectual.

In an interview with George Clowes (2001), Dianne Ravitch said that the working title of her recent book (*Left Back: A Century of Battles over School Reforms*) was 'Anti-Intellectualism in American Schools' and that the underlying theme was "the recurrence of this anti-intellectualism, this idea that knowledge is unimportant, facts are unimportant." She saw "a fundamental anti-intellectualism in the IQ testing movement, in the industrial education movement, the vocational-education movement, and the child-centered movement."

Anti-intellectualism may in some strange way be producing a union between relativism, scepticism, nominalism and conventionalism. This virulent form of scepticism epitomizes the humanities as arbitrary and therefore boring.

Evidence for this is found in a graph based on the freshman surveys by the Higher Education Research Institute at UCLA in “The American Freshman: National Norms for Fall 2003 - Charts and Graphs.” See Figure 4 on a news release on their web site: [www.gseis.ucla.edu/heri/-3\\_norms\\_charts.pdf](http://www.gseis.ucla.edu/heri/-3_norms_charts.pdf), .

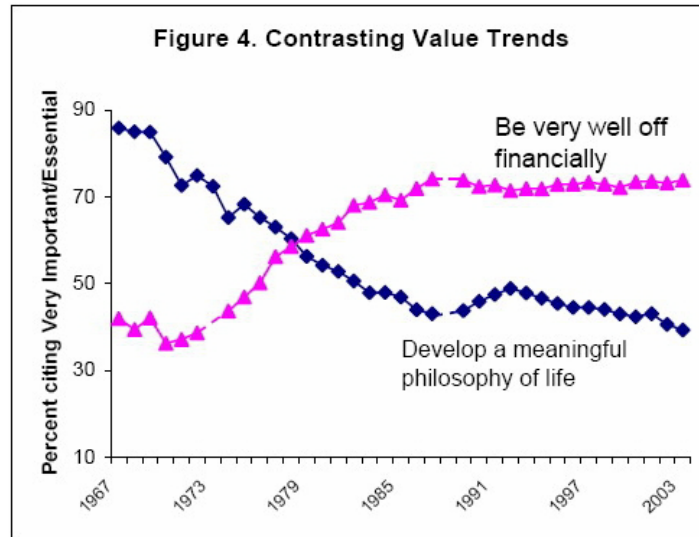


Figure 1: Declining Value in Developing a Meaningful Philosophy of Life

So what explains this disarray in the humanities? Are the aforementioned philosophical viewpoints fundamental causes or are they background causes, symptoms or effects? And given the proximate causes, what would constitute a remedy?

## 2. The Problem of Objectivity in the Humanities

Even though post-modernism is associated with the current disarray, one can argue that post-modernism reflects the lack of objective standards in dealing with the nature of man, the truth of his beliefs, the goodness of his actions and the beauty of his creations.

The disarray and the lack of objectivity involving the human condition have resulted in an interest in bringing greater intellectual order into the humanities. The following are suggestions presented at the Second International Conference on New Directions in the Humanities.

Walsh (2004), a classics professor at Loyola College in Maryland, recalled an attack in 1808 on Oxford’s support for the humanities. A strong defense of the non-utilitarian value of studying classical antiquity and the humanities was given by Cardinal John Newman. According to Walsh, Newman thought that “ancient Greece was uniquely what we are ... since they were able to address those important issues in the human condition in ways that [since] have not really been

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*equalled.*” Newman thought we should focus on the Greeks because “*their writings are so unsurpassed in their ability to help us understand how to lead our lives.*” In response to those who questioned the utility of such studies in the modern world, Newman noted that “*the special mission of the university was to form a habit of mind – to lead students to a virtue: the perfection of their intellect.*” Newman argued that “*the liberal arts are the most effective path for creating these habits of mind.*” Newman argued that “*a complete and generous education [in the classics and humanities] prepares a man to perform justly, skilfully and magnanimously all the offices – both private and public – in peace and war. Education in the classics prepares each of us not only for our professional lives but as a friend, as a companion and as a citizen at large. The study of Greek literature was preparation for life.*” Walsh concluded that such a defense would be most unlikely today since academics must not assert anything that would “*privilege one culture over another.*”

This inability to defend value comparisons is an instance of the problem of objectivity. What makes the Greek classics objectively better than other sources in forming such habits of mind?

One approach to the lack of objectivity is to use selected methods of critical thought throughout the curriculum. Lorenz and Kritzman (2004) noted that to retain the liberal arts identity at Loras College in Dubuque, Iowa, all students are introduced to the Toulman model of argumentation in an issue-based critical thinking course.

Toulman (1958) identified four forms of arguments. Arguments may be classificatory in nature; they may offer explanations for actions or for various states of affairs; they may provide justifications for future action or understandings; or they may serve as admonitions. But this objectivity in approach (the use of the Toulman model of arguments) seems to give little support for the objectivity of claims about truth or values.

In the discussion, Kritzman noted that the increased emphasis on active learning may result in a more meaningful study of content to students even though there may be less of a traditional focus on content. And since the operational definition of ethics is applied ethics and applied values, it requires extra effort to fit in any philosophical underpinnings.

Another approach to the lack of objectivity is to de-politicize the humanities. Racevskis (2004), professor of French and Italian at Ohio State University, reviewed the ongoing culture wars and noted that what seems to be at issue are “*the changes in the humanities since the 1960s.*” He reviews the criticisms of Hanson (2003) in the National Review. In the past, Hanson remembered, “*humanities professors taught a body of knowledge, historical facts, philosophical doctrines, time-honoured themes in models and plays, that might offer a student the ability to translate the daily chaos of the present into some abstract wisdom of the ages.*” Hanson continued critically, “*Today’s learning is best fielded by the*



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*three-fold team of multiculturalism, cultural relativism and utopian pacifism. Instead of offering courses that would develop wisdom and a love of beauty, universities have a proliferation of 'studies programs': ethnic studies, women's studies, environmental studies, and peace studies, as if the traditional missions of philosophy, literature and history after 1970 had become incapable of dealing with age-old issues of class, race, gender, war and the environment."* Ingram, another critic, says, *"We should demand an end to the elite politicization of education and return to what the great 19<sup>th</sup> century thinker Mathew Arnold proposed. Educators must cultivate the habit of scholarly disinterestedness that refuses to lend itself to any ulterior political or practical considerations."*

Racevskis notes that *"to subscribe to this disinterested pursuit of knowledge in this day and age is either to demonstrate a profound ignorance or an utter disregard for what has been happening, not only in the field of humanities, but also in the social sciences, in economics, and most notably in the field of neuroscience."*

Obviously value claims require an argument to transform them from subjective to anything 'objective.' To remove values from the humanities would be to 'devalue' them into being irrelevant if not inhuman. But how can one speak objectively about values?

The following are other changes or actions that their authors believe might reduce the disarray in the humanities.

Massey, Indiana Humanities Council, and Malloch (2004) noted, *"We have created a technology that not only enables us to change our basic nature, but is making such change all but inevitable."* They are convening *"a national discussion of the direction of the public humanities ... to examine intellectual, social and economic trends that contribute to a re-thinking of the public humanities ... in the first stage of efforts to strengthen civic life."*

Corrigan (2004), Assumption College, indicated that an excessive focus on the 'utilitarian, professional or political' may have undermined the focus on the human. *"The challenge of a liberal education is to educate human beings, not consumers, jobholders and docile citizens. Thoughtful 'reading' of the foundational works of the humanities may be the key to meeting this challenge. The college humanities curriculum – if taught in a human rather than a utilitarian, professional or political way – offers an antidote to this myopia. It can keep alive the transcendent dimension of being human."*

McCullough (2004), Department of Philosophy at Coastal Carolina University, issued a call for action instead of mere contemplation in *"strengthening the position of the Humanities in the college curriculum through realizing and exemplifying their relevance ... with a special emphasis on the discipline of philosophy."*

Asirvatham (2004) scheduled a talk arguing that *"In as much as the social sciences have helped to replace idealism with contextualism in the humanistic disciplines, they offer promise for teaching humanistic questions to students in American public universities."*

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Rich Murphy (2004) scheduled “a workshop demonstrating knowledge gained from inductive reasoning for the Humanities” titled, “*Practicing Inductive Reasoning, Owning Inductive Knowledge: Making Meaning in the Humanities.*”

As one speaker put it, we need “*stature without straight-jacket; plurality within unity; a balance between unity and diversity that avoids the ‘slippery-slope’ trend toward excessive relativism.*”

In summary, many in the humanities are acutely aware that they lack an objective basis for choosing between competing ideas involving human nature, truth, goodness and beauty. Teachers in the humanities are sometimes left with an acute sense of sadness and futility when facing the continuing criticisms by those asserting the irrelevance of the humanities to modern life.

Still many accept the burdens of relativism as far more acceptable than the burdens of dogmatism which have sometimes limited the growth of knowledge.

### **3. Unobservables in the Humanities**

What explains the lack of objectivity in the humanities? It is not just the subject. People are studied by anthropologists, biologists, psychologists and sociologists. But these disciplines tend to focus on external characteristics and behaviours while the humanities go beyond to focus on the human: the thinking, motives, goals, hopes and fears. The sciences focus more on observables; the humanities focus more on unobservables. Yes, the humanities work with texts, art, music and drama, but their concern is with their meaning and value to human beings – both of which are publicly unobservable.

Establishing the objectivity of unobservables is a key test for any standard of objectivity. How do we obtain objective knowledge of those things we cannot directly observe? Unobservables include minds and motives as well as microwaves and muons.

It is difficult enough to identify what is fundamental about things we can observe: rivers vs. lakes, vegetables vs. fruits, and fish vs. mammals. It is more difficult to identify what is fundamental about things we cannot observe directly.

The humanities deal with unobservables. If teachers believe that societal power relations are highly relevant to interpreting texts, they are making a claim about the reality and relevance of an unobservable. By what standard can we assess the truth of their claim? Since other unobservables could be used, how do we justify the fundamentality or relevance of a given unobservable?

Since final and formal causes are the kinds of unobservables we need to validate, studying the problem of unobservables may clarify the relevance of Aristotle’s four causes. Clatterbaugh (1998) reviews part of the causation debate.

Connell (1973) views the mental movement from observables to unobservables as the crucial step in human thought. Things that are observable are factual: their properties and actions are empirical. Since evidence can provide answers, there is little point in arguing about judgments on such matters. On the other hand, the

truth of things unobservable is disputable. Arguments are required concerning such judgments.

The problem of objectivity may seem insolvable. How can there be any standard for objectivity that applies to wide generalizations about the human condition, that avoids excessive dogma and absolutism so it includes human differences, and that avoids excess relativism so it doesn't become mere opinion?

Similarly the problem of unobservables may seem insolvable. How does one argue for the existence of unobservables while remaining empirically-based and without becoming an idealist or a rationalist? How can one argue against the pseudo-science claims of others involving unobservables without eliminating all claims involving unobservables and becoming a complete sceptic?

These two problems – the problems of objectivity and unobservables – are not limited to the humanities. They exist in every academic discipline. To see this we will review instances of these problems in the social and physical sciences.

#### **4. Unobservables in Psychology and the Social Sciences**

As sciences, psychology and the social sciences are distinguished by several features. (1) To avoid subjectivity, they focus on characteristics and behaviours that are measurable. (2) Since people are not internally identical, they rely on random assignment or random selection to obtain representative results that are statistically significant. (3) To determine causal relations, they rely on controlled experiments whenever possible to eliminate the influence of related factors that were unobserved or are unobservable.

(1) Focusing just on things that are publicly or inter-subjectively measurable limits a discipline's ability to deal with things that each of us observes internally: our thinking, values, goals, hopes and fears.

(2) Some authors in the text by Harlow et al. (1997) question the meaningfulness of using statistical tests to obtain meaningful information.

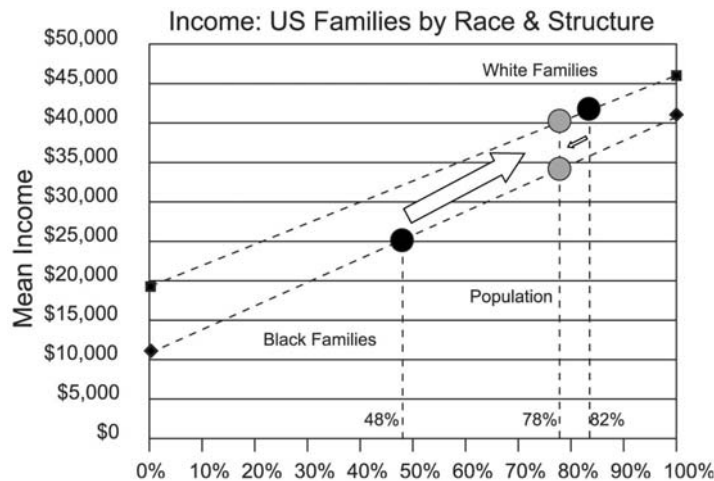
(3) And since many experiments involving people are unethical, social scientists must either limit themselves to areas where such experiments are ethical (e.g., psychology) or they must rely on observational studies and use statistical associations as evidence for causal connections (e.g., sociology). Both choices have major consequences for understanding human behaviour.

Unobservables – or at least things unobserved – are the Achilles' heel of the observationally-based social sciences despite their insistent focus on observables and objective procedures. Lieberman (1985, 2002) and Schield (1999, 2004b) identify some of the many pitfalls in such inferences when using data from observational studies.

In the absence of random assignment, all statistical associations are subject to the influence of confounders: things unobserved that are tangled up with those factors being observed. Confounders include (1) things that are observable but are not being observed such as questions left off the questionnaire and (2) things that are always unobservable such as curved space and black holes.

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Schild (2004a) noted that we can measure the influence of a confounder when it is taken into account. In Figure 1 the average family income is \$41,000 for whites, \$25,000 for blacks: a gap of \$16,000. But we recognize that two-parent families can earn more than single parent families – all other things equal. Married couples head 82% of white families, 48% of black families.



**Figure 2:** *Influence of Family Structure on Incomes by Race*

We can take this confounder into account by standardizing: treating both races as if they had the same proportion of families headed by married couples. The standardized income for whites is now \$39,000 and for blacks is \$33,000. Standardizing reduces the income gap from \$16,000 to \$6,000: a decrease of 62%. So 62% of the white-black family income gap (\$16,000) can be explained by the difference in family structure.

The observable – the white-black family income gap – is influenced by something that may be unobserved – the percentage of families who are headed by a married couple. In this case, the unobserved confounder was observable. The larger problem is our unawareness of unobserved confounders or our inability to measure those that are not directly observable.

The moral is that the problem of unobservables does not go away by focusing solely on what is observable. Indeed, the epistemic problem of things unobserved is the fundamental dilemma of the social sciences. If they ignore unobservables, they face the problem of confounding. If they take on unobservables, then they face the problem of objectivity: what makes their results objectively true.

A solution to the epistemic problem of things unobserved is the sine qua non in order to free the social sciences from their dilemma of dealing with unobservables defensibly.

Again, there are those in the social sciences who accept the problem of unobservables as still being far less burdensome in the social sciences than in the humanities.

## **5. Unobservables in the Physical Sciences**

Many of the physical sciences can conduct manipulative experiments (mechanics, optics, chemistry and biology). But some cannot (e.g., astronomy and astrophysics) and merely observe. It appears that psychology viewed manipulation as the essence of science while ignoring the potential contribution of the observational (non-manipulative) sciences. As mentioned previously, the manipulative paradigm has ethical limitations in dealing with the human condition. By failing to see the observational sciences as closer in kind, psychology may be following an inadequate paradigm.

The observational sciences have solved some important problems involving unobservables or things heretofore unobserved. Observational physics produced Kepler's laws, explained stellar energy as nuclear reactions, and inferred the life cycles of stars based on the Hershel-Russell diagram. Given their inability to manipulate things, the observational sciences have had their share of problems in dealing with unobservables. Dragsdahl (2001) reviewed some examples of problems in the history of science.

In the 1600s, unobservables were believed to exist as real things to be discovered. Consider the argument for gravity: an action at a distance without any known carrier. Newton argued that gravity existed as a property of mass and that the earth's mass produced a gravity that attracted both the apple and the moon. By identifying the nature of this unobservable (the inverse-square law), Newton was able to explain Kepler's laws and to make accurate predictions about other solar bodies such as comets.

In the 1800s, unobservables were treated as being unscientific. Consider the history of the arguments for and against the existence of atoms. In the early 1800s, Dalton argued that the existence of atoms would explain Avogadro's law: equal volumes of any gas at the same temperature and pressure contained equal amounts. By mid-century, chemists were making major strides in using the concept of valence to predict the behaviour of chemical reactions. While valence was described using mechanical hooks rather than electrical attraction, they were readily understandable as properties of atoms. The hydrogen atom had only one hook, etc. Physicists used the idea of atoms to explain Boyle's law involving the relationship between the volume, pressure and temperature of a gas and to calculate the value of the constant  $k$  in Boyle's law:  $P \cdot V = k \cdot T$  where  $P$  is pressure,  $V$  is Volume, and  $T$  is temperature.

Yet in the mid 1850s, leading chemists argued that to believe in unobservables such as atoms was a superstition that was inappropriate for scientists. And despite many more advances in knowledge using the idea of atoms, some chemists persisted in arguing against their existence until the early 1900s.

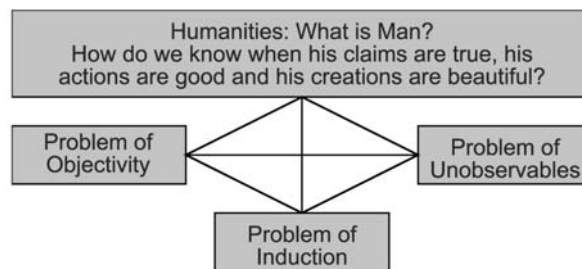
Dragsdahl argues that the inability of French chemists to deal with atoms (unobservables) marked the demise of their intellectual leadership.

To better understand the problems associated with unobservables, one must understand the problem of induction.

## 6. The Problem of Induction

The problems of objectivity and unobservables involve the problem of induction as shown in Figure 2. Induction involves a conclusion which seems to contain more than its premises: reasoning from observed to unobserved such as reasoning from some to all, from past to future, or from effect to cause. See Norton (2003).

The problem of objectivity is how to validate the relationship of concepts and ideas to reality. The problem of unobservables is how to establish that unobservables exist and/or are sufficiently well based to use for prediction and/or explanation. The problem of induction is how to ‘validate’ our generalizations.



**Figure 3:** *Problems of Objectivity, Unobservables and Induction*

Mill argues that “*all discovery of truths not self-evident consists of inductions and the interpretation of inductions.*” Mill’s theory of logic is based on the laws of association. It is the first thoroughgoing attempt to do for the inductive logic of scientific inquiry what Aristotle had accomplished for deductive logic. Mill’s logic, like that of Francis Bacon, is the study of scientific method, seeking the relations of cause and effect among phenomena. It proceeds from a study of the actual facts of experience (particulars) and is inductive.

Huron (2004) reviewed the historical difficulties with the concept of induction.

[17] *The 18th-century Scottish philosopher, David Hume, recognized that there are serious difficulties with the concept of induction. Hume noted that no amount of observation could ever resolve the truth of some general statement. For example, no matter how many white swans one observes, an observer would never be justified in concluding that all swans are white. Using postmodernist language, we would say that one cannot legitimately raise local observations to the status of global truths.*

[18] *Several serious attempts have been made by philosophers to resolve the problem of induction. Three of these attempts have been influential in scientific circles: falsificationism, conventionalism and instrumentalism. However these attempts suffer from serious problems of their own. In all three philosophies, the validity of empirical knowledge is preserved by forfeiting any strong claim to absolute truth.*

## **7. Popper and Kuhn on Falsification**

Karl Popper is a leading exponent of falsification in handling the problem of induction. The following is from Huron (2004).

*[18] The most well-known attempt to resolve the problem of induction was formulated by Karl Popper in 1934. Popper accepted that no amount of observation could ever verify that a particular proposition is true. That is, an observer cannot prove that all swans are white. However, Popper argued that one could be certain of falsity. For example, observing a single black swan would allow one to conclude that the claim -- all swans are white -- is false. Accordingly, Popper endeavored to explain the growth of knowledge as arising by trimming the tree of possible hypotheses using the pruning shears of falsification. Truth is what remains after the falsehoods have been trimmed away.*

Dragsdahl (2002) views Popper's philosophy to be an 'assault' on science. According to Dragsdahl, Popper "*promoted a philosophy whose key tenets are that induction is a myth, that scientific theories are at root arbitrary constructs and that the absence of falsification—rather than positive evidence—is the standard for adopting scientific conclusions.*"

According to Dragsdahl, previous theories were not just replaced or extended in Popper's view; previous theories were refuted or falsified. Existing theories cannot be supported, confirmed or proven true by additional evidence (finding more white swans). We can only say that finding more white swans is 'consistent with' or 'not contradictory to' the claim that 'all swans are white.' [Note the similarity of Popper's falsifiability approach with the approach used in statistical inference when a null hypothesis may be rejected, but it is never accepted. One only 'fails to reject' the null hypothesis.] See Popper (1959, 1972).

Finally, only those theories that are falsifiable are scientific; all others are non-scientific. This distinction solves what Popper called 'the problem of demarcation.' For Popper, Marxism and Freudianism were two examples of non-scientific theories: they can be made consistent with any state of affairs.

Popper's approach to knowledge appears to be hard-headed empiricism. Without omniscience, it seems that we cannot be certain of anything except what is contradictory. But if Dragsdahl's characterization is correct then Popper's falsification approach has two negative consequences.

(1) Popper's approach means that 'truth' is never obtainable. Since the process of pruning depends on new data and since new data is always forthcoming, what remains at any given point in time is merely what has not yet been falsified. Only with infinite time or with omniscience can one say that what remains is truth. All theories are just hypotheses, conjectures or guesses. Who knows if they are 'true?'

(2) Popper's approach means that all scientific theories that have not yet been falsified are equally 'true.' The scientific claims of science and pseudo-science have the same status. Yet typically the scientific claims of pseudo-science make predictions that are much more difficult to refute than those of regular science. But so long as these claims have not been refuted they have the same status as the scientists' belief that the sun is powered by nuclear reactions or that the moon is

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not hollow. As a standard for objectivity in scientific knowledge, Popper's falsification approach may inadvertently support the growth of pseudo-science.

Today, scientists are reluctant to assert the reality of unobservables such as the models of unseen activity so they present the theory of evolution as a working hypothesis. This may explain why a Gallup poll shows that only 28% of Americans believe in evolution while 48% believe in creationism and 68% believe in the devil. The unwillingness of modern science to assert the objectivity of unobservables may be inadvertently decreasing the level of scientific literacy in modern society.

In striving for objectivity, Popper may have opened a Pandora's Box unleashing a sophisticated form of subjectivity that may inadvertently promote the non-objectivity of knowledge and the assault on science.

Yet scientists may still choose to use Popper's "provisional hypothesis" language to avoid any implication that their knowledge is absolute or unchanging.

Kuhn (1962) explains the advance of science in terms of what he calls a 'paradigm shift.' But Kuhn's description of this succession of paradigms in the scientific community lacks any sort of predictive or evaluative standard for what paradigm should succeed. Thus Kuhn's philosophy of science may permit moving to paradigms that have no durable justification or enduring value.

Paton (2004), professor of health policy at Keele University, notes a relativistic aspect to Kuhn's empiricism. Paton argues that Kuhn's 'paradigm shift' explanation of scientific progress in the natural sciences might be a blind alley in that it had 'overtones' of relativism." And while he thinks Kuhn had a great deal of insight into the scientific process in the natural sciences, he wonders (1) if "*perhaps sociologically or psychologically rather than logically, Kuhn has been a bit of a disaster in the social sciences*" and (2) "*if Kuhn were a kind of father of a type of social relativism in the social sciences where people have bastardized and misused the concept of paradigm so they could always say, 'Well, that is your paradigm, but not mine' which is close to a post-modern claim, 'This is my truth and that is all I need to say.'*" He notes that with Kuhn you start with concepts, while with post-structuralism you start with language but that they both seem to lead to a similar type of relativism.

Paton proposes "*a view of social theory which avoids the label 'science,' ... yet seeks to re-establish the absolutist basis for ethics (and normative political theory).*" Paton argues that "*the social sciences are better seen, in a very pragmatic way, as a branch of the humanities since that link might help the social sciences avoid some of the blind alleys they encounter when they both 'ape and reject' the methods of the natural sciences.*"

Shamos (1995) noted the need for a conceptual scientific literacy. He suggested that science set up a curriculum guide for 'scientific awareness.' This guide would focus on topics such as the meaning of scientific 'facts'; the meaning of scientific 'truths' and the role of theory in science.



Yet without standards for objectivity in the observational sciences, creating such a guide may be difficult. And without a method of validating generalizations, any description of theory may either include some pseudo-science or may limit such theories to being guesses that are yet unfalsified.

Peikoff (2003) provides a contrary view of science in which errors are corrected and new knowledge is incorporated without rejecting everything previously learned – provided the underlying concepts are objectively defined. Newton’s theory of gravitational attraction replaced Kepler’s theory of magnetic attraction to explain the motion of the planets without invalidating Kepler’s laws. Einstein’s ideas of general relativity extended Newton’s laws but did not invalidate them in the context in which they were formed.

### **8. The Potential Contribution of the Observational Sciences**

The problems of objectivity and of unobservables are common to all the academic disciplines that try to make sense out of their experience. But these problems are of most concern in those disciplines that are unable to manipulate conditions in controlled environments: the observational disciplines shown on the right side of Figure 3.

If the humanities and the social sciences are to learn about the standards for objectivity involving unobservables from the sciences, they must not look to the experimentalists for guidance; they should look to the scientists who work primarily with observational data – such as those in astronomy, space physics and astrophysics. Following the model of the experimental sciences would require that a soft science renounce its focus on the most human aspects of the human condition.

A severely challenging matter will be the issue of measurement. Quantitative measurement is the sine qua non of science. Yet measurement seems all but absent in describing the human condition.

Disciplines	Experimental	Observational
Hard Science	Most physics and chemistry	Astronomy, Space Physics
Soft Science	Psychology	Sociology
Non-Science		Humanities

**Figure 4:** *Classification of the Disciplines*

The humanities are like the “canary in the coal mine.” They are more sensitive to the lack of objectivity than other disciplines because the human condition is essentially unobservable and rather complex by any standard. This may make it harder for those in the humanities to envision or generate a solution to the problem of unobservables.

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The observational hard sciences offer a plausible source for a solution. The hard sciences are more closely linked to observable reality and the natures and properties of entities are simpler to identify, so they seem to provide a better environment for understanding induction. Unobservables and unmeasured observables are a continuing problem but not such an overwhelming one.

Connell (1973, 1995 and 2000), Kelley (1988 and 1998), Lakoff (1999), Peikoff (2003), Norton (2003), Machan (2004) and Giere (1999 and 2005) may provide useful direction on the problems of objectivity, unobservables and induction. Giere (2005) states his objective is “*to develop an understanding of scientific claims that mediates between the objectivism of most scientists, or the realism of many philosophers of science, and the constructivism found largely among historians, sociologists and literary theorists.*”

### **9. The Future**

Resolving the problems of objectivity, unobservables and induction could:

- Provide a reality-based middle ground that avoids the excesses of relativistic subjectivism and dogmatic intrinsicism while preserving the idea of objective standards in a context which is ever changing.
- Reverse the tide of anti-intellectualism, scepticism and pseudo-science.
- Bridge the divide between the humanities and the social and physical sciences.
- Provide a stronger foundation for the general education in liberal arts colleges and for the study of ethical, political, economic and aesthetic claims.

With adequate support for appropriately-trained scholars in the observational hard sciences and the philosophy of science it may be possible to solve or resolve one of the greatest outstanding problems in human thought: the triple-crown problem of cognition – the problems of objectivity, unobservables and induction.

Solving or resolving these fundamental problems in a way that provides reality-based principles without dogma could provide a basis for increased scientific literacy, could provide a basis for a new direction in the humanities and might even lay the foundation for a second renaissance that would outshine the first in its benefits to society. Although this constellation of problems has defied resolution for 2,000 years and the chance of success may seem almost nil, the payoff from solving or resolving the problems of objectivity, unobservables and induction could easily exceed the payoff from all the investments made in science and technology in the last hundred years.

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