

# Validation of Theory: Exploring and Reframing Popper's Worlds

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**Abstract:** Popper's well-known arguments describe the need for advancing social theory through a process of falsification. Despite Popper's call, there has been little change in the academic process of theory development and testing. This paper builds on Popper's lesser-known idea of "three worlds" (physical, emotional/conceptual, and theoretical) to investigate the relationship between knowledge, theory, and action. In this paper, I explore his three worlds to identify alternative routes to support the validation of theory. I suggest there are alternative methods for validation, both between, and within, the three worlds and that a combination of validation and falsification methods may be superior to any one method. Integral thinking is also put forward to support the validation process. Rather than repeating the call for full Popperian falsification, this paper recognizes that the current level of social theorizing provides little opportunity for such falsification. Rather than sidestepping the goal of Popperian falsification, the paths suggested here may be seen as providing both validation and falsification as stepping-stones toward the goal of more effective social and organizational theory.

**Key Words:** Falsification, metatheory, philosophy of science, theory of theory, three worlds, validation of theory

## Introduction

Within the social sciences, and more specifically within the study of organizations, numerous papers are implicitly or explicitly creating and/or promoting some form of social theory. Each indicates by its existence how relatively easy it is for someone to create and in some sense validate a social theory. However, despite the importance of advancing social theory, it remains nearly impossible to test, falsify, and improve such a theory (Popper, 2002). As a result, the efficacy of social theory and the opportunity for advancing organizational science is also limited. My interests are to understand and advance social theory, thus these are material concerns to address. My approach in this paper is to provide a model as a tool for advancing theory.

The limitations of social and organizational theory are becoming increasingly evident (e.g., Boudon, 1986; Burrell, 1997). There are even ongoing questions as to the viability of academia (Shareef, 1997). The limited effectiveness of social theory seems to have encouraged some to adopt an essentially a-theoretical approach (e.g., Shotter, 2004) that appears as an "epistemology of practice" (Schön, 1991). However a-theoretical it may seem, "practice is never theory-free" (Morgan, 1996, p. 377). I doubt such a focus on application, rather than theory, enhances the development of the social sciences. Dichotomies, unresolved, rarely enhance any endeavor over the long term because they represent a failure to integrate the dialectic.

The difference between the ease of creation and the difficulty of falsification probably explains 90% of social theory rises rapidly, only to fall again (Oberschall, 2000). This is a



distressing situation for the continued validity of academia and also for the practitioners who use those theories to improve life on personal, interpersonal, and transpersonal levels. Shareef (2007) suggests we use Popperian falsification to improve our management theories. Yet, he only echoes a call that is decades old and mostly unheeded.

I suggest that Popper's falsification criterion presents a too-high hurdle, and in its present state, social theory is not strong enough to make that leap. In order to more effectively advance theory, I suggest a reframing of Popper's views, not as a means to avoid falsification, but to suggest multiple paths—each with relatively easy steps leading to the lofty summit of empirical falsification. In this paper, I explore a philosophical pathway from present forms of scholarship toward a more integral view of scholarship and its results.

To begin that exploration, I discuss the nature and structure of theory. Next, I describe and briefly discuss Popper's views on empirical falsification as well as his lesser-known views on "three worlds" (empirical truth, emotions/concepts, and theories), which are closely related to his goal of empirical validation. In that section, I discuss some weaknesses of his three worlds conception.

I propose to resolve these structural weaknesses by reframing and applying integral thinking. This reframed version of Popper's three worlds suggests a new way of validating theory, one that more easily supports the advancement of theory towards empirical falsification. Finally, I apply this framework to test a theory, suggest how theory may be advanced more effectively, and discuss limitations of this new model.

## **Theory and Validity**

In the social sciences, there is a growing conversation around the nature, structure, and validation of theory. I provide a brief background to that conversation and suggest the multiplicity of views may be more useful than any single criterion. As prelude, I draw an analogy to two primal forces of our universe.

As we know, the force of gravity holds together our galaxy, solar system, and planet. Life without gravity would not be possible. Therefore, it is tempting to say that gravity is "the" best way to understand life. Yet, life as we know it would not be possible without atoms. And atoms are held together by the strong nuclear force (Considine, 1976, p. 1629). Understanding our universe requires an understanding of the galactic-scale force of gravity as well as the atom-scale nuclear force. Similarly, we might consider that the process of validating theory requires the understanding of multiple influences.

Sutton and Staw (1995) characterize the conversation around theory by saying, "Strong theory, in our view, delves into the underlying processes so as to understand the systemic reasons for a particular occurrence or nonoccurrence" (p. 378). Their version of theory might be summed up as possessing, "a single, or a small set of well-developed, logically linked research ideas that lend themselves readily to empirical testing" (Ofori-Dankwa & Julian, 2001, p. 415). Similarly, Weick (1989) works with Southerland's definition that a theory is, "an ordered set of assertions about a generic behavior of structure assumed to hold throughout a significantly broad range of

specific instances” (p. 517). Wacker (1998) pushes for a more atomist than systemic approach, asserting that a theory has four basic criteria: conceptual definitions, domain limitations, relationship building, and predictions.

In their philosophical debate on epistemic justification, BonJour and Sosa (2003) suggested that the validation of a theory might be centered on either an internal or an external perspective. The interlinked assertions or basic criteria noted above may be understood as an internal test of the theory. In contrast, an empirical test is one that occurs on the outside of the theory.

From another external perspective, Quine (1969) suggests in his essay on ontological relativity that we may make sense of a theory from the perspective of a larger theory—or the view from society, as a whole. For example, just as one who knows a complete language is able to make sense of any sentence in that language. The sense-making arises in and applies to the larger societal context. However, in the quest for a more effective social theory, such an approach is problematic: it invites regress and irrelevance. Sense-making contracts to apply to the “nearest” context. For example, within the largest context of our shared society, the sub-context of academia seems to make sense. Nested within academia are various disciplines and publications that make sense. Nested within each of those are many theories, and each of those may also be said to make sense. However, those theories remain ineffective in practice—out in the larger society. Thus, Quine’s methods do not seem adequate to his own challenge of adjudicating among rival ontologies.

In contrast to Quine’s “outside-in” approach testing that uses the inside-out approach mentioned above might be considered a test of the logical structure of the theory – what might be called the “logos.” I am defining the logos of a theory as the structure of the logical arguments that support the theory. While the academic process may be seen as an exercise in the development of the logos, I suggest we *expand and deepen how theorists understand the structure of the logos*. Whetten (2002) appears to agree, noting how a theory may be criticized for its lack of logical internal consistency. This integral perspective goes beyond Popper’s decades-old understanding of theories that were comprised of and therefore structured by separable axioms.

Such an advance in thinking seems to parallel the development of applying an integral perspective. For example, in Wilber’s (2001) four quadrant model (where each quadrant is said to be defined or understood through the perspective of the other three), we can take the perspective of viewing the relationship among the quadrants as the internal structure of the theory. That structure must be rigorously defined, or the model will be open to criticism.

In short, for a theory to be considered effective, it must be subject to both internal and external testing. This leads us to a potential problem of regress, because in one test we are looking for empirical facts; yet, “there are no facts that are independent of our theories” (Skinner, 1985, p. 10). As a result, the empirical/applied test becomes problematic because the results of that test must be viewed through a worldview, that is, through the lens of another theory. Thus, the question: if theories guide perceptions and actions change theories, where then is there any certainty to conclusions based on perceptions?

To recognize the difficulty of testing social theory through practice is not new. Echoing reports above, some say social theories have not proven very useful for effecting social change (Appelbaum, 1970; Boudon, 1986). The success of economics as a theory was questioned long before the late 2008 meltdown (Rapoport, 1970, as cited in Dubin, 1978). In organizational studies, even though theory does inform practice (Weisbord, 1987) in some quarters, an increasing number of practitioners describe organizational theory as “irrelevant” to their work (Tsoukas & Knudsen, 2005). In such cases as these, theory is ignored in practice rather than tested through practice.

On the other side of the coin, we can imagine an excellent organizational change practitioner who, if required to employ “bad” theory, makes modifications “on the fly” consciously and/or unconsciously. Thus, a good practitioner might compensate for bad theory, further compounding the difficulty of testing theory through application. A version of this approach is implied by Weick and Sutcliffe (2001) where they advise practitioners to manage more mindfully, adopting a range of useful techniques to move away from the trap of too heavy a reliance on plans and procedures. Of course, “good” theory might be applied with bad results – as anyone can attest whose fingers have slipped while using a calculator, and subsequently generated an answer that they considered believable... but useless within a mathematics examination.

Thus, both internal and external approaches have their possibilities and limitations when it comes to determining the validity of a theory. In such a case, we would do well to understand how both approaches are necessary, or at least useful, to understand the validity of a theory, just as we do well to understand how both the gravitational force (large scale) and the nuclear forces (small scale) are needed to understand our physical universe.

In the next section, I provide some background on Popper’s worldview and his approach for advancing theory. I also go into some detail describing Popper’s three-world model, and how, with slight revisions to that model we can use it to advance our understanding of theory validation.

## **Popper: Background and Worlds**

Broadly, Popper’s view suggests that science is in continual revolution. There, in the pursuit of objective knowledge, science is advanced by the rigorous testing and falsification of theories, “designed to replace existing theories with more accurate theories based on empirical research outcomes” (Shareef, 2007, p. 275) and “each step brings us closer to the truth.” Importantly, Popper’s “concept of truth is based on the intuitive idea of truth corresponding to empirical facts” (p. 276). Necessarily, this is an iterative process beginning with inaccurate theories, and moving toward theories of greater accuracy.

Popper’s version of scientific progress through the conjecture and refutation of theory has influenced a wide range of disciplines including organizational theory (Shareef, 2007). Thus, I find his ideas useful in my efforts to understand and advance social theory. Yet, despite wide understandings of Popper’s call, and many decades of research, progress is clearly elusive. The tree of knowledge grows slowly and thus far is not bearing fruit. In the field of organizational

studies, of many theories proposed, few have been adequately falsified. I find no well-documented advancement toward truth.

Turning attention to develop my earlier point, we have not advanced because the requirements for falsification set a standard too difficult for most scholarly investigations. Realistically, then, while falsification remains a useful goal, a series of steps toward the goal rather than a single hurdle would be more achievable for the social sciences.

Popper's own work has the insights needed to identify those steps. He developed his "three worlds" model to resolve the mind-body problem of knowledge. Although this approach is not so well known as his call for falsifiability, I explore those three worlds and the system they create, to suggest a useful key for validating theory. In doing so, I offer a new model as a tool to advance theory more easily towards falsifiability and thus closer to effective use by practitioners.

In brief, Popper's (1978; 1996) three worlds are as follows. World one (W1) is the physical world, consisting of physical objects, energy, and plants. World two (W2) is the mental world, consisting of feelings, thoughts, decisions, and perceptions. Popper suggests that W2 may be subdivided into the conscious and the subconscious. World three (W3) is the world of more complex conceptual constructs including stories, mathematical constructions, artistic compositions, and, importantly for this paper, theories. The contents of each world are called "objects;" so , for example, a rock would be a W1 object, a feeling of joy would be a W2 object, and a theory would be a W3 object.

These worlds can interrelate. For example, a painting (as a physical thing) would have some W1 existence (as do all physical objects). The aspect of the painting that makes it a great work of art would be a W3 object. When an individual views a great painting and experiences an emotional reaction, that reaction is a W2 object.

In developing the idea of a third world (of theory and complex constructions), Popper broke with many contemporaries and classical philosophy that suggested there was only one world or at most two (one of body, and one of mind). Popper called himself a pluralist for this reason, suggesting that all three worlds were needed to understand the mind-body problem and the situatedness of knowledge. In this, he suggests, somewhat hierarchically, that each world is founded on the one below it. W3 Theories are based on a combination of W2 ideas, and those ideas are based on perceptions of W1 objects.

Objects are subject to classification schemes. Popper discusses W1 objects (such as a block of marble), as a class of things. He also discusses W3 objects (such as a theory or symphony) as a class of things. He also notes how W3 objects, such as a plan, may be changed and altered as if they were W1 objects (one may chip away at a theory, in much the same way as one may chip away at a block of marble). While he mentions that knowledge is situated in W2, he also asserts that both W1 and W2 objects are things that might be known. Logically then, there are classes of that which might be known.

Part of Popper's discussion in these texts involves proving the "reality" that he refers to as "truth" of these worlds, essentially seeking to validate, justify, or prove the existence of the

objects within each world. He does this primarily by recognizing the importance of interaction of objects within and between worlds; for example, “observation is always observation in the light of theories” (Popper, 2002, p. 47). Thus, no W2 observation is possible without W3 theory.

Wilber (1999), perhaps accurately though much too briefly, notes one main thread of Popper’s investigation; he characterizes the three worlds as relating to objective and subjective knowledge. In lumping Popper’s three worlds with a variety of other concepts, Wilber misses an opportunity to use the three world concept in a way that might have proved useful in supporting the arguments he presented in *The Marriage of Sense and Soul* thus advanced integral thinking. Here, however, I use the three-world idea, but focus on science rather than soul.

For his AQAL model, Wilber suggests that each of the four quadrants exists in relation to the other three. That is to say, each quadrant may be understood only through the perspective of the other three. In a sense, if one quadrant were removed, the other three would lose their validity. This is the heart of integral thinking: recognizing and learning from interrelatedness. In contrast, Popper sees each of his three worlds as arising from the one below it. The W1 physical universe must have existed before humans evolved to perceive it (W2), and those perceptions must have preceded the sense making needed to create W3 theories.

This generation of worlds, however, is not a one-way street: “Our minds are the creators of world three; but world three in its turn not only informs our minds, but largely creates them” (Popper, 1978, p. 167). This is like the idea that “we shape our world and our world shapes us” or “our mindset affects how we see the world.” Morgan (1996, p. 274) presents a similar view when he draws on theories of complexity, chaos, and autopoiesis to encourage managers to think in terms of “loops, not lines.” That is to say, we should avoid thinking mechanistically (e.g., A causes B), and rather incorporate “the idea of mutual causality, which suggests that A and B may be co-defined as a consequence of belonging to the same system of circular relations.” We humans frequently seek a single cause to link to a single effect. We need deeper understandings about the complete system and its multiple causes, effects, feedback loops, limits to growth and exponential growth.

In contrast to Morgan’s mutual causality, the emergence of Popper’s worlds one from another seems more linear. However, his discussion of those worlds goes deeper. In addition to the above description of how W3 theories may impact W2 perception and knowledge, he also described how changes in theory would enable changes in W1. This makes good sense, as a person with a plan might make more significant changes to the world than a person without one. Yet, he suggested that such changes would only occur through the intermediary of W2. In short, W3 affects W2, which affects W1. This relationship may be understood as a three-stage linear relationship.

Importantly, as Stinchcombe (1987) notes in his extensive discussion on theory, such a relationship seems to render the intermediary term (W2, in this case) redundant. We might just as well say that changes in W3 cause changes in W1. However, this would leave out Popper’s very reasonable suggestion that W2 objects such as emotional reactions and insights are of a very different nature than the W1 empirical facts, and W3 theories. The three worlds are intimately interrelated while qualitatively different.

Popper saw a theory as being constructed of a set of axioms, suggesting that falsification of one axiom need not result in the falsification of another axiom. His view of axiomatic severability is troubling because the most effective theories (those that allow us to most reliably make changes or predictions in W1) are the theories of physics. Those theories are robust in the sense that each axiom is co-defined by the other axioms of the theory. For example, in Ohm's law (a theory of electronics), there are three aspects (volts, ohms, and amps). Each of those is defined by the other two. If we were to falsify volts (for example), the entire structure would collapse: there would be no way to describe amps and ohms. Thus, effective theories of physics are not amenable to axiomatic severability.

Popper pushes further in this direction suggesting that there is "no hope" of developing a useful understanding of a theory based on the relationships between the component statements because those statements (and the objects represented by them) can always be dissected to smaller pieces (Popper, 2002, p. 112). Instead, he suggests that a theorist begin with "relatively atomic statements" as long as those statements are linked to some sort of objective instrument of measurement. However, as is well known (then as now), even atoms may be split into components. In short, Popper's preference for atomistic structure of theory must be called into question. Further, as noted above, our philosophies have advanced since Popper's time, allowing for new insights into the structure of theory.

Popper can appear contradictory. "All of our actions in world one are influenced by our world two grasp of world three" (Popper, 1996, p. 142), yet, this suggests actions are a W1 object, while actions are not typically mentioned as an integral part of this theory. The act of research, as an example of an action, is mainly an implied part of the model, rather than an explicit aspect. This lack of clarity is an opportunity to improve on, or at least reframe, Popper's model.

This analysis indicates that Popper's worlds might be better understood by looking at them in a different relationship: moving from a linear view to a co-causal view of the three worlds. This approach would be a more integrated view of theory, one I expect to provide a closer coupling—a tighter integration—between worlds, and so enable a better understanding of scholarship in general, and the validity of theories, in particular. In short, I hope that by reexamining and reframing Popper's ideas, I might draw some novel conclusions that will aid in the advancement of social theory.

## **Reframing Relationships between Popper's Worlds**

If, as noted above, the linear relationship between the three worlds is inadequate, an alternative, co-causal, model is an alternative with which to experiment. To start by iterating the observation above, each of the three worlds might be considered co-casually related to the other two. To do so would suggest that W3 theories would be determined by W2 facts and feelings and W1 reality/truth. This throws us into an immediate tailspin of regress, as we have no way of establishing that truth, outside of our feelings and theories.

In order to develop an adequate model of co-causal worlds, the content of those worlds must be reframed. An important part of Popper's equation may have been overlooked. He carefully describes how the combination of W1 truth and W3 theories will conjoin to create W2

knowledge. Yet, he seems to take for granted that such knowledge would be accepted as such. We should ask, why that truth is accepted as truth.

If the objectivity of knowledge were the only criterion, belief would not be necessary (Powell, 2001). Yet, the W2 aspect of belief does seem to be an inescapable aspect of the Popperian philosophy. The answer, which we experience on a daily basis, is that it “makes sense.” That “sense of truth” would be a necessary part of the equation. Without it, how would we “sense” that one truth had any more validity than another?

We could argue that one could read two versions of theory, and simply identify that set of arguments that appears to be more valid than the other. However, that may be understood as the very definition of “sense making.” After all the arguments, conversations, examples, dissections and connections, each reader must experience some feeling that the conversation makes sense in order for it to be considered correct or right.

For example, I occasionally enjoy a good trivia quiz. In those events, I have noticed in myself and observed in others that there appear to be instances where knowledge is accompanied by a sense of “rightness,” even if that sense does not necessarily correspond with the version of truth held by others. While that feeling might, conceivably, be lumped into W2 with Popper’s version of knowledge, such an approach interferes with our ability to differentiate between knowledge and feelings. And, for the reasons just mentioned, that distinction is an important one. In short, there are important differences between knowledge and the sense of rightness associated with that knowledge that is not related to a change in theory.

That sense of rightness seems to emerge from the intersection of theory and knowledge. When the facts fit the theory, we say that there is epistemic justification, that is, that the information seems to be true. Therefore, that sense seems to have important distinctions from what Popper would describe as knowledge even though both of them are what Popper would call W2 objects. Therefore, I recommend reframing those three worlds to separate these vital aspects.

Additionally, while there may be a world of absolute reality or truth, and our improved theories may bring us closer to that ultimate truth, I think it is safe to say that we will never fully understand that ultimate reality. Therefore, I’m not sure it makes sense to have W1 as part of the model. We would not, as an example, include the moon in a theory of continual advancement in running techniques, for no amount of running will ever reach the moon. There may be absolute truth. But if that knowledge is unobtainable, there seems to be little use to including it in a theoretical model.

For this reframing, it is more useful to understand W1 as the repository of perception and knowledge. The W2 would remain the domain of feeling and emotions, and W3 remain the domain of theory. Significantly, this distribution of worlds creates the opportunity to understand each of the three worlds in integral, co-causal relationship to one another.

For those who might object to removing Popper’s version of reality, some absolute truth from this model, I would suggest designating “world-zero” as some place of absolute truth. Then too, as we are observers of this model, and we humans are also observers to our own selves



(knowledge, emotion, and theories) the self or observer might be represented by a “world-infinity.” Those two worlds, however, are bracketing the present conversation, and would require additional development. So, let me return to the focus of validating theory. I propose Popperian falsification may be adequately represented by the reframed relationships between three worlds. There is a W3 theory, a W2 sense of rightness, and a W1 knowledge. I think, however, that there is room for additional insight into theory validation within each of these three worlds.

## Reframing Validation within Worlds

In the spirit of applying multiple perspectives, I will now shift our point of view. Instead of looking at the relationship between worlds, I will seek to clarify the situation as it exists within worlds. According to the previous discussion, a theory might be falsified by the information derived from the theory, in conjunction with the feeling of rightness accompanying the theory and the information. This other, internal, perspective might look at the truths within a world as a class unto themselves. Or, as Shareef (2007) notes, Popper recognized that within each world there were levels—essentially “degrees of truth.”

For example, one might have the same theory, the same feeling of rightness; yet have a greater quantity of knowledge. Therefore, we may understand at least a quantitative level within each world. Similarly, as a new version of theory emerges, each advanced degree of truth or succeeding theory might be met with an increasing sense of rightness. These may be understood as varying levels of certainty within W2. For example, I know when I am asked a question, there are times when I have an answer... and times that I am more or less certain of that answer. As discussed above, these forms of validation might be seen as internal to the theory, rather than the external tests of validation through application and the generation of data, and the accompanying sense of rightness (or lack of same).

For example, in W1 it may be said that each object of fact has validity because it is differentiable from other objects. Also, internally to W2, it may be said that the feeling of love has some validity because it is differentiable from the feeling of hate. Moving to look at W3, it is important that Popper notes, "What is most characteristic of this kind of world 3 object is that such objects can stand in logical relationship to each other" (Popper, 1978, p. 158). In short, there is a sense of validity afforded by the categorization of objects within a world. They are also validated by the ability to differentiate objects within a world, as well as how they are related to one another within that world. Focusing on the validation of theory within W3, Popper notes the validity of mathematics (including the idea of infinity) as existing relatively independent of W1 (where no one has ever counted to infinity).

Of course, relying on internal justification alone creates the opportunity for a pitfall. Powell (2001), for example, suggests that “thick illusion” by definition, is not falsifiable. Therefore, he concludes, our uncertainty never vanishes. And so--and this is quite important--no theory is ever complete: there is always the opportunity for improvement. Exactly what constitutes “improvement” in a theory is topic for additional dialog. While Popper suggests that a more advanced theory is one that is closer to the “truth,” such a claim is difficult to confirm because that truth, itself, is part of the thick illusion.

Gödel's Proof hints at this limitation. Essentially, Gödel proved that nothing could ever be proved. Or, more formally, that no theory could be both complete and self contained. However perfect and complete the theory, there is always someone reading the theory and so formulating a new insight that goes beyond the original theory (for an interesting discussion on this topic, see Hofstadter, 1980, *Gödel, Escher, Bach*).

We might create a theory that appears to have a high level of internal consistency; yet has no basis in reality. For example, Tolkien's "Lord of the Rings" describes a carefully constructed world (including mythic languages and fire-breathing dragons). His work has a high level of internal consistency. Despite this W3 internal strength, fire-breathing dragons remain fictional. This same theoretical limitation exists in texts of fiction, fantasy, metaphysics, and religion.

While I focus here on interrelationships within and between worlds, I do not discard the traditional need for clarity and consistency of logical arguments. Consistency is especially important. If a theory says that a dollar may be redeemed for three apples, we cannot change dollars for kiwi-fruit, or apples for diamonds, without also describing the changes in the rate of exchange. Our understanding of clarity may shift, however, under the model I am presenting. For example, we might develop, ad hoc, a three dimensional theory that includes aspects of People, Places, and "Stuff." While the use of Stuff as an aspect of theory might, on the face of it, seem hopelessly vague, the vagueness is due to the lack of context. We might enrich that context by specifically describing the relationship between the aspects within the theory. For example, we might say that more People and more Places will result in more Stuff. Thus, Stuff might be seen as roughly analogous to "memories" (for the limited purpose of this ad-hoc example).

When co-validation is said to occur between the constituent propositions of a W3 theory, that co-validation may be repeated, fractal-like, in W1 and W2. In those other worlds, the relationship between the propositions are played out and falsified by actions and observations. For example, a theory that is essentially a metaphor might have little or no W3 validation. It would, if published, have greater W2 validation. If applied successfully to an organizational change effort, it would have greater W1 validation. At the other end of the spectrum, a theory with infinite propositions might be perfectly accurate (with high W3 validity); however, the application would be nearly impossible.

For W3 objects, which pose significant validity in one world, I suggest that the call for greater validity can be answered from within other worlds, and in the relationship between worlds. Indeed, as a theory or other W3 object advances in its internal validity, it generates a call for validation in and between the other worlds. *Broadly, a complex W3 fantasy calls for a reality check in W1 and a sensibility check in W2.* A profundity of W1 data that do not "make sense" calls for the creation of a W3 theory to weave them all together. Similarly, the level of sense between W3 objects may also be compared to suggest which one theory might seem more sensible than another.

Popper's work suggests the best way to validate a theory is in the way it allows for predictions in W1. Thus, a theory of physics (W3), which fails to predict change in W1, will have been falsified. In the social sciences, however, the process becomes a highly complex issue of recursion. For example, changes in theory (W3) will cause changes in productivity (W1) but may

also alter individual sense of importance (W2), so that an individual may no longer place the same value on the items being produced. For example, individuals working on an assembly line might (based on an emerging mindset) change their minds and decide that the human producer is more important than the objects on the conveyor belt.

Driven by a modern rather than integral mindset, Popper may have pushed too far in pursuit of his deductive agenda, a “Kantian epistemological activism” to the point where “we attempt to impose our interpretations onto the world rather than being passively instructed by it” (Shearmur, 2005, p. 265). Although Popper concludes that measurable W1 results represent the highest level of validation, because W1 represents empirical outcomes, both the process and the content of his conversation on the relationships within and between worlds suggests that the door is still ajar for alternative forms of validation.

For example, by way of recursion, Popper’s arguments in favor of falsifiability can themselves be understood as a form of theory. As a set of logical arguments that are not backed up by empirical data, Popper’s argument does not stand up to his own test. It does, however, retain validity in this reframing of his worlds where his theory may be understood as an advanced W3 object. By reframing his model from a linear/mechanistic one to an integral/co-causal form, I am advancing that model to a higher W3 standing. However, that higher W3 standing also heightens the imbalance between worlds, resulting in a call for W1 validation.

Thus, no one world, or relationship between worlds, should serve as the single criterion for the validity of theory. Instead, a theory should be understood as increasingly valid as it increases in validity within and between all three worlds. Because my focus here is on the validation of theory, I discuss validation within W3 in the next section. Following that section, I apply these concepts in an analysis of a theory.

## Validation within World Three

If a theory, as a set of related propositions, claims validity through logical arguments, it is legitimate, even necessary, to ask whether those arguments are essentially part of the theory, or are they part of the justification of the theory. If it is the latter, the logical arguments used to justify a theory are themselves objects of W3. This means they also must be legitimized in the same way. This creates an issue of recursion that may severely undermine attempts to validate theory through logical arguments. In the past, such an issue has been resolved by resorting to axioms. For example, Steiner (1988) describes the system of a theory, at least in part, as being constructed as a chain of definitions. Frustratingly, her conclusion was that the last link of a chain remains undefined. Her assertion seems atomistic and unusable. As I have developed elsewhere (Wallis, 2006, 2008a) the idea of a theory constructed of co-defining propositions provides a robust alternative to axiomatic terms.

Legitimacy exists for two reasons: (a) there is a co-causal relationship *between* worlds, and (b) there is a co-causal relationship *within each* world. If greater validity is derived from greater agreement (e.g., the consensus of expert opinion is more valid than the opinion of a single expert), that line of reasoning can extend to positing that *more aspects* of validity should be seen as *conferring greater* validity. That is, a combination of validating relationships (including W1,

W2, and W3) confers greater validity than any single one. An object in any world has greater legitimacy when it is validated from more “directions:” (a) qualitatively, within worlds and between worlds, and (b) quantitatively, more relationships are better, whether they are inter-world validations or inner-world validations.

As the issues I am addressing indicate, the conversation on the validation of theory based on its structure has been mired in Western-traditional understandings of logic and rhetoric. For example, Steiner’s (1988) work is a framework for theory justification based on the construction of language and logic. In a logical argument, the W3 object of theory is constructed of a chain of other arguments that ultimately must rest on observation. While the components of the theory may, or may not (depending on their complexity), be considered as W3 objects, the observations are certainly W2 objects. Hence, many arguments of logic are essentially validations between worlds. Because individual understanding of the world (W2 objects) is dependent on individual theories (W3 objects) the issue of regression, as demonstrated above, is inherent even in simple observation. Or, more briefly, “Truth itself is plainly useless as a criterion for the acceptance of a theory” (Kaplan, 1964, p. 312).

In contrast, Dubin’s (1978) work went beyond the traditional calls for rational argument by suggesting that higher validity could be obtained by higher orders of structure of the theory. While this appears to be looking within the W3 object, it is more useful to say validity results from comparing the components of the theory, *where those components are of sufficient complexity to stand on their own as W3 objects*.

For example, a theory that is essentially a list of facts would not be much of a theory. Indeed, decomposing any body of theory to a list of bullet points would essentially remove the structure from its W3 standing. In short, to achieve the opportunity for W3 validation, a theory must be of sufficient complexity that each of its component propositions must also qualify as W3 objects. In a sense, such a reduction is like atomizing or de-integrating the construct from W3 to W1 status.

Recently, I developed Reflexive Dimensional Analysis, a method for analyzing a body of theory (Wallis, 2006). Later, I clarified the importance of “internal justification” of a theory (Wallis, 2008a). For an example of an internally validated theory, I return to Ohm, and his  $I=E/R$  where each aspect (volts, amps, and ohms) is defined by the other two aspects (Considine, 1976, p. 1678). The internal justification view I introduced considers theories of greater internal validity to be more “robust” and, as illustrated by the robustness of Ohm’s law, more robust theories stand much stronger chances of enabling—and eventually predicting—W1 changes.

Although some might say Ohm’s law is a relic of modernist or deterministic thinking, from another perspective, Ohm’s law *is only deterministic if two of the three aspects are known*. For example, in order to determine the volts in an electrical circuit, both the ohms and the amps must be known. If, in attempting to determine the voltage of a circuit, the investigator is aware of only one aspect (e.g., the amps), the other two become *indeterminate*. In that case, the model, even when indeterminate, may serve as a signpost suggesting directions for further investigation. Thus, the model simultaneously provides deterministic boundaries (based on the limitations of the model) and also provides indeterminate opportunities for exploration. The context and extent of determinants account for a model’s simultaneous possibilities.

Where Nonaka (2005) suggests the group creates and validates knowledge, in the same way, both individuals and groups must use theories in the process of validating knowledge. Where Nonaka discusses the idea of “ba,” which includes “contexts and meanings that are shared and created through interactions” (p. 380), I seek to differentiate contexts and meanings in a straightforward process with methods for theorists and change agents to evaluate theory through multiple perspectives. Those intersubjective methods of measurement may be developed across and within Popperian worlds to objectively identify the epistemological validity of theories.

If theories can be created and confirmed to have a high degree of validity, we should expect those theories to be more helpful for processing information individuals encounter in their daily lives. In short, when theories are more useful, individuals may develop themselves more effectively.

In some sense, delving into a turn of the regression, we can conceive the inside view of one model to be the outside view of another. That is to say, an outside view of validation of theory involves a comparison of three worlds (theory, fact, and feeling of rightness). As we move into the inside view of theory, to validate a theory from the inside, we are now adopting a new perspective. What were previously seen as W3 theories, have now become W1 facts. The W3 theory place is now held by the method of metatheoretical analysis being developed here. However, that is all a matter for a future paper. In the next section, I apply the above ideas to the analysis of a theory.

## An Analysis of Theory

To support my belief that the ideas presented here have useful implications, I apply them in analyzing others’ work. If validity of theory may be understood within and between worlds, each scholarly study should include reflections on how the new theory fits within and between worlds. Such an effort need not be extensive, once the ideas are generally understood. Such a review would include observations, logical arguments, and some reflection on the authors’ sense of rightness. To some extent, many scholars aim toward such goals on a regular basis. In this section, I present and apply a framework for using this analysis to show how it might be done.

This framework for the analysis of theory operates as a coherent checklist. Its benefit is the clear indication of validation within and/or between worlds. The analytical results can be shown in a matrix of the checklist’s dimensions of validity (Table 1). Such a presentation of an analysis

**Table 1. Dimensions of Validity**

	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>
<b>World One</b> (Facts or data)	Uses objective data.	Uses objective data from multiple sources.	Future facts are predicted.
<b>World Two</b> (Meaning, emotions)	Makes sense to author.	Makes sense to editor, reviewers, and readers.	Consensus of expert opinion (this theory is preferred over other theoretical options).
<b>World Three</b> (Theory)	Includes logical arguments.	Theory is constructed of specific propositions.	Theory is constructed of co-causal propositions.

enables theories to “recommend themselves” to managers and other organizational change agents in search for a strong, appropriate theory to apply. While this is more a test of existing theory, it also indicates areas to focus on for future advancement of the theory.

For this demonstration analysis, I pulled (more or less at random) an article from my files, and now analyze its contents using the reframed three worlds perspective. The article is *Institutional entrepreneurship in mature fields: The big five accounting firms* (Greenwood & Suddaby, 2006). The study combines multiple theoretical bases to identify dynamics of change in organizations. Essentially, the focus is on institutional theory, which considers organizational change (and stability) as well as how the organization affects individuals, their mental states and their interactions. Briefly, the big five accounting firms became so large and powerful that they were no longer subject to the norms of their industry. They became more open to alternative ideas, such as the creative accounting processes of Enron. The analysis shed light on the dynamics leading to the collapse of Enron and Arthur Andersen.

World one considers the facts, or the data of the study. In this case, the authors interviewed senior partners at top accounting firms. They also drew on archival data such as annual reports, audit statistics, training records, press releases, and transcripts from hearings. As such, there was a large quantity of what might be considered facts, in the Popperian sense. The figures showed that the big five did indeed hold the lion’s share of the market – nearly 80%. Based on their analysis, the authors went so far as to predict that the evolution of the field’s elite will outstrip regulatory efforts.” Based on these results, their study has a high level of W1 data. Their data are objective, from multiple sources, and includes their prediction of future events (another form of data).

In contrast to the world of facts, world two is focused on meaning and emotions. In this world we may assume that the paper makes sense to the authors, or they would not have written it. Additionally, in their “appreciations,” the authors note the contributions of research funding, numerous collaborators, and anonymous pre-publication reviewers. This explication raises the level of W2 validity because it indicates that more scholars believe the paper has merit. Finally, the paper earned the authors the Academy of Management Journal “best paper” award for 2006. The external professional recognition indicates the paper has a still higher level of meaning for experts in that field. It is too early to determine if the paper will have much effect outside of academia; if so, that would indicate another level of meaning.

While we may assume that the authors’ writing process included a great deal of reflection (an important part of making meaning), one defect here is that the authors do not explicitly surface their own reflective process in the paper itself. Explicating their making-meaning process transparently would add to the W2 validity of the paper. In an interesting negative example, the authors credit a specific individual with cutting a “Gordian knot.” This analysis would have more data if the authors had discussed the knot and the process that led to its removal.

In world three, the theory of the article contains many logical statements. I do not spot any “contradictory axioms” that could be used by the authors to draw any conclusion they desired (as might be found in metaphysical texts) (Popper, 2002, p. 71).

The authors describe their theoretical orientation, and as a result of their research, suggest a process model and a set of seven propositions to explain the phenomena under investigation. Interestingly, their process model suggests two views of the process. The first view shows a coarse-grained analysis of the interrelationships between relevant theories, the second a fine-grained analysis that shows the causal relationships between the various aspects of those theories.

Propositional analysis is a useful tool for analyzing the relationships between co-causal aspects of a theory (Wallis, 2008a). Essentially, propositional analysis involves identifying the total number of aspects (or concepts) within a theory and, within that number, identifying those aspects that are “concatenated.” A concatenated aspect is one that is influenced, caused, or understood by two or more other aspects (Van de Ven, 2007). For example, in a proposition where A & B together cause C, C may be understood as a concatenated aspect, while A and B are not (being purely causal). By dividing the concatenated aspects by the total number of aspects, a ratio is derived that describes the robustness of the model.

Robustness, then, is measured on a scale of zero to one, with zero indicating no robustness (as might be found in a shopping list of concepts), while a robustness of one may be found in a very effective theory of physics (such as Ohm’s law). Further, robustness is a measure of the internal integrity, or integrality, of a theory and, as posited above, is a useful predictor of that theory’s efficacy in practice.

Although space does not allow for a complete exposition of analysis using my model, a propositional analysis of Greenwood & Suddaby’s coarse-grained model finds a robustness of 0.29 (the result of two concatenated aspects divided by seven total aspects). Their fine-grained view has a robustness of 0.31 (the result of five concatenated aspects divided by 16 total aspects). These levels of robustness, while not very impressive compared to Ohm’s law, are not uncommon for social theory. For example, institutional theory has a robustness of 0.31 (Wallis, 2008b).

Moving outside of the individual worlds, and into the relationship between worlds, additional insights and important contradictions begin to emerge. For example, the authors’ prediction about the field’s elite evolving faster than regulatory changes. Such a relationship would be considered observable data, yet those data are not accounted for in the theoretical model the authors propose. This misalignment between the world of data and the world of theory suggests the need for additional (and more careful) work in developing their model. In short, each of the three worlds is an admirable exemplar of academic work. However, these three worlds are not necessarily part of the same solar system.

The analysis presented in this section may also be understood as a piece of W1 evidence, relating to the W3 theory presented in this paper. Of course, as discussed above, those two worlds are insufficient by themselves. I must also *apply* my model *to my use of* the model, another recursion to examine validity. To form a more integral model, then, there must be an accompanying W2 feeling of validity. The same levels of analysis pattern I used on Greenwood and Suddaby is the pattern I now use on this work I am writing that you are reading. On one level, there is some feeling of rightness on my part, although I certainly feel that I need to do

continued investigation and explication of my theorizing. I assume there is an implicit sense of rightness on the part of the reviewers and the editors, else this article would not be published here. A more important level of W2 validity is the feeling of rightness that may be felt by you, the reader.

**Table 2. Dimensions of Validity for Greenwood & Suddaby**

	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>
<b>World One</b> (Facts or data)	Uses objective data.	Uses objective data from multiple sources.	Future facts are predicted. However, data predicted do not match source data.
<b>World Two</b> (Meaning, emotions)	Makes sense to authors. Authors should explicitly surface reflections.	Makes sense to editor, reviewers, and readers. Authors recognized by peers.	Does not have consensus of expert opinion. Model is not compared with other models.
<b>World Three</b> (Theory)	Includes logical arguments.	Theory is constructed of specific propositions.	Theory has co-causal propositions to 0.3 level of robustness. Room for improvement by increasing robustness.

## Limitations of the Proposed Model

My approach to validation of theory does have limitations. For example, if we wanted to analyze a complex structure such as a high-rise office building containing multiple organizations, the difficulty of listing each item, to say nothing of categorizing each of those items into its sub-aspects of each of the three worlds would be intimidating, to say the least. Perhaps the most effective use of my model is in metatheoretical analysis. There, for example, the scholar may review his or her own work, or the work of another scholar, and readers could easily identify the strengths and weaknesses of articles they reflect on and make useful suggestions for improvement.

Reflecting on the above analyses, and the levels of validity noted in Table 1, indicate another area for possible improvement of this model. The W2 levels of sense-making starts with the article making sense to the author. Then, at progressively higher levels, it essentially asks if the paper makes sense to editors, reviewers, and other experts. The usefulness of this scale may be called into question because any article that is subject to this evaluation will have already passed the first and second levels. Few will ever reach the third. Some reframing of this scale may be useful. Similarly, most or all papers will easily reach the W3 level of including specific, logical propositions, while few will ever reach a level of high robustness of their co-casual propositions.

One alternative might be to revise the scale into something more quantitative. A metatheoretician might, for example, count the total number of facts, the number of propositions, and the number of people who agree with the model. This would provide specific and objective data for comparing and contrasting theories.



The generally high levels of efficacy found within worlds for the analysis of the Greenwood and Suddaby paper may be expected for an article of their high academic caliber. This, in turn, may suggest that the form of analysis I presented represents an evaluation based on traditional academic and/or Western values. More reflection and analysis should reveal more insight into this concern. I, for one, would be interested in seeing alternative evaluation methods, and an argument might be made for non-evaluation (although such an argument would be an evaluation).

Future studies might include an investigation into the measurement of each world's objects and how they are seen and measured from the combination of other worlds. Another opportunity is to identify a "triple helix" of iterative interactions between the three worlds. Nonaka (2005) suggests a spiral relationship in the knowledge creation process, resulting in the generation of more knowledge and knowledge that is more useful. If this process is replicated for W1 and W3, we might imagine three spirals, with interesting opportunities for measurement and insight. Looking within each world, there is the possibility to "unfold" each world into additional dimensions to identify the quantitative and qualitative nature of each world object. The opportunity also exists for a similar quantification of objects that exist simultaneously in all three worlds.

Another form of validation might be seen in the process of creation. For example, the social construction perspective suggests that knowledge and social norms are both created through the general process of social interaction (Burr, 1995), that a socially constructed culture strongly determines how each individual sees the world, and finally, that knowledge and social action are linked. Social construction might be seen as analogous to the process of theory creation, where the theory is a cultural frame of reference, and that frame of reference is continually changed by its interaction with other theory, application, and conversation.

Both processes (social construction and theory construction) seem to be recursive in that they are continually repeated processes; the theory changes the way individuals see and gather information, the information changes the theory. In short, within the process of communication, theory may be understood as being created by knowledge and that the process of using theory generates knowledge. It seems this reframed view might dovetail with a social constructionist point of view. However, more study would be required to develop this idea.

The relationship between worlds presented in this paper could be tested through a longitudinal study that tracks the knowledge, theories, and effectiveness of an organization over time. The resulting information could suggest, for example, the amount of effort that should be allocated between action, knowledge creation, and theory creation within the environment of a particular industry. Such knowledge would contribute the effectiveness of translative and transformative development.

For example, one could analyze economic theory used at the state and national level, including the robustness of those theories. Those results might be compared (over time) with level of consumer confidence and the number of people living above the poverty line. Similarly, one could study the theories and policies used by corporations and community groups. The

results of those studies could be compared with organizational success and/or organizational adaptability.

Here, I have focused on W3. Future research might focus on other worlds. One big question might be an investigation into spirituality. If spirituality is associated with and evidenced through a spiritual awakening, and that awakening is reflected in a sense of wonderment, that sense might be understood as a W2 object. As such, there may be internal analyses that seek to analyze the quantity and quality of such moments of amazement. More interestingly, however, we could investigate how that W2 feeling might be understood in co-causal relationships with W1 evidence and W3 theory.

While Table 1 offers a matrix-checklist approach for investigating the validity of theory, it could be expanded by identifying a scale within each box. For example, if a theorist is seeking validation on a W1 dimension at Level 1, he or she could (and should) note how many situations have shown improvement from the application of the theory. As noted above, there is no specific progression between worlds. While W2 validation may move from individual opinion to consensus of opinion, that consensus does not guarantee increasing validity in W1 or W3.

Perhaps neither knowledge nor theory can be fully understood or validated except in relation to the other. If so, the primacy of that relationship suggests all the following are worthy of significant exploration: (a) the processes of theory creation, (b) the structure of theory, and (c) especially the relationship between action, knowledge and theory.

## Conclusion

Popper (1996, p. 4) is mainly interested in the growth of objective knowledge. This direction is in keeping with his call for empirical validation of social theory. However, in his discussion of the three worlds, he is highly focused on developing the W3 perspective of theory. In that focus, he may have missed some interesting insights. Significantly, he was a product of the modern age. That milieu is reflected in the linear structure of his three worlds model. His view of theory may have opened the door for the explosion of theory in the social sciences without necessarily advancing any specific theory. This is because he saw a theory as being comprised of and constructed by a set of axioms. He thought falsification of one axiom need not result in the falsification of another axiom. This view may have provided philosophical ammunition to scholars, emboldening them to revise theories by changing their axioms, almost at random. It seems strange to me that this approach would actually be acceptable to Popper (Popper, 2002, p. 113).

While, on the surface, this may seem a perfectly reasonable approach to some, demands for rigor should prevent such a disconnection within the bounds of a single theory. After all, if a theory is composed of two axioms, and one is falsified, the theory would no longer be a theory: it would be a single axiom. An alternative would be to replace the falsified axiom with a new one. However, in this example, that means half of the theory has been changed. Can we reasonably call that theory by the same name? I don't think so. For a deeper discussion on the problems of changing theory, and the measurement of that change, see my discussion on "dynamic robustness" (Wallis, 2008b).

My thesis is that instead of holding ourselves to the nearly impossible standard of using empirical validation to create higher quality theory, we of the social sciences instead have been building and amassing higher quantity of theories. Drawing on and reframing Popper's idea of three worlds, I proposed a co-causal version of the three worlds model. I presented a range of possibilities for the validation of social theory including methods within and between worlds. Additionally, I presented a checklist style matrix for the easy validation of theory. Essentially, this matrix indicates that theories might be validated more effectively from the inside and the outside rather than one or the other. Finally, I tested that matrix in an analysis of a theory. In this, I have identified an important way to advance an otherwise admirable paper (i.e., Greenwood & Suddaby).

Because our theories shape the way we work in the world, the opportunity to purposefully advance a theory is also the opportunity to indirectly impel social adaptation and evolution. In short, by advancing our theories, we advance humanity and more.

Despite the apparent failure of the social sciences, there is progress toward success. The shared understanding of metatheory is advancing. For example, in addition to many other valuable insights, Whetten (2002) and Van de Ven (2007) both provide useful metatheoretical exercises for students. This is a significant improvement over the previous approaches to understanding theory because the ability now exists to engage in useful classroom exercises on theory creation where previously, that ability was tacit or non-existent. Such a capacity suggests that the understanding of theory has advanced to a particular level. On the other hand, this might also indicate that the opportunity exists for theorists to step back and not be so concerned as to whether a theory is good or bad, and simply note that the mass of theories that have been developed over the past century may now be described as data for metatheoretical studies.

When climbing a technically challenging mountain, such as Everest, the expedition establishes a "base camp" where supplies are easily stockpiled. At a convenient location, higher up the mountain, it establishes an "advanced camp" where climbers recuperate and get additional supplies ferried up from the base camp. Should the first attempt to reach the summit be unsuccessful, the next attempts launch from the advanced camp. Thus, a well-organized expedition does not lose valuable time and energy going back to the foot of the mountain to re-supply and re-energize: a more efficient way to make repeated attempts until the summit is reached.

In that spirit, I hope the model I present in this paper indicates how we can establish a conceptual camp for advancing theories. At such a camp, an evolving theory might gain energy from validation within worlds and falsification between worlds, on its way to the summit of empirical falsification. In short, I anticipate that increasing our capacity to understand theory will lead to improvements in theory, and so inform developments in practice for the benefit of many across many domains of life.

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