

The Problem of Psychology and the Integration of Human Knowledge

Contrasting Wilson's Consilience with the Tree of Knowledge System

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ABSTRACT. The central thesis of this essay is that the problem of psychology lies at the very heart of the difficulties associated with integrating human knowledge. The startling consequence of this insight is that it means the solution to psychology's epistemological woes opens up a new pathway for achieving unified knowledge. A brief overview of the fragmentation of knowledge will be offered and special attention will be paid to Wilson's (1998) proposal. The problem of psychology, Wilson's failure to address it, and the reasons why it is integral to any proposal for unifying knowledge will then be specified. The article concludes with an articulation of how the Tree of Knowledge (ToK) System solves the problem of psychology, resolves many of the fundamental issues associated with integrating human knowledge, and is commensurate with the foremost concerns of natural scientists, social scientists, and humanists, allowing for objectivity, coherence, and pluralism.

KEY WORDS: consilience, integration, Justification Hypothesis, philosophy, Tree of Knowledge System, unified theory, unified psychology

In this time of divisive tendencies within and between the nations, races, religions, sciences and humanities, synthesis must become the great magnet which orients us all. ...[Yet] *scientists have not done what is possible toward integrating bodies of knowledge created by science into a unified interpretation of man, his place in nature, and his potentialities for creating the good society. Instead, they are entombing us in dark and meaningless catacombs of learning.* (Reiser, 1958, pp. 2–3)

Attempts to unify knowledge have been made by many, but no proposal has been met with much generalized success. The central thesis of this essay is that the problem of psychology lies at the heart of the difficulties. The startling consequence of this insight is that it means the solution to psychology's epistemological woes opens up a new pathway for achieving unified knowledge. This argument will build on a series of claims. First, an overview of the fragmentation of knowledge will be offered with a focus on E.O. Wilson's *Consilience: The Unity of Knowledge* (1998). Second, the problem of psychology will be clearly specified, and it will be shown that Wilson's failure to address this problem is a crucial weakness in his system. Third, an articulation of how the ToK System (see Henriques, 2003, 2004) solves the problem of psychology will be offered. This will be followed by an analysis of how the ToK System deals with many of the problems encountered by Wilson. The example of aggression will then be used to illustrate how the ToK System can be applied to real-world phenomena. Finally, this paper will offer some thoughts on how to move toward a more unified state of knowledge.

Wilson's Consilience and the Continued Fragmentation of Human Knowledge

Even a cursory glance across the intellectual landscape reveals a primary fault-line between the sciences and humanities. Catapulted into the academy's consciousness by C.P. Snow's famous analysis (Snow, 1959), the antagonisms between these 'two cultures' and the seemingly irreconcilable differences in the manner in which they acquire, judge, and convey knowledge has only deepened since Snow's articulation. Although Gould and Wilson are often depicted as intellectual adversaries, both agreed the 'greatest enterprise of the mind has always been and always will be the attempted linkage of the sciences and the humanities' (Wilson, 1998, p. 8, cited by Gould, 2003, p. 7). Yet proposals for unifying the sciences with the humanities into a grand knowledge scheme have generally met more resistance than success.

An examination of *Consilience* provides a useful entry point to understand the primary issues and core difficulties associated with unifying knowledge. Wilson opened *Consilience* with an impassioned call for unified knowledge, although he acknowledged early that his quest was not currently based on science but instead was a 'metaphysical world view, and a minority one at that' (p. 9). He argued forcefully that if there could be a successful linkage of theory and facts that tied together the natural sciences with the social sciences and the humanities into a common framework of explanation, the potential payoff would be immense as it would allow our increasingly complex civilization a much needed common understanding from which to operate.

The logic underlying Wilson's vision can be telescoped into essentially three steps. First, evolutionary biology is consilient with the physical

sciences, which provides the foundational bedrock for all of science. Second, sociobiology allows for the understanding of animal social behavior via the lens of evolutionary biology (Wilson, 1975). Third, because humans are animals, the social sciences must rest on a basic sociobiological foundation. To this formulation Wilson added the notion that because the humanities have radically different goals than science, they will remain as a separate great branch of learning. The social sciences are currently fragmented across the two great branches and will eventually split ‘with one part folding into or becoming continuous with biology, the other fusing with the humanities’ (Wilson, 1998, p. 12). Finally, although the sciences and humanities will remain separate, Wilson optimistically predicted that once consilience is achieved, the interconnections between the two great branches will be much more harmonious than is currently the case.

Consilience received a huge amount of attention and has been hailed by many as bold, provocative, and groundbreaking. However, it also received criticism and resistance—so much so that Ceccarelli (2001) characterized it as failing in its goal to galvanize interdisciplinarity. In a powerful analysis of rhetorical inquiry, she compared and contrasted the response to *Consilience* to earlier interdisciplinary works by Dobzhansky (1937) and Schrödinger (1945), both of which were tremendously successful at building interdisciplinary bridges. By examining the difficulties Wilson encountered, a clear picture emerges of the major problems any attempt at the unification of knowledge must address. Four major domains for which Wilson was criticized are: (1) reductionism; (2) the relationship between the natural and social sciences; (3) the fact–value distinction and the relationship between the sciences and humanities; and (4) the need for unification and the nature of knowledge. These criticisms will ultimately be returned to and reexamined in light of the ToK System.

Reductionism

Todorov (1998) convincingly demonstrates that Wilson offered two versions of consilience, one ‘hard’ and the other ‘soft.’ In the hard version, the world is essentially singular and material. Numerous times Wilson claimed that all of nature is organized by simple universal physical laws, to which all other principles can be reduced. This ‘hard’ Wilson (1998) argued that there is only one class of explanation (p. 53); that nothing fundamentally separates human history from the course of physical history (p. 11); and that all things, from ‘the birth of stars to the workings of social institutions, are based on material processes that are ultimately reducible, however long and tortuous the sequences to the laws of physics’ (p. 266). By virtually all accounts, the hard version appears to be guilty of what Daniel Dennett (1995, p. 82) labeled ‘greedy reductionism,’ in which the boundaries between disciplines melt away and the vocabulary of physics becomes the one and only true explanatory framework—because, after all, everything is energy and matter.

Yet there is also the ‘soft,’ more agreeable Wilson (1998) who claimed that we need more investigation into the emergent, holistic properties of the mind (p. 109); that virtually all human behavior is transmitted by culture (p. 126); that physics doesn’t explain life (p. 68) and that biology doesn’t explain culture (p. 127); and that ‘the ultimate goal of science’ is synthesis rather than reduction (p. 211). By these accounts, Wilson seems to be a ‘good’ reductionist (Dennett, 1995). Yet by straddling these two versions of reductionism, the picture offered by *Consilience* is not at all clear.

The Relationship between the Natural and Social Sciences

Wilson’s ambiguous stance toward reductionism is paralleled in his articulation of the relationship between the natural and social sciences. On the one hand, he seems to call for bridge-building efforts in which natural and social scientists can mutually benefit from less hostile exchanges—that is, if only social scientists would simply recognize that culture is in some ways connected to biology. This is, of course, a relatively soft claim. As Wilson (1998) himself admits, there are far fewer ‘biophobic’ adherents to the Standard Social Science Model than there were 20 years ago (p. 188). In other places, the hard version of Wilson shows up. Envisioning, as he does, the social sciences folding into biology echoes his earlier claims that sociobiology would cannibalize the social sciences. In addition to offering a picture of the sciences that Burnett (1998) characterized as ‘distressingly flat,’ Wilson at times also showed a brazen arrogance about the abilities of natural scientists relative to social scientists and those in the humanities. Rose (1999) expressed embarrassment at Wilson’s apparent ‘contempt’ of those in working other disciplines.

In a manner that clearly paralleled the ambiguous claims about reductionism, confusing questions remain about the hierarchical nature of the sciences in Wilson’s version of consilience. For example, will the language, theories, and methodologies of the natural scientists will replace those of the social scientists (hard version), or will social scientists simply come to anchor their ideas more clearly to a natural science foundation (soft version)? Are there identifiable boundaries between the sciences, or will eventually all sciences become physical sciences? Or will there be broad categories and boundaries between the physical and biological sciences? Or between the physical, biological, and social sciences? If there are to be boundaries, where are they and why will they be drawn at those junctures? For all its encyclopedic detail, *Consilience* does not answer these basic questions.

The Fact–Value Distinction and the Relationship between the Sciences and Humanities

The fact–value distinction is one of the most important in all of philosophy, but Wilson (1998) brushes it aside, claiming that the naturalistic fallacy is

itself a fallacy and that oughts are simply another form of is. 'Ought is the product of a material process' (p. 251), the seemingly hard version of Wilson writes. Yet the obvious question that exposes the dark underbelly of the naturalistic fallacy is not dealt with at all: Is everything that is natural good? Numerous philosophical and empirical analyses have demonstrated that the answer is clearly no; yet Wilson's ethical analysis provides little information regarding to which natural oughts we ought to adhere.

Although all knowledge systems are complicated mixtures of facts and values, it nonetheless remains clear that descriptive statements about what 'is' the case are clearly a different kind of thing than prescriptive claims about what 'ought to be' (Henriques, 2005). And it is generally well recognized that the sciences and the humanities have different charges with regards to these two types of claims: the basic sciences serve to generate the most general descriptive claims, whereas the expressive creativity embodied in the humanities carries with it the charge of illuminating how the world could be (e.g., W.T. Jones, 1965). Thus Wilson achieves his connection between the sciences and the humanities by ineffectively blurring one of the most foundational distinctions in knowledge—the difference between facts and values.

The Need for Unification and the Nature of Knowledge

Numerous critics questioned the necessity and the reasonableness of Wilson's call for a more unified system of knowledge. For example, Rorty (1998) questioned the need for consilience and instead argued that the various academic disciplines are functioning just fine. Indeed, many reviewers with different epistemological leanings questioned the need for unity, and others strongly objected to Wilson's derisive dismissal of any and all forms of postmodernism or relativism and his general denigration of philosophy (e.g., Quackenbush, 2005).

The problems associated with Wilson's philosophical stance are increased because careful examination of his position reveals significant confusions about the kind of thing he claims science to be. At one point he states clearly that 'science is neither a philosophy nor a belief system' (1998, p. 45) and supporters applauded him for 'debunking' the notion that science is a social construction (Kurtz, 1998). Yet Wilson (1998) also describes science as 'the boldest metaphysics of the age ... a thoroughly human construct, driven by the faith that if we dream, press to discover, and dream again' (p. 12), understanding will be ours. At another point, he describes science as 'religion liberated and writ large' (p. 6). Finally, in a statement that adds to the ambiguity, he acknowledges his belief in consilience to be metaphysical rather than scientific, although he asserts that consilience within the natural sciences can already be considered a scientific truth (p. 9), despite the fact that many scientists and philosophers would dispute such a claim.

While the above focus on criticisms is likely to leave a harsh impression of Wilson's attempt at unifying knowledge, it is important to temper this characterization, for several reasons. First, the book was a monumental effort that surveyed a huge landscape of information. Second, it generated much productive discussion that provides a way of examining and framing many of the fundamental issues that arise when attempting to generate a scheme for unified knowledge. Third, I believe the hypothesis regarding the unity of knowledge is viable, and I share the notion that if it could be successfully achieved, it would be of tremendous benefit to humanity.

Of course even if one agrees in principle that a unified theory of knowledge would be extremely valuable, it does not follow that support should be thrown toward any such proposal. It is precisely because the implications of such a theory are so profound that the scrutiny and criticism of all potentially viable proposals should be intense. I am critical of Wilson here because it is clear to me that his version of consilience is wrong. I believe it is wrong for one fundamental reason that underlies and ties together all the problems mentioned above. It fails to solve the problem of psychology.

The Problem of Psychology

In numerous different essays, I have criticized the current status of psychology¹ and pointed out its many problems. Is it reasonable to now claim that there is a singular 'problem of psychology'? Meaning is intertwined with context, and in the context of integrating human knowledge the problem of psychology is clearly specified by simultaneously highlighting two of psychology's most prominent characteristics: its conceptual incoherence and the fact that, more than any other discipline, it connects to each of the great branches of learning.

Psychology's conceptual incoherence is clearly identifiable: (1) there is no agreed-upon definition; (2) there is no agreed-upon subject matter; (3) there is a proliferation of overlapping and redundant concepts; (4) there are a large number of paradigms with fundamentally different epistemological assumptions; and (5) specialization continues to be increasingly emphasized at the expense of generalization and thus the problem of fragmentation only grows. So bad is the problem that several have darkly proclaimed that it is insoluble. Sigmund Koch (1993) put the issue as follows:

The 19th-century belief that psychology can be an integral discipline, which led to its institutionalization as an independent science, has been disconfirmed on every day of the 112 years since its presumptive founding. When the details of that history are attended to, the patent tendency has been toward theoretical and substantial fractionation (and increasing insularity among the 'specialties'), not toward integration. (p. 902)

As scholars of the discipline know, to dive into psychology is to dive into a whirlwind of confusion that pulls one simultaneously toward the natural sciences, the social sciences, and the humanities. Gordon Allport (1960) characterized psychology as existing at the center of the major intellectual fault-lines in knowledge. A rather extensive quote from him gives a clear articulation of his view of the problem:

According to a division commonly adopted, there are exactly four winds in the intellectual heavens, springing from the four basic provinces of research and learning—the [physical] sciences, the biological sciences, the social sciences and the humanities. Have you ever thought before that it is in the territory of psychology, and *only there*, that all these four winds collide and run a tempestuous course? (p. 4)

Allport continued to describe the relationship of psychology to the four intellectual winds in very human terms:

From the [*physical*] sciences comes the colossal impact of scientific methodology. I suppose in the entire history of human thought there never was a case where one science has been bullied by another science as psychology is bullied by her elder sister science, physics.

From the *biological sciences* [come] the evolutionary and organismal points of view without which psychology would still be scholastic in character. ... In many quarters ... [biology has] threatened to push every vestige of humanism out, leaving psychology with a plague of rats.

Social science is causing a tornado on its own. It refuses to blend amicably with natural and biological science, but claims mind pretty much as its own province for study. Mind, they insist, takes its form almost wholly in response to cultural demands.

The last wind that blows into our storm center is gentler and less voracious. ... It is the wind of humanism. After all is said and done, it is philosophy and literature and not the natural, biological or social sciences, that have fostered psychology throughout the ages. (pp. 4–5)²

Taken together, the quotes from Koch and Allport provide a clear articulation of the problem of psychology and its relevance to the integration of human knowledge. The field resists a coherent definition and yet at the same time it connects more deeply to each of the great branches of thought than any other discipline.

Returning to *Consilience*, it becomes clear that Wilson (1998) failed to appreciate the significance of the problem of psychology. In fact, the existence of a problem is not even acknowledged. Yet by solving the problem of psychology a new opportunity emerges to simultaneously see both why Wilson was wrong in his specific version of consilience *and* why the consilience quest that he outlined is both noble and attainable.

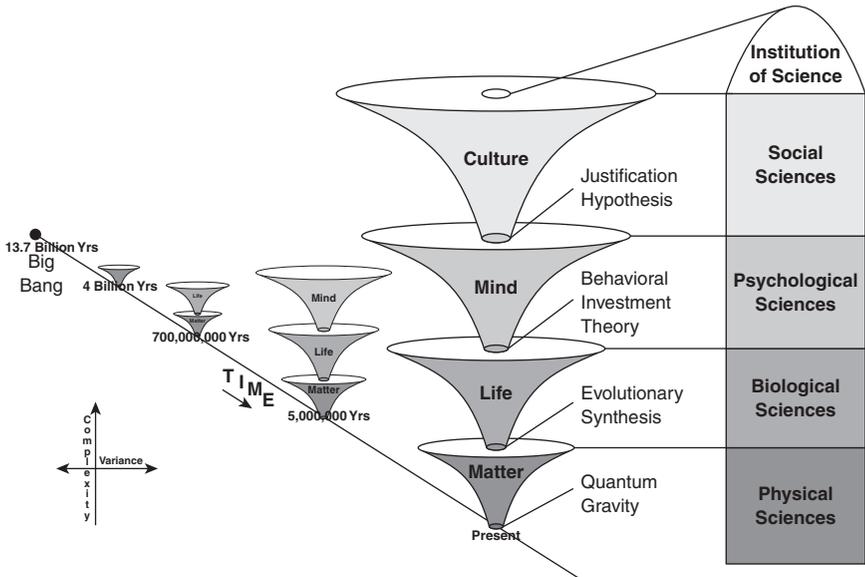


FIGURE 1. Tree of Knowledge.

Solving the Problem of Psychology: The Tree of Knowledge System

In outlining a proposal for the theoretical unification of psychology (Henriques, 2003), I first introduced the Tree of Knowledge (ToK) System (Figure 1), which offers a pictographic representation of cosmic evolution as occurring in four distinct phases: Matter, Life, Mind, and Culture.

Some have suggested that the ToK System is simply a reiteration of the major levels of complexity that have been long recognized by scholars dating all the way back to Augusta Comte's (1830–1842) hierarchy of the sciences (e.g., Lilienfeld, 2004). And correspondences between the ToK and other versions of reality are frequently apparent (see, e.g., Reiser, 1958). Yet despite the surface similarities, there are numerous aspects of the ToK System that make it a radically different proposal. One major difference is that it depicts reality as four distinct dimensions of complexity. Dimensions of complexity emerge because novel forms of information processing evolve that mediate different classes of behaviors. Genetic information processing mediates organic behaviors, neuronal information processing mediates mental behaviors, and symbolic information processing mediates cultural behaviors. Thus, while many have recognized that nature is hierarchically arranged into levels of complexity, the ToK System is singularly novel in its proposal that nature exists as both dimensions (Matter, Life, Mind, and Culture) *and* levels within each dimension (e.g., subatomic, atomic, and molecular levels exist within the

material dimension; genetic, cellular, and multicellular levels exist within the organic dimension; neuronal, animal-as-a-whole, and animal group levels exist within the mental dimension; and finally symbol, human self-consciousness system, and society are levels within the cultural dimension).

The ToK System further posits that each dimension of complexity can be accounted for by a specifiable theoretical joint point. A joint point is a theory of the complexity-building feedback loop that results in the evolution of the dimension of complexity. Quantum gravity is the first joint point, and the combination of quantum mechanics and general relativity is theorized to account for the evolution of matter from the energy singularity which existed at the beginning of time. The modern evolutionary synthesis is the second joint point and accounts for the evolution of life on earth.

If one accepts that the ToK System offers a relatively true map of reality, then it clearly depicts the need for specifying the joint points between Life and Mind and between Mind and Culture. As discussed in greater detail elsewhere (Henriques, 2003, 2004), Behavioral Investment Theory (BIT) was proposed as the Life-to-Mind joint point. Specifically, BIT connects Skinnerian theory with modern evolutionary theory and cognitive neuroscience in a coherent manner that explains the process by which animals (meaning humans also) compute their behavioral investments. The Justification Hypothesis (JH), which connects the core insights from psychodynamic theory with academic psychology and the social sciences, was offered as the Mind-to-Culture joint point. Importantly, several authors demonstrated that BIT, which provides the foundation for the formal science of psychology, is consistent with a broad array of research and theoretical perspectives within the general mind sciences (e.g., Geary, 2005; Gilbert, 2004). Others have shown that the JH is consistent with human psychology and dominant perspectives in the social sciences (e.g., Haaga, 2004; Stanovich, 2004).

One of the most powerful indicators that the ToK System is a different kind of proposal is the manner in which it generates a solution to the longstanding problem of psychology. Corresponding the ToK System with the varying definitions and conceptions of psychology reveals that the discipline has spanned two fundamentally different dimensions of complexity: (a) the mental dimension, which corresponds to animal behavior in general; and (b) the cultural dimension, which plays a crucial role in human behavior at the individual level. Elsewhere (Henriques, 2004), I showed how this new view of the subject matter can be used to effectively define the discipline by dividing the science of psychology into two domains: (a) psychological formalism and (b) human psychology. Psychological formalism is given the charge of describing, explaining, and predicting mental (animal) behavior in general, whereas human psychology focuses on human behavior at the level of the individual.

Reanalyzing Wilson's proposal through the lens of the ToK clearly reveals that he got the problem of psychology wrong. Indeed, a rather basic error occurs early in his thinking. In jumping from basic evolutionary theory to

sociobiology, Wilson shifted into a different dimension of complexity. Sociobiology attempts to describe animal behavior, especially the behavior of animals in groups. Yet from a ToK vantage point, the behavior of the animal as a coordinated singularity mediated by the nervous system that produces a functional change in the animal–environment relationship can be convincingly demonstrated to be a fundamentally different dimension of complexity than organic behavior in general (Henriques, 2003). In short, according to the ToK, Wilson's sociobiology should technically be considered a branch of the formal science of psychology (see Henriques, 2004, p. 1215, Table 1).

For his part, Wilson (1998) considers psychology to be concerned solely with human behavior (p. 150); however, for a host of reasons this position is unjustifiable (see Henriques, 2004). Wilson's inability to incorporate an effective conception of psychology is clearly seen in his patterns of intellectual avoidance. Nowhere in *Consilience* and virtually nowhere in all of his writings does Wilson even acknowledge the existence of the man often heralded as the most influential psychologist of the past century, B.F. Skinner (see Haggbloom et al., 2002). This absence is particularly striking given the popularity and success of Skinner's operant theory in describing, explaining, and predicting animal behavior.

The absence of Skinner in Wilson's work is made all the more remarkable when one considers that both men strongly waved the banner of science for the betterment of humanity. It seems likely that Wilson would justify his avoidance of Skinner through a dismissal of radical behavioral epistemology. Such a dismissal is partly justifiable, and I have articulated in detail elsewhere why Skinner's strong anti-mentalistic position is untenable (Henriques, 2004). Nonetheless, ignoring Skinner raises at least two separate problems for Wilson. First, it highlights that, contrary to Wilson's derogatory claims regarding the need for and place of philosophers, questions about ontology and epistemology are obviously crucial in determining what data are included in the edifice of science and how those data are to be interpreted.

The second reason a blanket dismissal of Skinner is problematic for Wilson is that Skinner's system offers a clear articulation of why the behavior of the animal as a whole is not fully reducible to biological theory (Uttal, 2000). Instead, through a process of variation, selection, and retention, animal behavioral complexity emerges in ontogeny much the same way organic systems emerged through natural selection (e.g., Skinner, 1981). As such, the behavior of an animal as a coordinated singularity is as conceptually distinct from the biological dimension as the behavior of a cell is distinguishable from the physiochemical dimension (Kincaid, 1990). Wilson's failure to appreciate this and his view of complexity as consisting solely of levels, rather than levels *and* dimensions, allows us to see that he failed to effectively recognize the boundary between biology and psychology—a boundary that Skinner saw quite clearly.

The conceptual dividing line between animal and human behavior is also not well specified in *Consilience*, and Wilson acknowledged that it is a

fundamental mystery to him. His proposal for the linkage, called gene–culture co-evolution, mixes the biological with the social, yet, in the end, the formulation does little to explain social phenomena, link disparate social theories, or provide new avenues for research.

In summary, because Wilson failed to effectively recognize the problem of psychology, did not clearly specify the dimensional nature of complexity, and did not articulate the joint points that link these dimensions, his version of consilience was flawed. In contrast, the ToK System was constructed by a social scientist with an explicit focus on the problem of psychology. And it was through resolving this central problem that a coherent pathway emerges for the unification of knowledge more generally.

Toward a More Effective Integration of Human Knowledge

The ToK System solves the problem of psychology in a way that *Consilience* does not. However, it remains to be seen how the ToK System deals with the major criticisms that were leveled against Wilson. Does the ToK System deal effectively with the problem of reductionism? Does it clearly specify the relationship between the natural and social sciences? Does it effectively deal with the fact–value distinction and the relationship between the sciences and humanities? And does it clarify the nature of scientific knowledge and its relation to human belief systems?

Reductionism

In the case of reductionism and the ToK System, a picture is worth a thousand words. Consider how the ToK captures both the essential truth of Wilson’s basic claims *and* his critics’ complaints. As illustrated by the ToK, energy and matter do indeed provide the physical basis out of which the higher dimensions grow. Furthermore, each emergent dimension of complexity incorporates the dimension beneath it in a manner consistent with ‘vertical integration’ (see Tooby & Cosmides, 1992). The extremely close correspondence between the ToK System and the natural science viewpoint is seen when compared to Chaisson’s (2001) cosmic evolution. Chaisson offered a fascinating proposal for the quantification of complexity called the free energy rate density, expressed in units of energy per time per mass and denoted by the symbol ϕ_m . Remarkably, this purely quantitative ratio yields a time-by-complexity hierarchical plot of rocks, plants, animals, and societies in an equidistant and sequential order (see Chaisson, 2001, p. 140) that directly overlaps with the map of complexity provided by the ToK. In short, the ToK is remarkably consistent with a ‘bottom-up’ perspective and should allay any concerns that the psychological and social sciences are not appropriately anchored to and consilient with their biophysical base.

At the same time, there can be no doubt that the ToK System strongly rejects greedy reductionism of the kind offered by neuro-philosophers (Rand & Illardi, 2005) or the 'hard' Wilson. The system grants genuine ontological status to mental behaviors and justification systems and clearly allows for downward causation and a top-down perspective. The large-scale justification systems that are the essence of society (Shaffer, 2008) are seen to play a causal role in the formation of individual justification systems, which in turn influence the neuro-behavioral investment system, which in turn plays a causal role in changing the biological and physical dimensions as well. For example, according to the ToK System, the events of September 11, 2001 can be understood only from the perspective of competing justification systems (Shealy, 2005). Although behaviors at the psychological, biological, and physical dimensions played a crucial role in how the events transpired, the events themselves could never be fully reduced to these dimensions of complexity without a huge loss of explanatory power. In other words, the physics of momentum, heat, and gravity can explain why the Twin Towers fell, but only a social science view that elucidates the dynamics between various micro and macro-level justification systems could possibly explain why the planes were flown into the towers in the first place.

As the preceding discussion suggests, much of the debate concerning reductionism can be framed by considering the concept from two opposing, perhaps even 'fear-driven,' points of view. The first point of view, frequently expressed by Wilson and his supporters, is the notion that all phenomena are material. The fear here is that failure to accept this point leads to an unworkable dualism (Barendregt & van Rappard, 2004). The second and opposing viewpoint protests that mental and cultural events are not 'just' material processes, and that a greedily reductionistic materialism is precisely that. The ToK System validates both perspectives and simultaneously debunks the fears of the Wilsonian natural scientists that the social sciences will exist in a free float, while at the same time it addresses the fears of psychologists and social scientists in that it preserves the integrity of their dimensions of analysis. In other words, the ToK System offers a consilient frame from which to view the world simultaneously from bottom-up and top-down perspectives.

The Boundaries between the Natural and Social Sciences

A salient feature of the ToK System is that it aligns the evolved dimensions of complexity with broad domains of science. A preliminary examination of the ToK suggests that rather than two broad divisions of science (natural vs. social), there should, in actuality, be four divisions: the physical, biological, psychological, and social. However, once this initial observation is specified, it remains that the traditional distinction between the natural and social sciences can be readily understood via the ToK System. From the vantage point of the ToK, the physical, biological sciences and the disciplines that make up

psychological formalism (e.g., the cognitive, behavioral, and neurosciences) would make up the natural sciences, whereas human psychology (e.g., personality, social, clinical) would be merged with the rest of the human sciences (e.g., anthropology, sociology, economics) to make up the social sciences. Thus by dividing the institution of psychology into two broad, logically consistent domains, not only does the science of psychology become more effectively defined, but it also becomes much easier to resolve psychology's confusing relationship between the natural and social sciences.

The clarifications offered by the ToK System in characterizing the relationship between the natural and social sciences can be highlighted via a more explicit focus on the subject matter. In direct contrast to Wilson's argument that nothing fundamentally separates human history from the rest of the universe, the ToK System explicitly demarcates human behavior from the behavior of other objects. Moreover, the ToK System specifies how a complexity-building feedback loop between language, a uniquely human self-consciousness system, and large-scale justification systems emerged that spun the course of human history into a qualitatively different dimension of reality. Wilson (1998) did explicitly acknowledge that the rift between the natural and social sciences is one of the great remaining problems in science:

We know that virtually all of human behavior is transmitted by culture. We also know that biology has an important effect on the origin of culture and its transmission. The question remaining is how biology and culture interact, and in particular how they interact across all societies to create the commonalities of human nature. What, in the final analysis, joins the deep, mostly genetic history of the species as a whole to the more recent cultural histories of far-flung societies? That, in my opinion, is the nub of the relationship between the two cultures. It can be stated as a problem to be solved, the central problem of the social sciences and the humanities, and simultaneously one of the great remaining problems of the natural sciences. (p. 126)

I believe the JH provides the solution. The essence of culture is the presence of large-scale belief systems that function to coordinate and legitimize human behavior, and the fundamental point of a social science perspective is that human behavior must be understood in the context of the larger socio-linguistic system in which it is immersed (Shaffer, 2005). The theoretical problem has been that there was no systematic way to understand how the evolution of mind in general, and the human mind in particular, led to the emergence of these cultural justification systems. As such, social scientists have tended to focus simply on the systems themselves and not concern themselves with the origins of their emergence. Consequentially, these social science models lacked any systematic framework for integrating biopsychological causation and thus were obviously incomplete. Unfortunately, however, the models such as Wilson's which were built by taking a bottom-up perspective have proven inadequate for providing a framework for understanding the emergence of the large-scale justification systems examined by macro-level social scientists.

The Justification Hypothesis completely changes this state of affairs. Specifically, the JH: (1) offers a clear formulation of the evolutionary changes in mind that gave rise to human culture; (2) offers a theory of human self-consciousness that links human psychological with sociological levels of analysis; (3) integrates a wide variety of different theoretical perspectives (e.g., psychodynamic theory, social constructionism, everyday life sociology) into a coherent whole; (4) organizes and explains vast domains of empirical data (e.g., the interpreter function of the left hemisphere, cognitive dissonance, self-serving biases, and the reasoning powers of humans relative to other animals); and (5) utilizes a frame of explanation that is consonant with current languages in the social sciences. It is the puzzle piece Wilson rightly points out to be missing.

The JH is also consistent with the powerful analysis offered by Anthony Giddens (1987) on the fundamental difference between the natural sciences and the social sciences. According to Giddens, physics, chemistry, biology, and other natural science disciplines are 'single hermeneutic disciplines' where scientists must engage in discourse with one another about the appropriate way to describe the phenomena. These scientists can generally be safe in their assumption that the discourse per se will do little to change the phenomena under investigation. Thus the observer and observed remain in their rightful places in natural science disciplines, complications from quantum mechanics notwithstanding.

However, the equation changes radically when the observed object is a concept-using being whose very conception of actions enters into the actions themselves. According to Giddens (1987), 'the concepts and theories invented by social scientists ... circulate in and out of the social world they are coined to analyze' (p. 19). Thus, the theoretical constructs that are originally generated by social scientists to explain some behavioral phenomenon may be digested by human actors with genuine causal consequences (i.e., they become part of the justification systems that guide human action).

The theoretical problem this creates becomes more apparent when one considers that the most successful descriptions of human behavior are precisely those that will receive the most lay attention. As such, one cannot have a comprehensive theory of human behavior and also expect that human behavior will remain unaffected by this very theory. Because there is no way of keeping the conceptual apparatus of the observer free from appropriation by lay actors in the social sciences, these disciplines must contend with the problem of the double hermeneutic, or the complex interplay between formal theory in the social sciences and the interpretive schemes adopted by socially and historically contingent actors. This problem has significant implications for the concepts generated by social scientists as well as for our understanding of the relationship between statements of fact and statements of value. We will return to this analysis in the context of examining the similarities and differences seen in applying sociobiology and the ToK System to human aggression.

The Fact–Value Distinction and the Relationship between the Sciences and Humanities

Wilson (1998) identified the relationship between the sciences and humanities as central, proclaiming that “[e]very college student should be able to answer the following question: What is the relationship between science and the humanities, and how important is it for human welfare?” (p. 13). Yet because Wilson offers an unsatisfactory resolution of the fact–value distinction, his linkage between the sciences and humanities is also dubious. Most in the sciences recognize that questions of ‘ought’ are of a fundamentally different kind than questions of ‘is’ (e.g., Pinker, 1997). Indeed, the purity *and* limitations of the scientific method become apparent as soon as one moves from basic descriptions to more prescriptive applications. Consider the following articulation from the legendary physicist Richard Feynman (1998):

All the major problems of the relations between society and science [are questions of application]. When the scientist is told that he must be more responsible for his effects on society, it is the applications of science that are referred to. If you work to develop nuclear energy you must realize also that it can be used harmfully [Yet] I think that to say these are scientific problems is an exaggeration. *They are far more humanitarian problems* [italics added]. The fact that how to work the power is clear, but how to control it is not, is something not so scientific and not something that the scientist knows much about. (p. 7)

In other words, the job of the basic scientist is to describe how the world works. Yet science *per se* does not provide any guidance about how those descriptions ought to be applied. Although the equations of physics allowed the atom bomb to be built, they were useless in assisting the decision whether or not it ought to be dropped.

The distinction between facts and values *and* their ineluctable interrelation in all knowledge systems is crucial to understanding the relation between the sciences and humanities. The reason is because it resolves a major point of ambiguity, namely the question of whether and how the sciences and humanities are separated by a focus on facts relative to values. From the vantage point of the ToK System in general, and the JH in particular, there is a fundamental difference between descriptive and prescriptive justification systems (see Quackenbush, 2008). And that fundamental difference plays a crucial role in defining that which separates and organizes the sciences and humanities. The former have the charge of basic description and the latter the charge of expressing how the world could be, which in turn connects to how the world ought to be. However, because all knowledge systems are complicated admixtures of facts and values, it is far more accurate to conceive of the tensions between descriptive and prescriptive justifications as existing on a dialectical continuum rather than as a dichotomy.

Interestingly, the essence of this argument was made over four decades ago. In his outstanding work *The Sciences and the Humanities*, William Thomas Jones (1965) observed ‘most philosophers either deny that there is any important difference between scientific and humanistic languages, or else, if they recognize a difference, they regard it as radical, a sharp difference in kind’ (p. 155). Jones proceeded to demonstrate that questions of fact and questions of value, although separable, should not be conceived of in dichotomous terms when looking at systems of knowledge, but instead should be seen as existing on a dialectical dimension (see p. 153 for a graphic representation). And he convincingly argues that the sciences represent the descriptive-designative end of the dialectic, whereas the humanities represent the prescriptive-expressive end.

The nature of this continuum is perhaps seen most clearly when ‘hybrid’ constructs are examined. As I have articulated in greater detail elsewhere (Henriques & Sternberg, 2004), the profession of psychology is separated from the science of psychology precisely because it includes a value-based prescriptive dimension that the science of human psychology does not. In other words, the profession of psychology lies closer to the humanities than does the science of psychology. However, because the profession is anchored to the science, it represents a more scientific enterprise than, say, literature, which has the charge of elucidating possible worlds with no necessary anchor in how the world actually is. Similar analyses hold for engineering (applied physics) and medicine (applied biology). Importantly, several authors have argued that one of the most promising aspects of the proposed theoretical unification of psychology offered by the ToK System is that the formulation allows for a potential reconciliation between psychology’s scientific and humanistic cultures (e.g., Shealy, 2005).

The Need for Unification and the Nature of Knowledge

In contrast to some of Wilson’s critics, I strongly agree that if a coherent, unified vision of knowledge could be developed, it would be of tremendous benefit to humanity. As history seems to attest, the absence of a collective worldview ostensibly condemns humanity to an endless series of conflicts that inevitably stem from incompatible, partially correct, locally situated justification systems. Thus there are good reasons for believing that if there was a shared, general background of explanation, humanity might be able to achieve greater levels of harmonious relations.

One area that clearly could benefit from more mutual understanding is the split between the ‘naturalists’ and the ‘social constructionists.’ One of the most novel and unique features of the ToK System is that it depicts where scientific knowledge exists *and* how it emerges out of culture to provide a descriptive map of complexity and change. Consonant with the primary claims of the social constructionists (and Wilson’s offhand comment that science is a ‘thoroughly human construct’), science is seen as a ‘particular branch in the evolution of

justification systems' (Henriques, 2003, p. 155). Thus, in a nod to the constructionist, science is a cultural product and can be studied as such. However, the nature of science is that it is 'built on the value of accuracy' (Henriques, 2003, p. 155), which, in a nod to the naturalist, makes it a very different kind of justification system. I believe the depiction of scientific knowledge offered by the ToK System can go a long way toward mapping out the nature of science and resolving the acrimonious tensions between those who do science and those who focus on the cultural context in which science exists (Gieryn, 1999). In short, as poetically argued by Quackenbush (2005):

The ToK System represents an Archimedean perch from which it is possible to assume our freedom as psychologists. Unlike Wilson's (1998) *Consilience*, the ToK System does not mask over the tensions between naturalism and social constructivism. Rather, properly interpreted, such tensions cease to be substantive. (p. 78)

While the above reviewed some of the more abstract, conceptual contrasts between *Consilience* and the ToK System, exploration of a concrete topic will perhaps allow for further clarification of the similarities and differences between the systems.

Aggression: A Concrete Example Contrasting the Two Systems

Wilson won a Pulitzer Prize for his 1978 book *On Human Nature*, which outlines a sociobiological perspective on human behavior. The chapter on aggression opens with the proclamation that humans are clearly innately aggressive and that human aggressiveness is obviously a biologically adaptive behavioral response repertoire that reliably emerges in certain circumstances, a frame he briefly reiterated in *Consilience*. He specifically mentioned seven such circumstances in which aggressive behavior reliably emerges: defense and conquest of territory; the assertion of dominance; sexual aggression; termination of weaning; aggression against prey; defensive counterattacks against predators; and moralistic aggression used by humans to enforce the rules of society.

Wilson (1978) provided examples of pacifist cultures that became aggressive when the circumstances changed, and reported studies supporting the hypothesis that warfare evolved because of aggressive traits that increased the inclusive genetic fitness of human beings. Although the evolved adaptive nature of aggression was emphasized, Wilson did describe the genetic bases of aggression in terms of learned preparedness, and mentioned the important role that different cultural traditions play in the expression of aggressive behaviors. At one point he explicitly proclaimed that 'only by considering the determinants of aggression at the three levels—the ultimate, biological predisposition; the requirements of the present environment; and the accidental details that contribute to cultural drift—can we fully comprehend its evolution in human societies' (p. 116).

The chapter that follows aggression is on sex differences, and Wilson points out that as a group, males are more aggressive, more assertive, and more physically venturesome. Much of the sex difference is explained in terms of sexual selection, with females representing a limiting resource around which males compete for access. Along with emphasizing the sex differences underlying tendencies toward aggression, Wilson mentions cultural and epigenetic factors, writing that he believed modest genetic differences are widened by learning and cultural factors. Wilson's evolutionary approach to violence and aggression has been elaborated upon by many (e.g., Daly & Wilson, 1994).

Approaching aggression from the vantage point of the Tree of Knowledge System reveals similarities and differences with Wilson's approach. First, Behavioral Investment Theory is directly consistent with Wilson's sociobiological viewpoint. BIT's core proposition is that the central nervous system computes the expenditure of energy on an investment value system built via evolution and learning (Henriques, 2003). The following analysis from Wilson (1978) demonstrates the close correspondence between his perspective and BIT:

Close studies by zoologists of the daily schedules, feeding behavior, and energy expenditures of individual animals have revealed that territorial [aggressive] behavior [occurs] only when the vital resource is economically defensible: the energy saved and the increase in survival and reproduction due to territorial defense outweigh the energy expended and the risk of injury and death. (p. 107)

The ToK System also aligns itself quite readily with Wilson's proclamation that human aggression must be analyzed on three 'levels': the biological, the environmental/ontogenetic, and the cultural.

There are also important ways in which the ToK System is quite different from Wilson's view. The first major difference pertains to emphasis and incorporation of various perspectives, which is greatly facilitated by the diagrammatic representation. For Wilson, the evolutionary view receives the vast majority of the attention, and although he mentions developmental and cultural factors, the theoretical viewpoints are not well incorporated into his system. In contrast, the theory of theories view afforded by the ToK does not prioritize one piece of the puzzle over others but instead provides an integrative frame to hold a multitude of perspectives that exist at each dimension of analysis (physical, biological, psychological, and social). For example, BIT readily integrates theory and research from learning theory, as the consequences that acts of aggression have during the course of an animal's lifetime are explicitly predicted to influence the likelihood that such behaviors will be emitted. Furthermore, with its emphasis on computational processes, BIT incorporates social cognitive perspectives (e.g., vicarious learning) as well.

Although the details are beyond the scope of this paper, the Influence Matrix (IM; e.g., Henriques, 2007) is an integrative model of social motivation and affect that represents an extension of BIT to the relational domain. It

posits that three relational process variables, power, love, and freedom, guide our social interactions; and emotions like anger, guilt, and pride provide feedback in relationship to these social goals. The IM provides a framework that can incorporate trait theory and psychodynamic factors to understand the individual difference variables associated with aggression and violence (Montazeri, Burnett, Barry, & Henriques, 2007), an area that evolutionary approaches are notoriously weak in explaining (Lewontin, 1999).

The second major difference between Wilson's views and the ToK System is realized via the JH, which offers an explicit lens to view individual and societal justification systems. For example, in *Prisoners of Hate*, Beck (1999) analyzes the various ways individuals justify their violent actions, usually through beliefs that others are manipulative, controlling, ineffective, or deceitful combined with beliefs legitimizing self-interest, power, and autonomy in a manner that is directly consistent with the JH. The JH also provides a clear lens to see how large-scale beliefs function to influence and coordinate human behaviors. Consider that the central feminist concern is in the manner in which males in power create knowledge systems (scientific, legal, political, or otherwise) that function to justify the patriarchal status quo. Contrast this perspective with Wilson's characterization of the cultural level described above (i.e., 'accidental details that contribute to cultural drift').

The third major area of difference is that the ToK System explicitly recognizes that the social sciences face the aforementioned problem of the double hermeneutic. Wilson has repeatedly expressed surprise at the vitriolic nature of the criticism that sociobiology encountered. It is likely that much of this surprise was because he overlooked the problem of the double hermeneutic—concepts that are promoted about humans are used by humans and influence human behavior. Thus, to the extent that biological explanations for male violence are promoted, there is a danger that such explanations become societal justifications. Of course, this fact per se does not legitimize suppressing such biological explanations, but it does leave social scientists with the conundrum regarding the much greater degree of confounded interdependence between facts and values for social sciences as compared with natural sciences. There are no simple solutions to this problem, but awareness of it via the ToK and JH in particular should result in avoiding some of the minefields that various pioneers of sociobiology unexpectedly wandered into by baldly proclaiming that aggression is innate and males are more aggressive than females.

Moving from a Fragmented Pluralism to an Integrated Pluralism

Like Wilson's formulation, the ToK System has also encountered criticism, and some have feared that it might result in a monolithic system that dogmatically stamps out pluralism, the diversity of ideas, and free scientific inquiry. Stam (2004) argued the ToK System was a 'disciplinary maneuver,' not an act of science. Yanchar (2004) and Viney (2004) worried that the ToK might place

psychology in an intellectual 'straitjacket.' Slife (2005) claimed that if the ToK System were adopted, certain individuals would be disenfranchised by 'definitional fiat' (p. 108) and with 'very little intellectual justification' (p. 112).

Given the consistency of these responses, it appears necessary to clarify the nature of the ToK System and the type of integration it offers. Consistent with the analysis of the problem of value offered by Quackenbush (2008), it seems appropriate to first proclaim a value of nondogmatism. Dogmatism prevents divergent opinions from being explored and does a disservice to reasoned inquiry. The following quote from the Buddha summarizes my views on this issue:

Do not believe what your teacher tells you merely out of respect for your teacher. But whatsoever, after due examination and analysis, you find to be conducive to the good, the benefit, the welfare of all things—that doctrine believe and cling to, and take as your guide. (as cited in R. Jones, 2005, p. 45)

Rather than a dogmatic monolithic system, I am advocating for a shift toward a general, shared background of explanation that is theoretically coherent and can account for empirical observations. Currently the underlying worldviews that guide human action and discourse are in a state of 'fragmented pluralism,' meaning philosophical worldviews that are fundamentally contradictory and incompatible. Fragmented pluralism does not seem to be an ideal state of affairs, and at a very basic level I am advocating for a shift toward an integrated pluralism (see also Mitchell, 2002). An integrated pluralism is where there are differences in emphasis that stem from disparate needs, goals, and other idiographic factors, but each individual is connected to the same, common base of shared, general understanding.

To articulate this idea further, it is useful to borrow from William Thomas Jones' (1965) attempt to construct a more effective bridge between the sciences and the humanities. Jones argued that the concept of 'experience' is advantageously ambiguous in regards to whether or not it primarily carries a subjective or objective meaning. "'Experience' is ambiguous," he explains, 'because, depending on context, it may refer to either what is encountered (the object experienced) or the encounter (the experiencing)' (pp. 33–34). Jones added two simple concepts to his formulation: background and foreground structures. The background structures provide the context for experiencing foregrounds, and all experiences are defined by background–foreground interactions. For example, if confronted with a poisonous snake (foreground), a herpetologist, a Pentecostal worshiper, and a snake phobic would have radically different experiences because of their radically different background structures.

Numerous implications emerge out of this simple yet elegant formulation. One clear implication is the inevitable pluralism of experience. Not only is it the case that two people will never experience precisely the same foreground, it is even the case that the same person will never have precisely the same experience twice. The reason is because the current foreground experience

folds into and changes the background structures, which in turn alters the manner in which new foregrounds are experienced. At the same time, Jones' formulation allows one to clearly see how and why similar background structures tend to lead to similar experiences of the same foreground. Thus although all individuals have unique experiences and thus unique background structures, it does make sense to characterize individuals by shared backgrounds. That is, it is legitimate to think about herpetologists as a group in relationship to groups of Pentecostal worshipers and snake phobics. This analysis is particularly relevant here because it raises the question of the possibility of a general or standard background structure. Framed in this light, it becomes possible to characterize the sciences as having the charge of developing the most standard, generally descriptive background structures possible.

In critiquing the ToK, Viney (2004) made the strong point that there is 'room for concern [in] that there is no concept of unification to date that does not neglect important aspects of human experience' (p. 1275). My retort is that the ToK System provides the ultimate map of the general background structure that can coherently frame *but not imprison* the infinite variety of human experience. My position also includes a value-based claim that such a shared, general background structure will be of tremendous benefit to humanity. Rather than placing us in an intellectual straitjacket, I both hope and believe it will open avenues for understanding and cooperation that have heretofore been unrealized.

In sum, because all experiences are the interaction between background and foreground structures, pluralism is both inevitable and, from a value-based standpoint, something to be wholeheartedly embraced. However, our general background structures are far more fragmented and incompatible than ideally would be the case. The argument presented here is that the ToK System and its concomitant theories allow for currently disparate background structures to be coherently merged, while at the same time it preserves the integrity and uniqueness of the human experience. It is a system that I believe is commensurate with the foremost concerns of natural scientists, social scientists, and humanists, and allows for objectivity, coherence, and pluralism.

Conclusion

In explaining why Wilson's *Consilience* (1998) did not galvanize interdisciplinary bridge building, Ceccarelli (2001) pointed out that his metaphors of conquest and strong emphasis on reductionism could have been effectively replaced with a more holistic version of knowledge. She wrote:

Imagine that instead of portraying the disciplines as different parts of the labyrinth [that could be reduced to physics], Wilson had compared the disciplines to different parts of a single organism. For example, like parts of a tree, the disciplines are all connected in an essential way. ... Though arranged in a hierarchy ... all must work together for the functioning of the whole. (p. 175)

I believe Wilson failed to see the whole because he—as many before him—did not recognize the problem of psychology. It is only with the effective resolution of the problem of psychology that a picture emerges of a consilient tree of knowledge that bridges the natural sciences, social sciences, and humanities.

In the spirit of holism, I will conclude where this article began and profess my profound hope that in this time of divisiveness within and between the nations, races, religions, sciences, and humanities, synthesis becomes the great magnet that orients us all. For with a shared sense of purpose and a common background of explanation, we might yet be able to integrate bodies of knowledge into a unified interpretation of humanity, our place in nature, and our potentialities for creating the good society.

Notes

1. As effectively illustrated by the title of Richards' article 'The Psychology of Psychology' (2002), the term 'psychology' has many different connotations, most notably, from his perspective, the distinction between the subject matter and the discipline. Indeed, even in my own writing I have been somewhat guilty of making subtle shifts in meaning without being explicit. For example, in Henriques (2003) I focused almost exclusively on the subject matter and the explanatory constructs that constitute the organized body of psychological knowledge, yet in Henriques (2004) my focus shifted slightly to emphasize the institution and its correspondence to the subject matter. In this paper, I am using the term to refer to an organized body of knowledge generated by the institution that maps on to the subject matter. With its depiction of the institution of psychology emerging out of culture and corresponding to the third dimension of complexity (i.e., Mind), the ToK System attempts to clarify—even specify—what the correspondence should be between institution, theory, and subject matter.
2. It is useful to note the parallels and differences between Allport's conception and the ToK System. The most striking parallel is that psychology is central to the great branches of learning and must be effectively aligned with physics and biology from below, the social sciences from above, and must connect also (somehow) to the humanities. The most striking difference is that the ToK System suggests there are (or should be) four classes of science: the physical, biological, psychological, and social. Allport's claim that the study of rats is a biological level of analysis is, from the vantage point of the ToK, erroneous. Instead, the behavior of rats should be seen as psychological, whereas the behavior of human individuals should be seen as mixtures of psychological and social.

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