

Creating Consilience

INTRODUCTION
CREATING CONSILIENCE: TOWARD
A SECOND WAVE

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This volume emerged out of a workshop called *Integrating Science and the Humanities*, held at the University of British Columbia in September 2008.¹ The relationship between the sciences and the humanities has long been a fraught one—a tension famously captured by C.P. Snow in the phrase “The Two Cultures” (Snow 1959/1993). The belief that humanists study “texts”—in the broad sense that this term has acquired in recent decades—whereas scientists study “things” is still commonplace in modern universities. The two groups typically perform their work in different parts of the campus, are served by separate funding agencies, and are governed in their work by radically different methodologies and theoretical assumptions. Attempts to bridge the two cultures have often taken the form of hostile takeovers: humanists trying to forcibly bring the work of scientists under the umbrella of arbitrary, interpretable “inscriptions”² or scientists arguing for the explanatory irrelevance of human phenomena not amenable to quantification.³ The purpose of the workshop was to bring together scholars from across the sciences and humanities to explore the potential of an alternative approach—an approach that is referred to as “vertical integration” (Tooby and Cosmides 1992; Slingerland 2008a) or, increasingly commonly, “consilience” (Wilson 1998).

Consilience is often framed in terms of bringing the study of humanistic issues into the same framework as the study of non-human species and non-biotic phenomena (e.g., Tooby & Cosmides 1992; Wilson 1998; Dennett 2009). However, we think this way

1. The workshop was made possible by a grant from the Peter Wall Institute for Advanced Studies. Additional support was provided by the Office of the Dean of Arts, the Brain Research Centre, the Cognitive Systems Programme, and the Departments of Psychology, Anthropology, English, Classical, Near Eastern and Religious Studies, Philosophy, and Asian Studies. For a full list of participants, all of whom contributed to this volume—if only through their questions and comments—see Appendix A. Videos of the workshop presentations and discussion sessions can be watched at <http://www.sci-hum.pwias.ubc.ca/>.

2. See, e.g., such classic examples of “strong program” science studies as Latour and Woolgar 1979/1986, or more recent calls for the humanities to subsume nature science into its magisterium of interpretation (Menand 2005).

3. For a recent characterization and critique of such “scientism” in the field of religious studies, see Cho and Squier 2008.

of describing the undertaking is not only unhelpful but also inaccurate. It is unhelpful in that it can give the impression that consilience involves the sciences engulfing the humanities—a prospect that is understandably off-putting for humanists. It is inaccurate because it was clear, before the consilience project was initiated, that significant changes would have to be made to the framework used to study non-human species and non-biotic phenomena in order to deal with a number of humanistic issues. Thus, in our view, it is better to think of consilience as an attempt to develop a new, shared framework for the sciences and humanities.

The idea that scholars' work should be informed by engagement with work outside their discipline is uncontroversial, and, indeed, the adjective *interdisciplinary* is bandied about as a term of approval in both the sciences and the humanities. However, the call for consilience, which requires extending interdisciplinarity across the sciences/humanities divide, has, for the most part, been met with by indifference or outright hostility by the majority of humanists. For instance, the work of the person responsible for popularizing the term *consilience* in recent years, E.O. Wilson, has, since the 1970s, inspired a backlash among humanists of such intensity and duration that it begs explanation.⁴ Such hostility continues to be the default reaction of humanists to calls for approaches to human behavior informed by scientific theories, as evidenced by the spate of recent pieces in the popular press proclaiming—usually with undisguised glee—the death of evolutionary psychology or of the consilience project in general.⁵ Why does the concept of consilience inspire such vociferous resistance among humanists? Are there ways in which the call for consilience could be modified or amended to make it more acceptable to humanists, or must the consilience project simply be abandoned? If consilience can be maintained as an ideal, what would a properly consilient approach to particular humanistic disciplines look like? These were the questions that the “Integrating Science and the Humanities” workshop was designed to explore.

In the remainder of this Introduction, we will outline the structure and content of the volume. We will then discuss a series of issues that the workshop and the contributors to this volume suggest need to be resolved if the consilience project is to advance. Lastly, we will summarize some of the conclusions that emerged concerning what a “second wave” of consilience—one in which humanists and scientists work together as equal partners in constructing a shared framework for inquiry—might look like.

STRUCTURE AND CONTENT OF THE VOLUME

Although by its very nature the workshop primarily attracted scholars with a positive attitude toward consilience, the organizing committee made an effort to include colleagues who are skeptical of consilience as well, and this volume, therefore, includes contributions that express a range of opinions regarding the desirability or possibility of consilience. So, although we will attempt to extract from both the volume contributions and the workshop discussions an integrated vision of how the project of consilience can

4. See Segerstråle 2000 for a helpful account of the reception of consilience in the academy.

5. See, for instance, Begley 2009 or Brooks 2009.

be advanced, we wish to emphasize that not all the contributors to the workshop or the volume are likely to agree with the vision.

The volume is divided into two parts. Part I, consisting of two sections, addresses some of the general theoretical issues raised by consilience. Section 1, “Ontologies for the Human,” concerns itself with what emerged at the workshop as the most fundamental of these issues: the question of how we conceive of human beings. Many of the dichotomies that coordinate with the sciences/humanities divide—explanation/interpretation, genes/culture, nature/nurture, determination/freedom—can be boiled down to the intuition that human minds belong to a fundamentally different order of reality than human bodies. The chapters in this section (chapters 1–4), therefore, explore the manner in which body-mind dualism relates to the current divide between the “Two Cultures,” as well as the likelihood and desirability of moving beyond this dualism. The four chapters fall roughly into two subsets. In chapters 1 and 2, two leading theorists in the debate surrounding consilience, Steven Pinker and Richard Shweder, respectively, defend and critique the argument that human-level realities can and should be studied against a background assumption of physicalist monism, with the human mind and its products being seen as ontologically continuous with the non-human world. Chapters 3 and 4, although ultimately siding with Pinker, attempt to explore the too-often overlooked fact that human beings seem intuitively resistant to such monism, and that innate folk dualism might mean that—at some level of cognition—humans will *always* be resistant to physicalism. Since this particular issue emerged as one of the central concerns of the workshop, we will delay a more detailed discussion of the chapters in this section to the examination of mind-body dualism that occurs later.

Section 2, “Consilience through the Lens of Anthropology,” adopts a somewhat more narrow perspective on the problems and prospects of consilience by focusing on the discipline of anthropology. We have singled out anthropology in this way because it straddles the sciences/humanities divide. Eric Wolf famously described anthropology as the “most scientific of the humanities and the most humanistic of the sciences” (Wolf 1964: 88). This characterization is, however, somewhat misleading. Contrary to what Wolf’s aphorism implies, individual anthropologists typically do not engage in both scientific and humanistic research. Rather, anthropology is the most scientific of the humanities and the most humanistic of the sciences because it contains some researchers who are scientists and some who are humanists. Significantly for our purposes, these two groups of researchers have been engaged in a debate about the pros and cons of their respective approaches for more than two decades (e.g., Shanks and Tilley 1987; D’Andrade 1995; Scheper-Hughes 1995; Lewis 1999; Cooper 2006). The disagreements between scientific anthropologists and humanistic anthropologists have occasionally become so heated that departments have reorganized into more or less independent wings or even split into two departments. We, therefore, reasoned that focusing on anthropology should shed particularly intense light on issues that need to be addressed in order to move consilience forward.

The papers in section 2 are by three leading sociocultural anthropologists—Pascal Boyer, Harvey Whitehouse, and Bradd Shore. Boyer (chapter 5) presents a tripartite classification of research within anthropology, and argues that the style of research that currently dominates the humanistic branch of anthropology, which Boyer calls the “relevant connections” approach, is unconvincing and unproductive. Whitehouse (chapter 6)

similarly criticizes the current state of humanistic anthropology, and then goes on to offer an explanation of why anthropologists are so resistant to the consilience approach. In the last chapter of the section (chapter 7), Shore warns against adopting an overly simplified conception of consilience on the grounds that it cannot account for the emergent properties of social organization. Many of Shore's criticisms speak to broader humanistic concerns about the dangers and limitations of consilience, and they play an important role in setting up certain problems that any "second wave" of consilience must address.

Our ultimate goal in the workshop was not only to explore the theoretical issues associated with consilience but also to examine how embracing consilience would concretely impact the study of topics in the humanities. Accordingly, Part II of the volume—sections 3–6—consists of case studies in which the consilience approach has been implemented.

The first set of case studies concentrates on culture. Culture is often seen as the main feature of human beings that distinguishes us from "mere" animals. The first contribution to this section, by Irwin (chapter 8), challenges this idea. Describing himself as "someone looking at the humanities from an avian perspective" (XX), Irwin notes that accepted definitions of culture have progressively changed over time in order to protect "culture" as an exclusively human phenomenon.⁶ He argues that this human-centric approach to culture is both intellectually indefensible and profoundly unproductive, and that exploring culture in non-human animals can shed important light on the mechanisms of phenomena, such as gene-culture co-evolution, that also have important implications for our understanding of humans. In chapter 9, Olivier Morin explores various features of the so-called epidemiological approach to cultural transmission.⁷ Morin—like workshop participants Sperber and Boyer—is one of a growing number of sociocultural anthropologists who are trying to take their field beyond Durkheimian "culture as autonomous entity" thinking and identify the processes that give rise to cultural phenomena. They contend that cultural transmission should be viewed instead as a selective process, whereby a large and powerful suite of innate human cognitive biases ensure that certain mental representations are more likely to be entertained and transmitted than others. Morin explores the dynamics of such constraints in more detail, arguing that "the impact of universal human psychology on culture is not everywhere the same" (XX), and that the relative importance of innate psychological constraints depends on the length and breadth of the transmission chain. This has important implications for understanding various forms of cultural evolution. The study by Schauer, in chapter 10, gives more flesh to this general model by applying a population-level, quantitative analysis to the development of motifs on figure-painted pottery in ancient Greece. Although Schauer notes that there exists a substantial bias against quantitative methods in the area of artistic cultural history, his study attempts to demonstrate how getting beyond traditional qualitative techniques can reveal hitherto

6. Cf. the work of another workshop speaker, Raymond Corbey, on a similar phenomenon in the history of the conception of the human-ape divide (Corbey 2005).

7. The metaphor of "epidemiology" was originally suggested by the evolutionary psychologists John Tooby and Leda Cosmides (1992), and has since become an important model in consilient approaches to the study of cultural transmission and evolution; see Boyer 1994 and Sperber and Hirschfeld 2004 for good introductions to this approach.

invisible phenomena, requiring an adjustment in the “traditional view of what is important in figure-painted pottery” (XX). Bentley and Omerod (chapter 11) also employ quantitative methods in their study of cultural transmission, but take an even more radical step away from conventional humanistic notions of culture. Drawing on work in “social physics,” they contend that, in many situations, modeling humans as if they are conscious, rational actors is unnecessary, and that remarkable results can be achieved by simply treating individuals as “zero intelligence” interacting particles. Although such models have enjoyed a considerable amount of empirical success, particularly in identifying “emergent patterns in collective behavior” under situations of complex choice, the fact that they continue to meet with a great deal of resistance among social scientists says much about the difficulties involved in bracketing our intuitive notions of the human.

Religious behavior is the focus of attention of the second set of case studies, which—like the case studies of culture—refuse to grant religious beliefs and practices the sort of autonomy and intuitive realism that they possess in everyday phenomenology. This is, of course, equally true of more traditional work in religious studies: Durkheimian, Marxian or Freudian approaches to religion are resolutely *etic* rather than *emic*,⁸ explaining religious beliefs and practices in terms of more basic social, economic, or psychological functions. Evolutionary approaches to religion simply push this process of explanatory reduction one step further, attempting to get at the more basic causality behind the social, economic, and psychological. Chapter 12, by Wilson and Green, lays out the basics of the new field of “Evolutionary Religious Studies,” comparing and contrasting it to more traditional approaches in religious studies, as well as describing some large-scale research projects currently under way. The chapter 13, by Norenzayan and Gervais provides an overview of the “evolutionary landscape of religion” (XX), focusing on theories concerning the cultural evolution of religious cognition and prosociality. Many contemporary evolutionary theories see religious belief as an evolutionary “spandrel”—that is, an accidental by-product of other evolved cognitive tendencies. The experimental, historical, and ethnographic research reviewed by Norenzayan and Gervais explores an alternative hypothesis: namely, that, although it may have originated as a by-product, religious cognition was exapted by cultural group selection because it increases within-group prosociality. They further argue that it was this cultural-cognitive innovation that allowed human societies to escape the group-size limits imposed by kin selection and reciprocal altruism, facilitating the rise of the sorts of large-scale, agricultural societies that have dominated most regions of the world for the past several thousand years. The last contribution to this section, by Robert McCauley (chapter 14), addresses the more specific phenomenon of religious ritual. Although one of the most salient features of religious ritual is its diversity, McCauley—applying a theory of “religious ritual competence” developed in collaboration with Thomas Lawson (Lawson and McCauley 1990; McCauley and Lawson 2002)—argues that innate human intuitions about the structure of agency “imposes fundamental, though commonplace, constraints on religious ritual form” and that “attention to these constraints enables us to look beyond the variability of religious rituals’ culturally specific details to some of their most general underlying

8. Terms borrowed from anthropology and commonly used in religious studies to distinguish “insider” (*emic*) from “outsider” (*etic*) accounts.

features” (XX). In particular, McCauley focuses on the structure of, and some of the tensions associated with, what he and Lawson refer to as “special agent rituals”—rituals in which counterintuitive, supernatural beings are perceived as the primary agents.

The third set of case studies looks at morality from a consilient perspective. The emerging “experimental philosophy” movement described by Stich (chapter 15) is motivated by a desire to get beyond that claim that philosophy—moral or otherwise—is an a priori, autonomous discipline, and aims to “use the data and the methods of experimental psychology, neuroscience, cognitive anthropology, evolutionary biology and . . . behavioral economics in an attempt to sharpen and resolve traditional issues in moral philosophy” (XX). One of Stich’s contributions to this project is an argument concerning how moral norms can be viewed as “one kind of socially acquired emotion trigger” (XX), a conclusion derived from a growing body of empirical evidence that supports the claim that explicit moral convictions are best viewed as the “rational tail” of the “emotional dog.”⁹ Chapter 16 by Krebs aims to provide an account of the evolutionary history of the human moral sense—identifying its potential precursors as well as sketching out its cognitive “anatomy”—whereas Gintis (chapter 17) treats human morality as “an emergent property of the evolutionary dynamic that gave rise to our species” (XX) and shows how it can be profitably analyzed with the tools of game theory. The contribution of Buchman et al. (chapter 18) is primarily focused on the more pragmatic institutional and training aspects of consilience, seen through the lens of the emerging field of neuroethics, where the complex nexus of ethical, legal, societal, and policy implications involved requires active collaboration between neuroscientists, clinicians, social scientists, philosophers, and legal scholars. This chapter provides, not only a description of the sorts of practical barriers that need to be overcome if consilience is to be advanced, but also some important examples of how “lower-level” disciplines, such as neuroscience, have significant contributions to make to both human moral knowledge and public ethical debates.

The final set of case studies in part II deal with stories in the form of literature and oral traditions. Chapter 19, the first contribution, by Scalise Sugiyama and Sugiyama, attempts to integrate literary and anthropological perspectives by arguing that oral narratives from foraging cultures can be seen as the records of responses to “recurrent problems of the human ecological niche” (XX), and thus as informative windows into both past and present fitness challenges faced by human societies. In chapter 20, Corbey and Moll adopt a similar evolutionary perspective in their analysis of *Beowulf*, arguing that approaches informed by costly signaling and kin altruism theory provide a more cogent analysis of the text than “traditional hermeneutic and culturalist understandings”—that is, approaches that consider cultural forms in a manner completely detached from our understanding of the biological world. They do not argue that interpretative approaches are without use but rather that the usefulness of such approaches is maximized when they are “vertically integrated” with our understanding of the biological world. This issue of the value of traditional “culturalist” approaches to literature is also taken up by Carroll

9. Haidt 2001; two of our workshop speakers (one, Prinz, not represented in this volume) have played central roles in the modern, empirically driven revival of sentimentalist theories of ethics (see especially Nichols 2004 and Prinz 2007).

et al. (chapter 21), who argue that social constructivist approaches to literature have caused literary studies to become cut off from a large and potentially extremely informative body of empirical knowledge accumulated by the natural sciences. They attempt to bridge this gap between science and the humanities by adopting the methods of data gathering, quantification, and explicit hypotheses testing in their analysis of characters from British novels of the nineteenth century. Their goal is to empirically demonstrate that “major features of literary meaning can be effectively reduced to simple categories grounded in an evolutionary understanding of human nature” (XX), as well as to illuminate the manner in which particular forms of literary narrative play an evolutionarily adaptive function in human social life. Like Corbey and Moll, their aim is not to obviate the need for more traditional interpretative approaches, but to see such approaches supplemented and constrained by models of human nature that are integrated with our understanding of the biological world. In the final contribution to this section, Dancygier (chapter 22) sounds a cautionary note by arguing that the attempt to vertically integrate the discipline of literary studies by directly grounding it in evolutionary psychology—the approach of the three other contributions to the section—is not necessarily the most productive or effective strategy. Emphasizing the importance of such cognitive processes as metaphorical projection and conceptual blending, Dancygier argues that “literary Darwinist” approaches are too often limited by an overly narrow picture of human nature, failing to appreciate the manner in which such cultural artifacts as human language can serve as mediums for cognitive innovation and creativity. She argues that a properly evolutionary approach needs to get beyond the Pleistocene brain and take account of human cognitive fluidity, gene-culture coevolution, and purely cultural evolution. “Without an understanding of how language and cognition are jointly responsible for the emergence of literature and other creative forms of expression,” she notes, “the evolutionary study of literature will not be able to account for new literary forms and themes and will lack a solid foundation in its work toward the goal—the evolutionary explanation of one of the central manifestations of human creativity” (XX).

The volume concludes with an invited Afterword by Geoffrey Harpham, President and Director of the National Center for the Humanities, which—like Dancygier’s contribution—draws upon the work of Shakespeare to highlight both the importance and unpredictability of human cultural creativity. In reflecting on the contributions to this volume, Harpham aims to temper our enthusiasm for consilience by giving voice to certain hopes and concerns about its nature and goals—concerns that must be addressed if consilience is to win broader acceptance across the various disciplines of the humanities. We will address the significance of Harpham’s reaction to the essays in this volume and provide responses to many of his reservations about the consilience project later in the Introduction.

POINTS OF TENSION

Many of the workshop presentations and resulting discussions circled around a set of recurring tensions, and, not surprisingly, these crop up as points of tension in the contributions to this volume as well. Although there are several ways in which these tensions could be framed, in this section we will organize and discuss them under three rubrics: mind-body dualism, reductionism, and the role of “scientific” methods in humanistic

work. It seems clear to us that the tensions revolving around these issues need to be resolved if the consilience project is going to succeed, and, therefore, in addition to characterizing each tension, we also suggest some possibilities for how they might be defused. Subsequently, we explore the productive power of these tensions, sketching out the manner in which responses to them have contributed to a modified, “second wave” of consilience—one likely to be much more appealing to humanities scholars than earlier versions, and, therefore, more likely to remove the remaining barriers to genuinely interdisciplinary collaboration.

Mind-Body Dualism

One of the most fundamental of the concerns aroused by consilience is the question of how we conceive of human beings. As we noted earlier, the first section of this volume is dedicated to this issue, but it also re-emerges in various forms in many of the other contributions. Perhaps the most common way of characterizing the difference between the “two cultures” of the sciences and the humanities—at least from the humanities side of the fence—is to invoke the idea of different modes of knowledge. The humanities are typically characterized as involving a unique mode of apprehension, consciousness studying consciousness, or “understanding” (*Verstehen*), whereas the sciences engage in mechanistic “explanation” (*Erklären*). The latter, on this account, is adequate to deal with the movements of dumb, inert physical objects, but the former is the only way to grasp human meaning.

Although it is rarely explicitly acknowledged today, there is reason to think that the primary rationale behind the distinction between these two modes of knowing—and, therefore, behind the sciences/humanities divide itself—is an intuition that there are two utterly different types of substances in the world that operate according to distinct principles: mind and matter (Corbey 2005, Slingerland 2008a). The humanities study the products of the free and unconstrained spirit or mind—literature, religion, art, etc.—whereas the sciences concern themselves with deterministic laws governing the inert kingdom of unthinking objects. Many of the other factors involved in the resistance to consilience can be seen as ultimately founded upon mind-body dualism: cries of “reductionism,” for instance, are typically inspired by violations of the mind-body distinction, and the concept of human beings as uniquely endowed with mind and its accompanying powers (thought, free will) motivates the idea that there is a fundamental distinction between the human and the non-human, or between the determinism of genes and the free play of culture.

Viewing the sciences/humanities divide from this perspective, the call for consilience can be seen as a plea to move beyond mind-body dualism: to see the realm of the human as coextensive with the realm of nature. This plea, in turn, is motivated by the contention that mind-body dualism—the idea that human bodies are uniquely inhabited by an autonomous “Ghost in the Machine”—is no longer defensible. The mind is the body, the body is the mind, and this mind-body unit is ultimately a physical system produced by evolution, and, therefore, amenable to being studied as a naturalistic system. Daniel Dennett, for instance, sees this collapsing of previously distinct ontological realms as the most profound contribution of Darwinism to modern intellectual life, and a clear warrant for bringing human phenomena under the broad umbrella of the sciences:

In a single stroke, Darwin's theory of evolution by natural selection united the realm of physics and mechanism on the one hand with the realm of meaning and purpose on the other. From a Darwinian perspective the continuity between lifeless matter on the one hand and living things and all their activities and products on the other can be glimpsed in outline and explored in detail, not just the strivings of animals and the efficient designs of plants, but human meanings and purposes: art and science itself, and even morality. When we can see all of our artifacts as fruits on the tree of life, we have achieved a unification of perspective that permits us to gauge both the similarities and differences between a spider web and the World Wide Web, a beaver dam and the Hoover Dam, a nightingale's nest and "Ode to a Nightingale." (Dennett 2009: 10061)

Our section on "Ontologies for the Human" begins with a similar observation from Steven Pinker (chapter 1), who notes that "the history of modern science has been a history of the unification of supposedly incommensurable metaphysical realms," from Newton's unification of the supralunary and sublunary realms to Darwin's unification of the living and non-living worlds (XX). The last remaining ontological chasm is between the cultural and biological, which, in turn, is based on a perceived ontological dualism between mind and body. Pinker argues that the key to bridging the gap between the "two cultures" is to recognize that, although intuitively appealing, such mind-body dualism is no longer plausible in light of what has been discovered about human cognition. The project of consilience is fundamentally premised on the conviction that there is an ontological continuity between the human/mental and the non-human/material, which justifies approaching these two realms of inquiry with a unified explanatory framework.

The converse of this, of course, is that, if one rejects the premise of ontological continuity, then consilience loses its basic rationale. There *are*, in fact, many humanists who reject this premise—who feel that physicalism is not a reasonable ontological stance to adopt because immaterial "mind" or "consciousness" is an irrefutable, bedrock feature of the universe, and, therefore, believe that the sciences/humanities divide is quite reasonable and desirable. Richard Shweder's contribution to this volume (chapter 2) is an impassioned defense of mind-body dualism and the irreducibility of the human, written by a leading cultural anthropologist. It represents a crucial piece of the puzzle when it comes to exploring consilience—a piece often ignored or misunderstood by consilience's proponents. Shweder correctly diagnoses consilience as requiring one to accept "the spectacular and breath-taking (or should we say 'dis-spiriting') counter-intuitive implication of mind/body monism of the materialist variety" (XX). This implication is that "mental states (including one[']s own truth claims about mental states) are epiphenomenal and have nothing to do with the chain of objective events that is the real cause behavior" (XX). Like many opponents of physicalist approaches to the human, Shweder feels that the power of the Cartesian *cogito* argument remains undiminished by cognitive science: The ontologically independent nature of consciousness means that there is some irreducible "first-person" quality to our experience that can, in principle, never be captured by or reduced to third-person accounts. Since the various disciplines of the humanities study phenomena that are products of this independent human consciousness, they, too, must be viewed as autonomous from the sciences.

Shweder's position is crucial because it represents the dominant view of the sciences/humanities divide among humanities scholars, and, therefore, needs to be both understood and responded to by those who wish to promote consilience. It is also important because it is not necessarily wrong. Another prominent opponent of consilience, the philosopher Charles Taylor, has long argued that we have no good reason for concluding that human consciousness and intentionality are any less basic than the sorts of physical realities studied by the sciences (Taylor 1989, 2007), especially in light of the fact that current-day neuroscience is still a long way from providing a fully comprehensive physicalist account of what human consciousness might be and how it might arise. Although proponents of consilience are confident that such an account will be developed, Taylor feels that—given our current state of knowledge—declaring physicalism to be the only defensible stance is “a little like selling the skin of the lion before the safari has even left Mombassa.”¹⁰ According to Taylor, none but the most dogmatic of physicalists could deny the possibility that the lion might prove indefinitely elusive, or that future discoveries about the human consciousness may verify its irreducibility or ontological independence from the material. There is, therefore, a possibility that the entire consilience movement may one day be viewed as a historical aberration, a misguided intellectual trend inspired by an excessive enthusiasm for the power of the sciences to explain all aspects of the world.

Although we believe this possibility should be acknowledged—and that our attitude as we pursue consilience should be rendered more circumspect as a consequence—our workshop and this volume are premised on the conviction that we should put our money on the lion hunters.¹¹ The main reason for this conviction is that the physicalist position is consistent with what we already know about the universe, whereas mind-body dualism is not. As far as we can tell, the general structure of the universe is such that higher-level phenomena emerge out of and depend upon lower-level phenomena. For example, molecules form and behave in accordance with more basic principles that govern both inorganic and organic substances. Thus, we have strong reason to expect mind to be a product of lower-level phenomena rather than an ontologically distinct, causally independent force.

The argument in favor of pursuing consilience is also bolstered by what we might call the *ad hominem* argument. Pursued in the contribution by Slingerland (chapter 3), the target *hominus* in this argument is *Homo sapiens*. Slingerland contends that, ironically, physicalist science can provide a good explanation for why human beings are biased against physicalism. His discussion centers on the observation that human beings appear

10. Personal communication to Slingerland, August 11, 2009. Of course, this philosophical skepticism concerning the possibility of a physicalist explanation of consciousness has a long history, as discussed in the chapter by Fiala et al. in this volume, going back at least to John Locke's comment that “it is as impossible to conceive that ever bare incogitative Matter should produce a thinking intelligent Being, as that nothing should of itself produce Matter” (Locke 1690/1975: 623).

11. For defenses of the “astonishing hypothesis” (Crick 1994) that consciousness is nothing beyond the firing of neurons, the reader is referred to Crick 1994, Flanagan 2002, Dennett 2003. For resistance to this hypothesis, Chalmers 1996 and Searle 2004 serve as helpful starting points.

to possess an evolved cognitive mechanism—“Theory of Mind” (ToM), the tendency to perceive mental qualities as distinct and causally efficacious forces in the world—that explains why human beings are uniquely vulnerable to the antiphysicalist argument: We simply cannot help seeing both ourselves and the world we live in as pervaded by intentionality and meaning. According to Slingerland, our possession of ToM both explains the continued appeal of mind-body dualism—as well as the sciences/humanities divide that grows out of it—and reduces its empirical plausibility. Descartes’ *cogito* argument is so powerful because we are designed by natural selection to find it convincing, not necessarily because it is a good argument.¹²

At the same time, Slingerland argues, the inability of psychologically healthy human beings to ever completely free themselves from mind-body dualism means that human-level truths will always present themselves to us as *truths*, not mere psychological constructions, which means that any program of consilience based upon eliminative reductionism faces an uphill battle. At one point in his piece, Shweder asks rhetorically, “Should the common-sense or folk psychology of everyday life be viewed as little more than error, ignorance and a superstitious faith in the causal powers of an ontological fetish?” (XX). Slingerland’s response to this is, essentially, yes and no: Humanists pursuing consilience have to adopt a kind of “dual consciousness,” acknowledging—and, of course, continuing to experience on a visceral level—the irresistible force of mind-body dualism, while bracketing it when going about their work. The fact that ToM ability is not uniform among humans, and is likely distributed in human populations in a spectrum ranging from autism (deficient) to schizophrenia (excessive) (Crespi and Badcock 2008), may explain, not only why the ability to perform this sort of bracketing varies from scholar to scholar, but even why individuals are differentially drawn to the sciences and humanities in the first place.¹³

Fiala et al. (chapter 4) also focus on the perceived “explanatory gap” between physical reality and consciousness that is typically invoked in the defense of mind-body dualism. Philosophical concerns about this gap are, they argued, derived from “a much more pervasive phenomenon—even people without any philosophical training find it bizarre and counterintuitive to think that consciousness is nothing over and above certain processes in the brain” (XX). This perceived distinction between consciousness and the physical body is the basis of what Bloom 2004 refers to as “folk” mind-body dualism: the apparently universal intuition that human bodies are inhabited by something separate and

12. Cf. the discussion by Fiala et al. concerning possible reasons for being suspicious of the epistemic validity of automatic, low-level systems.

13. See Tanaka (under review) for an argument that such a “spectrum” theory may explain the variety in individuals’ levels of acceptance of physicalist, Darwinian models of the mind, as well as Shore’s comment in this volume that “differences between the two cultures are also sustained by the fact that the humanistic and scientific camps are populated by individuals with very different mind-sets” (XX). Also refer to Simonton 2009 for data that demonstrates how scientific disciplines can be clearly ranked in a hierarchical configuration based on a variety of measures, as well as some preliminary, but intriguing, data concerning both how this hierarchy can be extended into the various branches of the humanities and how personality traits and life histories might predict the appeal of various levels of analysis to particular individuals.

autonomous, the “mind” or “soul.”¹⁴ With their discussion of “dual process models” of human cognition, Fiala et al. attempt to provide a concrete account of both the intuitive human resistance to consilience, and why this resistance may be misguided. As they explain, adopting the sort of physicalism that undergirds the consilience project involves a conflict between “system 1” (fast, automatic) *agency* cognition, which is firmly dualistic concerning minds and bodies, and “system 2” (slow, effortful) *cognition*, which—for many, at least—is compelled by the weight of empirical evidence to the conclusion that consciousness must have a fully physiological explanation. Although Fiala et al. conclude that conflict between the output of these two systems can be reconciled—through temporarily bracketing the outputs of system 1, something like the sort of “dual consciousness” that Slingerland proposes—the fact that system 1 cannot simply be turned off means that adopting the framework of consilience will likely never be entirely intuitive for human beings.

Reductionism

The central conviction of the consilience project is that human phenomena should not be approached as *sui generis* realities possessing *only* their own internal logic and structure, but rather as objects of inquiry that can also be productively explained by lower-level phenomena—just as, say, organisms’ inheritance of traits has been explained in terms of DNA. However, for many humanists, including several of the skeptical contributors to this volume, consilience’s commitment to reductionism is problematic. Perhaps the clearest expression of this concern in the volume can be found in Bradd Shore’s contribution. As Shore argues,

While reduction can explain many properties of human life, it cannot explain everything. If the evolution of human life were simple, reduction would go a long way in accounting for its properties. But human life is a complex system of organizations, structured at multiple levels: atomic, chemical, genetic, social, cultural and individual. It seems to me that a serious appreciation of the aims of science and the humanities requires an inter-theoretic discourse, not a reductive one. (xx)

As this passage illustrates, the skeptics reject consilience because they view it as an attempt to account for all aspects of human life by lower level phenomena, which, in turn, is deemed unacceptable because there are certain aspects of human life are not amenable to reduction.

14. As Fiala et al. observe, there have been recent suggestions concerning how the model of folk dualism originally proposed by Bloom should be modified, particularly concerning the precise relationship between “mind” and “soul,” between the “subsouls” present in many religious traditions, or even whether folk divisions are typically dualistic or tripartite (mind-body-soul). Nonetheless, it seems clear that the cultural elaborations of soul-mind distinctions or various subsouls are parasitic on two basic intuitive systems dedicated, respectively, to reasoning about minds and bodies (Slingerland (in preparation)), what Dennett 1987 refers to as the “intentional” vs. the “physical” stance.

This response does not withstand scrutiny. To begin with, the claim that certain aspects of human life are not amenable to reduction is poorly thought out. Any truly interesting explanation of a given phenomenon is interesting precisely because it involves reduction of some sort—tracing causation from higher to lower levels or uncovering hidden causal relationships at the same level. Regardless of whether we are scientists or humanists, we are generally not satisfied with explanations unless they answer the “why” question by means of reduction, by linking the *explanandum* to an *explanans*. As Steven Pinker has put it, the difference between reductive and non-reductive explanation is “the difference between stamp collecting and detective work, between slinging around jargon and offering insight, between saying something just is and explaining why it had to be that way as opposed to some other way it could have been” (Pinker 2002: 72). This is why the manner in which even humanists go about their work is, by its very nature, reductionistic. Reduction is at the heart of scholarly activity, and when someone fails to reduce we rightly dismiss their work as trivial, superficial, or uninformative. Thus, if there are aspects of human life that are not amenable to reduction, as the skeptics of consilience contend, they can no more be analyzed within the conventional humanistic framework than they can within the consilience framework.

Another reason the skeptics’ concerns about consilience’s commitment to reductionism are misplaced is that there is considerable evidence that avoiding reduction often results in spurious conclusions being reached. When the deeper principles behind phenomena are poorly understood—that is, when lower levels of causation underlying phenomena we are interested in explaining are not accessible to our prying—we are often forced to invent vague, place-holder entities to stand in for the missing information. Ideally, we are aware of what we are doing. For instance, Mendel could reason about the inheritance of traits without knowing how information about them was physically instantiated or transmitted, and Darwin could similarly map out the implications of natural selection without any clear conception of the substrate of inheritance. In such cases there is an implicit faith that the lower-level entities and processes will eventually be specified; if not, the theory may have to be abandoned. A discipline can find itself in a dead end, however, when it has postulated vague, placeholder entities without realizing that this is what it is doing—when it takes these unspecified and unknowable entities or faculties to have genuine explanatory force because they represent ontologically independent realities.

Richard Shweder’s chapter illustrates this problem. At one point in his contribution, Shweder observes that moral intuitions have to do with “respect for the human ‘person’ understood to be a subject... not merely a physical object and thereby something that transcends or in some very difficult to understand sense exceeds its physical form” (XX), and that such intuitions present themselves to us with inescapable realistic force: “The natural moral order of things is something you discover (or have revealed to you), not something you invent, or at least that is the near universal consensus among the ‘natives’ of the world” (XX). Shweder is no doubt correct in his phenomenological analysis of moral intuitions, but the leap he makes to some form of moral realism is more difficult to defend. His position on the felt sense of dignity inspired in us by other human agents, the distinction that we feel exists between humans and mere objects, and the overwhelming force of the moral law brings to mind Immanuel Kant. Indeed, it is the central

intuition behind Kant's claim that morality is an autonomous, a priori field of inquiry, completely independent of any empirical facts about human nature, psychology, or history. However, Kant's position was arguably fatally undermined by Friedrich Nietzsche over a century ago. In response to Kant's analysis of "synthetic a priori judgments"—essentially, moral "truths" that present themselves to the human mind as irrefutably true—Nietzsche observed:

"How are synthetic judgments *a priori possible*?" Kant asked himself—and what really is his answer? "*By virtue of a faculty*" (*Vermöge eines Vermögens*)¹⁵—but unfortunately not in five words, but so circumstantially, venerably, and with such a display of German profundity and curlicues that people simply failed to note the comical *niaiserie allemande* involved in such an answer. (Nietzsche 1886/1966: 18–19)

Nietzsche goes on to compare the "explanation" offered by Kant to the answer of the doctor in Molière's *Tartuffe* to the question of how opium produces sleep: "Because it contains a sleepy faculty, whose nature is to put the senses to sleep." Nietzsche declares that "such replies belong in comedy," and concludes that we need to answer instead the question, "Why is belief in such judgments *necessary*?" (19)—that is, necessary for creatures such as ourselves. This is precisely the question addressed by cognitive scientific and evolutionary approaches to morality—as reflected in our section on this topic—which promise to *explain* the existence, structure, and function of moral intuitions without denying their inescapable phenomenological force.¹⁶

The need to explain without eliminating brings us to the second aspect of humanistic concern about reductionism: the notion that consilience involves reducing all aspects of human life to some lower-level common-denominator phenomena, such as genes or biological instincts. This notion is incorrect for several reasons. To begin with, there is no single level of explanation that is exclusively privileged within the framework of consilience. Some work within the consilience framework seeks to explain the properties of human life in terms of lower-level phenomena, such as genes, but other work employs higher-level explanatory phenomena, as is illustrated in the case studies in this volume. For example, although Corbey and Moll seek to explain aspects of *Beowulf* with genetic hypotheses, Norenzayan and Gervais argue that religious belief is a culturally selected by-product of evolved psychology, and Dancygier argues that literature cannot be understood without an appreciation of the emergent-level properties of human language, as well as the potential for novel cultural blends that language allows. In these latter cases, cultural-level forces are portrayed as the driving causal entities. The contribution by Alex Bentley and Paul Ormerod demonstrates how completely bracketing our normal view of humans as "cultural, thinking people, in all their complexity and variety" (XX) in favor of a model whereby individuals are treated as "zero intelligence" particles can provide us with greatly enhanced predictive power when it comes to modeling certain forms of

15. Lit. "By means of a means."

16. In this regard, Nietzsche's demand at the end of this section of *Beyond Good and Evil* that psychology be recognized as "the queen of the sciences" and the "path to fundamental problems" (32) was—as was, of course, much that Nietzsche said—quite prescient.

cultural transmission. The same approach, however, would be of little help in understanding the dynamics at work in a particular work of literature. The contribution by Schauer similarly illustrates the power of a quantitative approach to reveal hitherto invisible patterns in the history of the creation of figure-painted pottery, while still recognizing that more traditional qualitative approaches are needed to decipher “the inner workings of unique objects” (XX). Rather than deciding a priori which level of reduction is suitable for human questions in general, consilience argues that the appropriate level of reduction needs to be evaluated on a case-by-case basis, in light of the goals and objects of a particular line of inquiry.

Moreover, there is no reason to believe this sort of methodological diversity will disappear, because the very nature of consilience requires what workshop participant Robert McCauley has referred to as “explanatory pluralism” within its “ontological seamlessness” (McCauley 2008). It should be clear from the history of the sciences not only that reduction is a very effective research strategy, but also that exploring reductive possibilities does not lead to the collapsing of disciplinary boundaries. Biology remains distinct from chemistry, and chemistry from physics, despite the fact that scientists have employed reduction as a research strategy for more than three hundred years. As McCauley observes,

Reduction has probably been the single most effective research strategy in the history of modern science, engendering more precise accounts of the mechanisms (and their operations) underlying everything from magnetic forces to organisms’ inheritance of traits to the visual perception of moving objects... Exploring reductive possibilities opens new avenues for sharing methodological, theoretical, and evidential resources. Successful reductions reliably generate productive programs of research at the analytical levels from which the candidate theories hail, squaring the lower level, mechanical details with the upper level phenomenal patterns and refining our understanding of both in the bargain. (McCauley 2007: 106)

Therefore, it should be recognized that, within the framework of consilience, there is scope for explanations at many levels, including the levels at which humanists typically formulate their explanations. All that consilience demands is that explanations for higher level phenomena—such as ethics, morality, and religion—should take account of any limits that are set by well-established hypotheses concerning lower-level phenomena. Or, to put it another way, all that consilience demands is that humanists be aware of whether their explanations are compatible with the findings of neuroscience, psychology, evolutionary biology, and other relevant sciences, and be motivated to explore and try to resolve any discrepancies.

It is also important to recognize that this exploration can move in either direction along the “vertically integrated” chain of explanation. It is not the case that the sciences simply set limits upon the humanities, but it is also possible that work in the humanities may require reformulations of scientific hypotheses. This phenomenon is illustrated by an interesting case from the history of science that was brought up at the workshop by a skeptic of the consilience project, Alan Richardson. As Richardson observed, the late nineteenth century saw what appeared to be an intractable debate

between Charles Darwin and the future Lord Kelvin concerning the age of the Earth. Darwin's theory of evolution required that the Earth be extremely old for there to have been time for evolution to have done its work—roughly ten times older than Kelvin argued was the maximum possible age considering known energy sources and the laws of thermodynamics. Richardson argued that this left Darwin and Kelvin in an intellectual stalemate, and portrayed this as just one example of how there is often a lack of consilience even within the sciences—in this case with evidence from biology fundamentally contradicting evidence from physics. In his concluding comments to the workshop, Slingerland argued that Richardson's Darwin-Kelvin example in fact illustrates quite the opposite point: faced with contradictory evidence, the followers of Darwin and Kelvin did not simply shrug their shoulders and go their own way, declaring biology and physics to be obviously autonomous and incompatible levels of inquiry. The fact that they disagreed profoundly *disturbed* them, and they did not rest until this disagreement was resolved—until consilience between physics and biology was once again restored by the discovery of radioactivity, an energy source of which Kelvin was unaware.

Thus, the Darwin-Kelvin case serves as an important example of causal explanatory force flowing *down* the chain of vertical integration: discoveries at a higher level of explanation—biology—helping to motivate the reorganization of a lower level of explanation—physical geology—breaking the latter field out of a conceptual dead end and sending it off in a new direction. This suggests that, once a two-way communication between humanists and scientists really begins to take hold, contradictions in predictions made by, say, literary scholars and cognitive neuroscientists may force us to revise our cognitive neuroscience rather than the other way around. However, none of this sort of mutual fertilization can even get off the ground until both humanists and scientists begin to feel the same sense of urgency to achieve consilience that motivated the followers of Darwin and Kelvin.

One of the prominent early skeptics of consilience, the late Richard Rorty, responded to E.O. Wilson's call by observing:

The various things people build and repair with tools are, to be sure, parts of a seamless causal web. But that seems no reason to impugn the plumber-carpenter or the carpenter-electrician distinction. The various vocabularies I use to describe and explain what is going on are all applied to the same seamless web, but why should I strive to bring them all together? (Rorty 1998: 30)

This is to misunderstand the consilience project. Consilience does not demand that we all become plumbers—that literary scholars all drop their books and become quantum physicists. Rather, it asks first that, like plumbers and carpenters, disciplines studying different aspects of reality come together and collaborate when they need each other's help. More importantly, it asks that—again, like plumbers and carpenters—this identification of shared problems and impetus for collaborative work stem from an overall shared conception of the nature of reality and the goals of human knowledge: the only reason that tradespeople can collaborate to build a house is that they share a general sense of both how reality works and what a house is for, and this shared sense

constrains in important ways the manner in which they go about their jobs. The call for consilience does not require that humanists or scientists give up or exchange their particular jobs. It merely argues that all academics can do their jobs better, and achieve more satisfactory results, when their efforts are coordinated in a vertically integrated manner.

The Role of Quantification, Hypothesis Testing, Controlled Experiments, and Mathematical Modeling

One of the most striking differences between the sciences and humanities is the rarity of quantification, hypothesis testing, controlled experiments, and mathematical modeling in the latter. In the sciences, it is commonplace to use both qualitative and quantitative data, whereas humanities research is overwhelmingly based on qualitative data. Similarly, hypothesis testing, controlled experiments, and mathematical modeling are widely employed in the sciences, but rarely, if ever, used in the humanities. Based on some of the discussions at the workshop and comments by the more skeptical contributors to this volume, it appears that this difference has played an important role in the failure of consilience to capture the imagination of humanists so far. Or, rather, it appears that a misunderstanding of the *significance* of the difference has played an important role in consilience's failure to capture the imagination of humanists so far. Accordingly, in this section we will try to clarify the nature of quantification, hypothesis testing, controlled experiments, and mathematical modeling, and explain why humanists should embrace them—as at least one tool in their methodological toolbox—alongside reductionism.

The attitude of most humanists toward quantification, hypothesis testing, controlled experiments, and mathematical modeling is one of suspicion. It appears the primary reason for this suspicion is that these methods are viewed as belonging to the “scientific worldview” and the realm of physicalistic, mechanistic explanation. Humanists are likely suspicious of these methods, then, for the same reasons that they are suspicious of physicalism and reductionism. We have already explained why we feel that concerns about physicalism and reductionism are misplaced, but it is also important to recognize that the commonly perceived linkage between these methods and reductionistic physicalism is fundamentally mistaken—the linkages between the two must be disentangled.

Physicalism is an ontological worldview, and, as such, is incompatible at a fundamental level from the (implicitly or explicitly) dualistic worldview that informs much humanistic work. There is nothing, however, that essentially links quantification, hypothesis testing, controlled experiments, and mathematical modeling to physicalism—they are not ontological assumptions, but rather epistemological techniques or devices for obtaining reliable knowledge. Beyond the assumption that there is a reality to learn about, and that some form of more or less reliable knowledge is obtainable, these methods do not involve any particular ontological commitment. Quantification, for example, does not, by its very nature, violate mind-body dualism or the notion that humans are unique. It does not even go against the desire to avoid reductionism, given that much of the work on the phenomenon of emergence is

heavily mathematical.¹⁷ Counting products of the human mind neither transforms them into aspects of the body, nor does it challenge their status as humanly produced, nor does it require them to be explained by some lower-level phenomenon. The same is true for hypothesis testing, mathematical modeling, and controlled experiments. Hypothesis testing involves no more than outlining a possible answer to a given question, specifying what the results of an analysis should look like if that answer were correct, and then comparing the actual results with the expected results; controlled experiments and mathematical modeling are also simply ways of evaluating explanations within the hypothesis-testing framework. These methods, therefore, involve only a commitment that is shared by scientists and most, if not all, humanists—namely, the idea that it is possible to obtain some sort of relatively stable, relatively reliable knowledge.

These methods are not only ontologically innocuous—and, therefore, nothing to be viewed with suspicion—but also have the potential to be extremely useful to humanists, as we think several of the contributions to this volume illustrate. To begin with quantification, its potential benefits are perhaps best seen in the chapter by Schauer. At the heart of the study, Schauer reports, is a quantitative analysis of the decorations that art historians have recorded on Greek figure-painted pottery from between 650 BC and 300 BC. Although time-consuming, the analysis is not complicated. It simply involves calculating frequencies for the motifs in a series of partially overlapping 50-year time periods. Yet despite its simplicity, it has yielded some novel and striking findings. The one Schauer highlights is a major difference between the frequencies of occurrence of Nike compared to Theseus. Prior to 525 BC, both of these mythological figures occur at a low frequency. After 525 BC, the frequency with which Nike is depicted increases dramatically compared to Theseus. This increase peaks between 475 and 425 BC, and then depictions of Nike decline again, although they remain considerably more frequent than depictions of Theseus. As Schauer notes, neither the difference in the popularity of Nike versus Theseus, nor the timing of the increase in popularity of Nike has been identified before, even though the relevant data have been available for decades. Moreover, this pattern presents a significant challenge to traditional ideas of “importance” in motifs on figure-painted pottery. Schauer’s chapter demonstrates that quantification is capable of revealing interesting and potentially significant patterns that are difficult, if not impossible, to identify using the qualitative approaches that have been traditionally relied on in the humanities.

Turning to hypothesis testing, its benefits can be traced to the role played by prediction in the process. To reiterate, hypothesis testing involves outlining a possible answer to a given question, specifying what the results of an analysis should look like if that answer were correct, and then comparing the actual results with the expected results. Or, to put it another way, it involves testing explanations by predicting what should be seen at the end of an analysis if an explanation is correct. This method provides several benefits.

17. Indeed, the typical association between mathematical modeling and eliminative reductionism is ironic considering that some of the strongest arguments for the need to take emergence seriously have come out of mathematical modeling work, including that of some of our contributors (see Bentley and Maschner 2003, 2007).

A significant one is that specifying a hypothesis and a prediction ahead of time forces one to pay close attention to both the data one needs to collect and the assumptions involved in the analytical technique that one intends to employ. Most research in the humanities involves these activities, but often they are engaged in *during* data collection and analysis, and as a consequence there is frequent backtracking. Hypothesis testing does not guarantee that there will not be any backtracking, but in our experience it reduces it considerably. As such, hypothesis testing enhances the efficiency of the research process. A second major benefit of having to specify a hypothesis and a predicted set of results, and comparing the actual results with the predicted results is that it is easier to determine whether a researcher has inadvertently biased their results to support the hypothesis. Again, this sort of self-checking is by no means unknown in the humanities, but it is typically pursued in a more ad hoc and cumbersome manner than is the case when hypothesis testing is utilized. A third major benefit of hypothesis testing arises from the final step in the process, the comparison of the actual and predicted results. Being forced to evaluate whether the actual results match the predicted results is a spur to critical thinking and further research. A discrepancy can be the result of four things: (1) a mistake in data collection or analysis, (2) a problematic assumption about the data or an aspect of the analysis, (3) an error in the formulation of the prediction, or (4) an incorrect hypothesis. If, after further analysis, one can exclude possibilities 1–3, then one can conclude that the hypothesis is incorrect and either modify it or begin looking for alternative hypotheses to test.

Several of the case-study contributions to the volume employ the technique of hypothesis testing. Of these, perhaps the most noteworthy is the contribution by Carroll, Gottschall, Johnson, and Kruger, because it applies the technique to what many likely consider the prototypical humanities discipline: literary studies. Carroll et al. report a study in which they used the results of published evolutionary research to formulate hypotheses about aspects of human nature likely to be relevant to readers' responses to literary texts, and then collected survey data to test the predictions of those hypotheses. Their chapter provides an excellent illustration of how specifying a hypothesis and a prediction not only guides data collection and analysis, but also allows potential biases to be straightforwardly evaluated, as the criticisms leveled at the chapter by Dancygier demonstrate. In addition, some of the results of Carroll et al. ran counter to their predictions, and this led them to reconsider their hypothesis and propose a new one (XX), which exemplifies the third of the aforementioned benefits of hypothesis testing—its ability to generate a virtuous circle of research.

As mentioned earlier, within the hypothesis-testing framework, controlled experiments and mathematical modeling are two ways of evaluating explanations. As such, they offer all the benefits of hypothesis testing mentioned earlier. What distinguishes controlled experiments and the type of analysis familiar to humanists—the analysis of observational data—is that, in a controlled experiment, researchers try to collect data in such a way that confounding factors are excluded and a “pure” test of the predicted relationship between variables becomes possible. Several techniques fall under the heading “mathematical modeling,” including optimization modeling, game theory, and population genetics modeling. As the name suggests, what these approaches have in common is the use of math, specifically algebra, to evaluate relationships that are predicted by hypotheses.

In some mathematical modeling-based studies, predictions are tested entirely in the abstract. In others, modeled results are compared to results obtained from the analysis of observational data.

A number of the case studies in this volume illustrate the utility of controlled experiments. For example, Stich describes the manner in which the new “experimental philosophy” movement has tried to supplement the traditional philosophical methods of armchair speculation and theoretical analysis with the sort of data that can be gleaned from controlled experiments, which, in just a short period of time, have given us a considerable amount of new insight concerning the nature of moral judgments. Several of our contributions also offer case studies that illustrate the usefulness of mathematical modeling. For instance, Gintis’s chapter employs game theory to study models of various forms of social cooperation, while Bentley and Ormerod employ a differential equation to assess the relative importance of random copying and purposeful selection in the spread of cultural traits. Obviously, the results yielded by controlled experiments and applications of mathematical modeling are artificial, but—as these and other examples in the volume illustrate—both approaches allow researchers to decisively reject hypotheses more readily than is the case with the analysis of observational data.

A good sense of how methods borrowed from the sciences can benefit the humanities can also be gleaned from the contributions of Wilson and Green and of Norenzayan and Gervais. These scholars are participants in an interlocking set of large, interdisciplinary, international collaborative projects aimed at exploring the hypotheses that religious belief has historically been selected for among human populations because of its role in promoting prosociality.¹⁸ Such hypotheses, of course, have a quite venerable history in the academic study of religion, but they have typically been supported only by ad hoc observation and cherry-picked historical examples. The consilient projects pursued by these scholars are bringing together theorists of religion, philosophers, historians, linguists, anthropologists, psychologists, economists, biologists, and mathematicians in order to generate falsifiable hypotheses concerning the evolutionary origins of religious belief and then test them with a variety of methods, including textual analysis, historical “observation,” quantification of historical textual and archaeological data, ethnographic observation, controlled laboratory experiments, and mathematical modeling. Like a team of tradespeople engaged in a large construction project, each specialist takes on only the particular tasks that suit his or her training and aptitudes, but all continuously communicate with one another and work within a consilient framework to pursue a shared set of goals. It is our conviction that the surest way to dispel skepticism about the value of consilience for the humanities is for these sorts of concrete collaborations to produce results that are not only novel and interesting, but that meet the highest standards of both scientific and humanistic inquiry.

18. The formation of research groups and planning of grant applications for these projects was one of the concrete results of our exploratory workshop. These efforts have now coalesced into two teams, one based in the United States and Europe and led by Wilson and Whitehouse, the other based in Canada and led by Slingerland, Henrich, Norenzayan, and Collard.

ELEMENTS OF A “SECOND WAVE” OF CONSILIENCE

Having outlined a set of tensions that arose from our workshop proceedings, we will now try to sketch the outlines of a modified consilience project that—responding to these perceived tensions—differs in some significant ways from the project outlined by Tooby and Cosmides (1992) and E.O. Wilson (1998). Borrowing terminology from the feminist movement, we have adopted the term *second wave* to characterize this modified consilience, because it grows out of and includes the earlier wave but pushes it in several new directions.

Perhaps the most common theme that emerged from the workshop discussions themselves—the Q&A after the talks, and the informal interactions over breaks and meals—is that the manner in which consilience has been characterized and presented to humanists has been off-putting and, hitherto, relatively unsuccessful. There was also something of a consensus that this involved both substantive and stylistic factors. More substantively, it was thought that issues such as the relationship between evolved human cognitive architecture and culture, or the status of science in the chain of explanation, needed to be treated in a more sophisticated fashion. More stylistically, many humanists noted that the rhetoric of proponents of consilience (most of them coming from the science side of the sciences/humanities divide) often tended to sound dismissive of the value of traditional humanistic work—needlessly dismissive, because, when pressed, no advocate of consilience would deny the value of such work. By the end of the workshop, a feeling began to develop among the organizers that it might be helpful to draw a line between the sort of consilience initially proposed by, for instance, E.O. Wilson, and the work being pursued by those of us in the next generation, many of us coming to consilience from a background in more traditional humanities disciplines, and, therefore, perhaps more sensitized to the aspects of consilience that rub humanists the wrong way.

No actual term for this shift emerged from our discussions. Indeed, it was not until this volume was being assembled that an explicit recognition began to develop among us that a shift was involved, and not until this Introduction was written that a name was concocted to label it. It is probably impossible to speak of being part of a “second wave” of anything without coming off as both smug and ungrateful. This metaphor was chosen in conscious emulation of second-wave feminism, which intended its self-characterization to be an inclusive one, incorporating and acknowledging the achievements of the retroactively designated first wave while also pushing it in new directions. Perhaps the computer metaphor of a “version 1.1” of a program would be a better one,¹⁹ capturing the sense that the sort of consilience that we saw emerging from the workshop is fundamentally the same product as the earlier version, but one modified in various ways in response to bug reports and usability complaints from initial adopters. Responding to the tensions that emerged from the workshop presentations and discussions, summarized earlier, the manner in which this modified “second-wave”

19. Especially since it is not at all clear that “third-wave” feminism partakes of this same inclusive and progressive character.

consilience²⁰ differs from its initial instantiation—in both substantive and stylistic ways—can perhaps be characterized as a desire to transcend three barriers: eliminative reductionism, the nature vs. nurture debate, and entrenched disciplinary chauvinism.

Beyond Eliminative Reductionism: Respecting Emergent Levels of Truth

Having hopefully clarified that reductionism is, when properly done, the central method of intellectual advancement in any field, more has to be said about good and bad forms of reductionism—because, of course, it is really “greedy” or “eliminative” reductionism that most humanists have in mind when they bandy about this charge. If those of us who support consilient approaches to the humanities wish to win broader acceptance among our colleagues, it is incumbent upon us to make it clear that consilience does not entail—as many humanists fear it does—collapsing humanities departments into biology departments or denying the significance of human-level truths. Rather, it merely asks that humanistic work not be treated as disconnected from the world of physical causation. Human-level meaning emerges organically out of the workings of the physical world, and we are being “reductive” in a good and revealing way when we seek to understand how these lower-level processes allow the higher-level processes to take place. The argumentative force of defenders of consilience concerning the issue of reductionism is very similar, then, to Nietzsche’s point regarding Kant: the humanities have yet to entirely free themselves from “Tartuffery,” and continue to rely on impressive-sounding but explanatorily empty entities and faculties.²¹ The commonly-cited belief that the humanities deal with sympathetic understanding or “thick” description²² has traditionally had the effect of systematically denying any possible substantive role to the sorts of “thin” bodily or physical processes studied by the sciences, thereby protecting the work of humanists from the prying eye of science by wrapping it in the mysterious cloud of *Verstehen*. Although this seems more sophisticated than the answer of the doctor in Molière, it is structurally quite similar. Humanists have long recognized the usefulness of reducing human phenomena to more causally basic levels of analysis—whether sociological, economic, psychological, or phonetic—and judging the usefulness of such reduction in terms of its productiveness and revelatory power. Consilience does not ask us to change this, but merely to refrain from drawing an ontological line below which we will not

20. For what we see as some representative examples of this sort of “second-wave” consilience as practiced by workshop participants, the reader is referred to Henrich et al. 2003, the three-volume series on *The Innate Mind* edited by Carruthers, Laurence, and Stich (Carruthers, Laurence, and Stich 2005, Carruthers, Laurence, and Stich 2007, 2008), Schaller and Crandall 2004, Gottschall and Wilson 2005, Slingerland 2008a, Heywood, Garcia, and Wilson 2009, Boyd, Carroll, and Gottschall 2010, and Schaller et al. 2010.

21. See, for instance, Tooby and Cosmides suggestion that terms such as “learning” or “rationality” as they are currently used in the humanities are as analytically useful as “*protoplasm*” or “*vital force*” was in premodern biology, and are likely to turn out to be blanket terms for what are really a variety of specific, modular, evolved cognitive processes (1992: 122–23).

22. See the classic expression of this attitude in Geertz (Geertz 1973: 6–10), who borrows the distinction between “thick” and “thin” description from the philosopher Gilbert Ryle 1971.

allow such reduction to go. Obviously, this will not satisfy committed ontological dualists such as Shweder, but it should at least respond to the more moderate concerns expressed by Shore.

Worries about levels of explanation and eliminative reductionism arguably also lie behind a charge commonly raised in humanistic circles concerning the ultimate irrelevance of consilience. This issue was raised by one of our workshop attendees, Stefania Burk, an expert on the intersection of poetics and political patronage as manifested in the production of official poetry anthologies in medieval Japan, who expressed skepticism concerning the degree that the sort of evolutionary approaches represented by the presentations in the literature session offer her anything of value in her own work. One answer is that adopting a consilient perspective—for instance, learning something about evolutionary psychology and cognitive science and taking it seriously in her work—might very well involve an important shift in her overall interpretative framework. The typical Foucauldian framework that she, like many humanists, learned in graduate school encourages her to see her work as documenting the manner in which aesthetics is primarily driven by politics and power, with “beauty” revealed as no more than culturally specific construction. An evolutionary framework might lead her to focus more on coalition-formation, prosociality, and aesthetic forms as in-group markers—an important advance over Foucault because it would allow her to plug her work into a much broader and more powerful explanatory framework, one that also has the wonderful virtue of being empirically plausible.

However, it is also important to acknowledge that 90 percent of her work is concerned with the specifics of how *this* particular person commissioned *this* particular poetry anthology, and how this historical event influenced some very culturally and linguistically specific forms of poetic expression. Evolutionary theory does not speak directly to these issues. As Dancygier notes in her contribution,

For the purposes of the humanities, [evolutionary] questions are interesting, but not central to the traditional concerns of the disciplines deeply immersed in cultural concerns. For examples, future answers (if at all possible to provide) might change the underlying assumptions of literary study, but they may do little to affect the core interests of most literary scholars. To put it simply, just knowing that literature is adaptive may not change the way in which most of the historicist or cultural research is done. (XX)

It must, therefore, be emphasized that, even if every researcher in the humanities immediately embraced consilience with the sciences, the vast majority of humanistic work would still consist of what we are calling “horizontal analysis”: analyzing phenomena by tracing out connections between entities native to emergent levels of explanation. This is of course the case in *any* field of analysis, scientific or otherwise: organic chemists spend most of their time exploring connections that make sense only at the level of organic chemicals, and even the most reductive evolutionary approach to poetry will necessarily focus primarily on problematic and modes of analysis native to the phenomenon of poetry. When it comes to humanistic fields, the importance of this sort of horizontal analysis is also heightened when we recognize that even the most trivial of human-level actions and thoughts are not naked

facts to be measured by objective instruments but, rather, are embedded in a set of long, complex stories that require the higher-level expertise of anthropologists, novelists, and historians in order to fully unpack. Because humanistic fields tend to concern themselves overwhelmingly with emergent structures and idiosyncratic cultural histories, it is not at all clear that adopting a consilient perspective would have such a global and dramatic effect on the day-to-day work of most humanities scholars. This is particularly the case when one recognizes that many humanists in fact implicitly share many of the assumptions of the consilient approach—such as important commonalities in human nature, universality in certain types of cultural forms, and so on—even if they deny these commonalities in their rhetorical and theoretical posturing.²³

Here the line between substantive and stylistic changes begins to blur, because it is not necessarily the case that advocates of “first-wave” consilience would disagree with any of this. It *is* the case, however, that respect for emergent-level realities does not come across clearly in their writing, as concerns expressed by many workshop participants attest. An important feature of the sort of consilience we wish to advance is the recognition that, although consilience can provide a crucially important new explanatory framework within which, say, literary studies could operate, it does not necessarily entail radical alterations in the everyday methodology, vocabulary, or focus of interest of the average humanist. Literary scholars, for instance, do not need to stop talking about history and genre, or confine themselves only to terms and concepts drawn from evolutionary psychology.

A final, and more substantive point, concerns what we might call the phenomenological status of human-level truths in a consilient framework. Although no evolutionary psychologist or cognitive scientist would purport to be an eliminative reductionist, and all give at least lip service to the idea that higher levels of explanation can feature emergent qualities not present at the lower levels, there is a common tendency to nonetheless privilege the material level of explanation: we are really just mindless robots or physical systems, no matter how things might appear to us phenomenologically. As we argued in our defense of physicalism earlier, there are some very good reasons for this privileging of lower levels of explanation. It is equally the case, however, that, as we move up the explanatory chain, we witness the emergence of one level of explanation in particular—that of human-level reality, as seen through the filter of Theory of Mind—that must be recognized as possessing such a special, ineradicable hold on the human mind that no third-person description can ever completely dislodge it. In other words, we apparently cannot help but, at some level, see a *Geist* in the machine, which means there will always be something importantly different about the *Geisteswissenschaften* for creatures like us.

This is a substantive point because some advocates of consilience argue that, because intentionality and consciousness are helpful for certain heuristic purposes, but possess no underlying reality, the rigorous study of human affairs will eventually be able to dispense with them entirely.²⁴ A common analogy drawn by those who feel dualism will soon disappear is the shift in human sensibilities that occurred with the Copernican

23. An observation also made by Joseph Carroll 2008.

24. See, for instance, Paul Churchland’s description of how we might wean ourselves off mentalistic folk psychology (Churchland 1979: 30–34), or Owen Flanagan’s comment that because concepts such as the “soul” or “free will” “do not refer to anything real, we are best off without them” (2002: xiii).

revolution. Copernicanism presented a view of the solar system that contradicted not only Scriptural authority but the evidence of our senses: the Bible states quite clearly that the sun moves around the earth, and this also happens to accord with our everyday sensory experience. Yet an accumulation of empirical evidence eventually resulted in Copernicanism winning the day—trumping both religion and common sense—and nowadays every educated person takes the heliocentric solar system for granted. Dennett (1995), for instance, argues that the physicalism versus dualism controversy explored in our “Ontologies for the Human” section is analogous to the early days of Copernicanism: we are resistant to physicalism because it goes against our religious beliefs and our common sense, but the weight of the empirical evidence is on its side. Eventually—after all of the controversy has played itself out—we will learn to accept the materialist account of the self with as much equanimity as the fact that the Earth goes around the Sun.

A basic problem with Dennett’s position, however, is that there is a disanalogy between the Copernican revolution and the revolution represented by physicalist models of the mind. The Ptolemaic model of the solar system falls quite naturally out of the functioning of our built-in perceptual systems, but it is not itself part of that system: we do not appear to possess an innate Ptolemaic solar-system module. Switching to Copernicanism requires us to suspend our common-sense perceptions, but it does not involve a direct violation of any fundamental, innate human ideas. If the claims concerning the innateness and automaticity of folk dualism advanced by Slingerland and Fiala et al. are correct, however, physicalism as applied to human minds *does* require such a violation, and this has a very important bearing on how realistic it is to think that we can dispense with mentalistic talk once and for all. The idea of human beings as ultimately mindless robots, blindly designed by a consortium of genes to propagate themselves (Dawkins 1976/2006), has not gained a foothold probably because it dramatically contradicts other firmly entrenched ideas such as the belief in *soul, freedom, choice, responsibility*—in short, all of the qualities that seem to us to distinguish human beings from mere things. The dualism advocated by classic defenders of the autonomy of morality, such as Kant, is not a historical or philosophical accident, but rather a development of an intuition that comes naturally to us, as bearers of Theory of Mind: agents are different from things. Although we are obviously capable of entertaining non-dualist ideas at some abstract level—using our system-2 mechanisms, as Fiala et al. would have it—we seem to have evolved in such a way as to possess system-1 mechanisms that are ultimately invulnerable to the idea of thoroughgoing materialism.

Thus, we may always see meaning in our actions: populating our world with “angry” seas, “welcoming” harbors, and other human beings as unique agents worthy of respect and dignity, and distinct from objects in some way that is hard to explain in the absence of soul-talk, but nonetheless very real for us. Qua physicalists, we can acknowledge that this feeling is, in some sense, an illusion. For better or worse, though, we are apparently designed to be irresistibly vulnerable to this illusion, at least on some level. In this respect, appearance *is* reality for us.²⁵

25. This is where, in fact, we see the limits of a thoroughly “scientific” approach to human culture, and need to finesse a bit our understanding of what counts as a “fact” for beings like us. In this respect, humanists and scientists concerned with the issue of levels of explanation and emergent properties have much to learn from the work of Charles Taylor (see especially Taylor 1989). Although Taylor is ultimately opposed to consilience or other forms of naturalism, we believe that his insights on this subject can be drawn upon to formulate a more sophisticated model of vertical integration.

One way of characterizing the attitude of “second-wave” consilience toward this issue is to see it as incorporating the viewpoints of both Kant and Nietzsche. To take moral intuitions as an example, we can follow Nietzsche—somewhat updated and put into the role of an evolutionary psychologist—and see why it is important, unavoidable, and revealing to ask about the adaptive forces that cause us to feel the force of synthetic a priori claims, rather than just experiencing them as unquestioned intuitions. Answering the question of origins—uncovering the lower-level, ultimate explanations for our moral intuitions—has important practical implications, but most of all we just simply want to *know*. We also need to follow Kant, however, in recognizing that, no matter what the origins of these intuitions, they are the spontaneous product of a powerful, built-in faculty, the output of which seem inescapably right to us. The Nietzschean *Übermensch*, living in accordance only with artificial values freely and consciously created by himself, is psychologically impossible for a cognitively healthy human being—which, of course, Nietzsche was not, at least in his later years. This means that, as empirically responsible humanists, we need to pull off the trick of simultaneously seeing the world as Nietzsche and as Kant, holding *both* perspectives in mind and employing each when appropriate.

So, ironically, proponents of consilience will have to live with a kind of dual consciousness, cultivating the ability to view human beings simultaneously under two descriptions: as physical systems and as persons. On the one hand, we are convinced that Darwinism is the best account we have for explaining the world around us, and, therefore, that human beings are merely physical systems. On the other hand, we cannot help but feel the strong pull of human-level truth. Moreover, those of us who are humanists also earn our keep by studying this emergent level of reality: unlike scientists, we do not necessarily have to withdraw our projections in order to perform our day jobs, which is a nice perk. Conceptualizing the subject of humanist inquiry not as the ineffable workings of some Cartesian *Geist* in the machine, but rather as the wonderfully complex set of emergent realities that constitute the lived human world—in all its cultural and historical diversity—allows us to respect and accommodate the fear, expressed by Shweder, of “completely reducing the ‘mental’ to the ‘material’ or ‘matterings’ to ‘matter’” (XX) without having to follow him into an empirically implausible form of mind-body dualism. A consilience grounded in McCauley’s “explanatory pluralism but ontological seamlessness” provides space for both the appreciation and explanation of the rich world of emergent human meaning.

Beyond the Nature-Nurture Debate: Recognizing the Importance of Gene-Culture Co-evolution

Some of the more recent popular press accounts of the “death of evolutionary psychology” lead one to believe that its potential limitations entirely nullify the value of work done in this field or even invalidate the consilience approach in general.²⁶ This could not be further from the truth, and these critiques are unhelpful to the extent that

26. See, in particular, Begley 2009 and Brooks 2009 on the “death of evolutionary psychology”; for a succinct response to the more extreme critics of evolutionary psychology, see Kenrick 2006.

they have been driven by a fundamental resistance to viewing humans as the potential subject of scientific inquiry. One beneficial effect of such criticisms, however, has been to focus attention on a feature of evolutionary psychology that is open to emendation: its tendency to focus more or less exclusively on the Pleistocene brain and the adaptive environment of our small-band living, hunter-gatherer ancestors. No one at our workshop would deny that the human brain has been shaped by the evolutionary history of our species, nor that the Pleistocene hunter-gatherer lifestyle represents an important and relatively long-lasting period of human cognitive evolution. However, a lot has happened to human beings since the Pleistocene. How to properly deal with human culture and its relationship to innate cognition within an evolutionary framework has been a topic of much concern. In fact, it is as much an issue of contention among proponents of consilience as it is between proponents and skeptics of the approach.

In his contribution to this volume, Shore notes that, although gene-culture co-evolution is often given at least lip service in consilient approaches, the actual treatment of these two aspects of human existence—one of the keys of achieving true consilience—has often been “decisively tilted” (XX) toward the genetic. We can see this in E.O. Wilson’s perhaps now-infamous metaphor of the human brain as “an exposed negative waiting to be dipped in developer fluid” (1975/2000: 156), which presents culture as a more-or-less direct expression of innate human psychological mechanisms, a mechanically expressed “phenotype” of a fixed human genotype on the order of a termite mound or beehive. The sort of second-wave consilience represented by the contributions to this volume can be seen as a modification of this position because it recognizes that culture and genes exist in a co-evolutionary relationship, and that human culture can play a role in *transforming* human cognition on both individual and evolutionary time scales. Culture on this model is best seen as a semi-autonomous force, with its own process of evolution and selection pressures—“*semi*”-autonomous because it is not some disembodied, Durkheimian superstructure but is necessarily carried by individual human brains and the physical, culturally modified environment. This second-wave approach also adopts a rather broader view of what constitutes the relevant “adaptive environment,” which, for humans, has to include the social-cultural world, and the socially and culturally transformed body-mind.²⁷

If we wish to frame this as a substantive critique of some advocates of “first-wave” consilience, we might say that the desire to push back against the extreme social constructivism that currently dominates the humanities was taken too far. One unfortunate effect of some recent attempts to bring a robust conception of human nature back to the fore in our study of human culture is the creation—perhaps often unintended—of a false dichotomy between nature and nurture: that the only alternatives are embracing full-blown social constructivism or believing in a single, universal human nature that merely gets “translated”

27. Many representatives of this second wave—including both contributors to this volume (Wilson and Green, and Norenzayan and Gervais) and other workshop participants (Henrich)—also openly embrace a concept that is still too often viewed as a terrible heresy by evolutionary psychologists: multilevel or group selection, which argues that groups of organisms can become vehicles for selection pressure. See especially Wilson 1975; Wilson 2006 on the “revival” of group selection in both biological and cultural studies.

into various cultures. In fact, a consilient approach to human culture—one fundamentally informed by evolutionary theory and the latest discoveries in cognitive science—can take us beyond such dichotomies. The work of scholars such as Pete Richerson and Rob Boyd (e.g., Richerson and Boyd, 2005) has shown how cultural forms themselves are subject to a kind of evolution, constrained by the structures of human cognition but also exerting their own independent force. In fact, cultural evolution seems to have driven certain aspects of human genetic evolution, favoring our big brains, linguistic skills, and ultrasociality, the three hallmarks of our species (Henrich and McElreath 2007). Cultural group selection theory gives us a model for how this process of co-evolution may have worked historically among human populations and how its effects can still be observed today.

In addition, tools drawn from cognitive linguistics, such as conceptual metaphor and blending theory,²⁸ give us very specific models for understanding how universal, innate human cognitive patterns can get projected into new domains or combined to generate entirely novel, emergent structures. Human cognitive fluidity,²⁹ ratcheted up over time by entrenchment in cultural forms such as language or architecture, can shape human emotions, desires, and perception in quite novel and idiosyncratic ways—from the subtle Japanese aesthetic sentiment of *mono no aware* (lit. “the sorrow of things”) to the sort of “cultivated needs” explored in depth by theorists such as Pierre Bourdieu. As Dancygier argues in her contribution:

Perhaps it is time for literary scholars interested in evolution and the mind to also start looking at language as the tool whereby new meanings can be expressed, and not a set of forms to be acknowledged and then put to one side. Without an understanding of how language and cognition are jointly responsible for the emergence of literature and other creative forms of expression, the evolutionary study of literature will not be able to account for new literary forms and themes and will lack a solid foundation in its work toward the goal—the evolutionary explanation of one of the central manifestations of human creativity. (XX)

More of an acknowledgement of how culture can play an active role in reshaping human nature would go a long way toward answering the sort of skepticism voiced by many humanities scholars who remain dubious about the value of the consilience project, and for whom the dazzling variety of various human cultures and the nuances of specific cultural products are the most salient features of human beings.

Beyond Disciplinary Chauvinism: Recognizing that Consilience Is a Two-Way Street

As conference participant Steven Pinker observed, there currently exists a “widespread perception that the humanities are in trouble,” which might at least in part be attributed

28. On conceptual metaphor theory, see Lakoff and Johnson 1999; on blending theory, see Fauconnier and Turner 2002, or the helpful introduction to blending found in Dancygier 2006.

29. The term *cognitive fluidity* was coined by the archeologist Steven Mithen 1996; for an attempt to sketch out how conceptual blending theory could serve as a powerful tool in both explaining and modeling cognitive fluidity and conceptual innovation, see Slingerland 2008a: Ch. 4.

to the “insularity of the humanities from new ideas and discoveries coming from the sciences” (XX). Pushing back against this emphasis on the foundational importance of the sciences, one of our workshop participants, Anne Murphy, made the important point that the empirical rigor of humanists such as herself are not adequately recognized by many scientists, who are sometimes wont to caricature humanistic work as facile story-telling or speculation. Responding to Murphy, we cannot help but observe that although empirical rigor is demanded and delivered when humanists focus on their particular areas of expertise—the development of the novel in nineteenth century England or the details of patron-poet relations in medieval Japan—such rigor is too often thrown out the window when it comes time to locating the significance of this specialized work in the broader framework of human experience. As one of us (Slingerland) put it, Michel Foucault is a profound and careful scholar when wearing his historian hat, producing important insights into, for instance, the history of the perception of homosexuality in the West (Foucault 1978). However, the significance of this empirical work is then undermined by being embedded in a variety of broader theoretical frameworks—for instance, theories concerning the relationship of language to thought, or of social discourse to political power—that betray an ignorance of even the most basic relevant empirical work on the structure of human cognition. Consilience demands that humanists need to start paying more attention to discoveries about human cognition being provided by cognitive scientists, psychologists, and specialists in non-human animal behavior, which have a constraining function to play in the formulation of broad humanistic theories—calling into question, for instance, such deeply entrenched dogmas as the “blank slate” theory of human nature, strong versions of social constructivism and linguistic determinism, and the ideal of disembodied reason (Pinker 2002, Slingerland 2008a).

However, by the same token, as scientists explore areas traditionally studied by the humanities—the nature of culture, religion, ethics, epistemology, literature, consciousness, emotions, or aesthetics—they need to draw on humanistic expertise if they are to effectively decide what sorts of questions to ask, how to frame these questions, what sorts of stories to tell in interpreting their data, and how to grapple with the ethical and social repercussions of scientific discoveries about complex human phenomena. This two-way dynamic—one of the most prominent themes that emerged from our workshop discussions—has, unfortunately, been too often ignored by earlier proponents of consilience.

To take one example, it was observed that one of the more puzzling features of the modern academy is that philosophy of science is pursued almost exclusively in humanities disciplines, with most working scientists pursuing their research in blithe unawareness of the developments in philosophy of science in the past several decades that has fundamentally questioned old-fashioned, positivistic models of scientific inquiry.³⁰ For instance, since at least the early 1970s it has become widely recognized that scientific theory and observation are inextricably intertwined, and that the positivistic ideal of a perfectly corroborated theory is a chimera. Too many working scientists today nonetheless continue to evince an overoptimistic faith in the scientific method as an infallible and direct route to “truth,” an attitude that can blind them to problematical assumptions or culturally specific elements that may be distorting their results.

30. See, for instance, now classic works such as Kuhn 1962/1970 and Feyerabend 1993.

The practical significance of this work can, of course, be exaggerated. When presented with scientific evidence, a common kneejerk reaction among humanists is to declare that such evidence can simply be dismissed, because “after Kuhn” we all know that science is merely one discourse among many—such statements often uttered with the greatest confidence by those who have never read a word of Kuhn.³¹ One point of consensus that emerged from the workshop was that the sort of extreme epistemological skepticism that currently permeates many areas of the humanities, and that constitutes one of the primary intellectual barriers to consilience, has outlived its usefulness. A primary benefit of getting beyond mind-body dualism is the ability to move past epistemological problems created by such dualism: both objectivist positivism and its evil skeptical twin are artifacts of an empirically implausible, disembodied, representational model of knowledge (Laudan 1996, Putnam 1999). The commonalities of human embodiment in the world can result in a stable body of shared knowledge, verified (at least provisionally) by evidence based upon common perceptual access. Abandoning strong mind-body dualism—bringing the human mind back into contact with a rich and meaningful world of things—would, therefore, reground the humanities on the foundation of an embodied mind that is always already in touch with the world, as well as a pragmatic model of truth or verification that takes the body and the physical world seriously. At the same time, such an embodied, pragmatic model of truth would also avoid the pitfalls of old-fashioned positivist objectivism, which all the participants also agreed has outlived its usefulness as an epistemological framework (Smith 2006).

Through contact and collaboration with colleagues in the humanities, second-wave “consiliators” coming from a science background can begin to become more aware of potential problems with their basic explanatory categories, and more attuned to the importance of cultural variation. Two examples discussed at the workshop, that of the psychology of religion and cross-cultural psychology, are revealing in this regard. Psychologists interested in the scientific study of religion have tended to be working with a rather unexamined conception of the category of “religion”—the defining of which has been a central, contentious, and extremely fraught issue in the academic study of religion for over a hundred years. This has a potentially significant impact of their work. For example, psychologists wishing to study the effect of “religious” primes on prosocial behavior have to select particular words to serve as their “religious” primes, which can fundamentally skew results when this selection is guided by a very historically unusual and culturally particular form of religiosity—particularly if a proportion of one’s subject pool operates according to a very different model of religiosity. Similarly, an entire subfield of cross-cultural psychology is based on a model of East Asian thought as “holistic,” as opposed to the “analytic” West (Nisbett 2003, Nisbett et al. 2001). As several workshop participants noted, the empirical data being gathered by these psychologists is extremely interesting, but when it comes to *interpreting* this data—that is, telling a coherent historical narrative that will explain it—they often fall back on unhelpful and essentialistic stereotypes. Eastern “holism,” for instance, is traced back to such foundational texts of Chinese thought as the *Classic of Changes*

31. Kuhn himself was, of course, rather appalled by the manner in which his work became yoked to a rabid form of epistemological skepticism; see Kuhn 1970.

(*Yi Jing*) or the *Dao De Jing*, but without any clear sense of when or how these texts were composed, how representative they are of “Eastern” thought, or how they have historically been used and interpreted in East Asia.

Researchers in the various branches of the cognitive sciences thus have much to learn from humanists, and the cognitive sciences absolutely require the expertise of anthropologists, literary scholars, and historians if they are to avoid reinventing the wheel or committing egregious interpretative errors. The topic of religion provides another angle on this point. One of our participants and contributors, David Sloan Wilson, has called for scientists interested in studying the evolutionary origins of religion to tap into the rich knowledge base of historians and other more traditional scholars of religion, and for such scholars to seek out the kind of unifying theoretical framework that scientists can provide. One analogy that he has employed to convey this point is the manner in which the rich and detailed, though rather unorganized, data compiled by pre-Darwinian naturalists served as an invaluable resource for post-Darwinian scientists armed with the theory of evolution (Wilson 2002). There is certainly something to this analogy: one could argue that too much of current work in the humanities resembles butterfly collecting—a fundamental limitation of what Boyer refers to as the “erudition mode” in the sciences and humanities is a lack of any sort of guiding theoretical framework to help researchers formulate productive research questions and to make sense of their data. However, as Slingerland pointed out at the workshop, there is an important disanalogy with Darwin and the pre-Darwinian naturalists: when it comes to a phenomena such as “religion,” the formulation of the very category itself requires humanistic expertise, and research into the possible evolutionary origins of religion risks going radically awry if not guided by such knowledge. This means that, when it comes to the scientific study of human-level phenomena, scholars with humanities expertise need to be on the ground floor of basic theorizing and experimental design, and not viewed as merely passive providers of cultural and historical data.

Bordering as it does on areas typically studied in core humanities fields, the discipline of psychology provides many examples of puzzling failures on the part of scientists to engage with basic work in the humanities. For example, the vast majority of psychological studies rely upon a subject pool composed exclusively of university undergraduates, and often, more specifically, undergraduate psychology majors. As an forthcoming piece co-authored by some of our workshop participants (Henrich, Heine, and Norenzayan 2010) observes, “broad claims about human psychology and behavior in the world’s top journals [are generally] based on samples drawn entirely from Western, Educated, Industrialized, Rich and Democratic (WEIRD) societies”:

Our review of the comparative database from across the behavioral sciences suggests both that there is substantial variability in experimental results across populations and that WEIRD subjects are particularly unusual compared with the rest of the species—frequent outliers. The domains reviewed include visual perception, fairness, cooperation, spatial reasoning, categorization and inferential induction, moral reasoning, reasoning styles, self-concepts and related motivations, and the heritability of IQ. The findings suggest that members of WEIRD societies, including young children, are among the least representative populations one could find for general-

izing about humans... Overall, these empirical patterns suggests that we need to be less cavalier in addressing questions of *human* nature on the basis of data drawn from this particularly thin, and rather unusual, slice of humanity. (61)

It seems likely that this piece will create quite a stir within psychology, and the authors are to be credited for their recognition of this basic problem, their thoroughness in documenting it in a manner likely to be convincing to their colleagues, and their courage in bringing it forward as a topic of debate. However, the response of most humanists, when told that North American university psychology undergraduates might not be representative of universal human nature, can be imagined by anyone with even a modicum of humanistic training. The diversity of human cognition across cultures and through historical time, while only recently a topic of study in psychology, is one of the most basic of truisms in the humanities, and it is a serious possibility that psychologists have wasted a fair amount of time pursuing research agendas that will prove upon reflection to be of only quite parochial cognitive interest.

There are a host of related problems that might be raised in this regard, some broached in the workshop discussions, others that have come up in subsequent collaboration. For instance, there is an often unspoken assumption in what little cross-cultural work that is done in psychology that terms drawn from modern American English can be unproblematically translated into exact equivalents in any language of the world—an assumption viewed as so unproblematic that the actual translations into foreign languages of study questionnaires and similar materials are hardly ever included in the “Methods” appendices of psychology journal articles. This, of course, gives fits to any of us who study languages for a living.

Such examples could be multiplied endlessly, but the take-home message is that analyzing the human mind and its products will often require both humanistic and scientific expertise. The recognition that consilience is a two-way street is not some polite concession to assuage the egos of humanistic scholars, but rather a call for humanists to be willing to collaborate with researchers from the sciences who are interested in traditional humanities issues and stand to profit from their accumulated expertise.

CONCLUSION: MOVING FROM BIVERSITIES TO UNIVERSITIES

It should be clear at this point that “second-wave” consilience calls upon researchers on *both* sides of the sciences/humanities divide to become radically more interdisciplinary. One of the primary questions explored at the workshop was how, practically, to help academics to do this—how to begin transforming Western institutions of higher learning from “biversities” into true universities, where scholars working at different levels of explanation feel comfortable exchanging information and sharing certain very general theoretical and methodological assumptions.³² Despite their variety and “disunity” (Dupré 1993), the various disciplines of the natural sciences have managed to arrange themselves in a rough explanatory hierarchy, with information and insights flowing both up and down the chain of explanation. The levels of explanation in the natural/social

32. See, especially, chapter 18 by Buchman et al.

sciences that most directly border on the humanities—such as social psychology, evolutionary psychology, cognitive science, and animal behavior—have finally advanced to a point that they both need to hear from the humanistic disciplines and have many interesting things to say in return. How do we facilitate this process?

Although a dispiriting panoply of institutional and pragmatic difficulties were identified by workshop participants, there was a general recognition that the primary barrier to such dialogue between the humanities and the sciences is a remaining wall of strong mutual distrust and incomprehension. As Bradd Shore observes concerning the miniature version of the sciences/humanities divide within his own discipline, “Faced with the criticisms and dismissals from the other, each side is convinced of the moral and intellectual rightness of their view of things. Positions harden, mutual respect wanes, and the possibility of dialogue dims” (XX). Too many scientists continue to see the humanities as disorganized, “soft” disciplines with little to offer them; too many humanists view the sciences as (at best) irrelevant to their own work, or (at worst) deeply flawed, culturally parochial discourses that threaten human values and dignity.

The invited Afterword to this volume, by Geoffrey Harpham, can be seen as both a plea for dialogue across the sciences/humanities barrier and a paradigmatic example of the sort of mutual incomprehension that allows that barrier to remain standing. Despite his claim that C.P. Snow’s caricatured “pure scientists” and “literary intellectuals” are long behind us, their ghosts reappear in Harpham’s “sneering” acolyte of scientific methodology (XX), who disdains poetry and would banish all meaning from the Academy once and for all, as well as the sensitive students of literature, poetry, and art whose adventurous imaginations are all that lie between mankind and the “profoundly impoverished, gray, savorless, and also terrifying and pathetic” (XX) future represented by the triumph of mechanistic science. Like many humanists, Harpham seems sincere in his desire for there to be more dialogue between humanists and scientists, while he remains equally convinced that humanists should continue working within their own particular mode of knowledge, their already quite fertile minds occasionally enriched by an interesting new tool tossed over the wall by the scientists working on the other side. For instance, in the EEG/fMRI study by the literary scholar, Davis, that he cites, the role of brain imaging technology seems limited to serving as a metaphor for something with which humanists are already quite familiar. The “powerful surge on the EEG graph” instigated by an engagement with creative-language use provides us with measurable, “empirical verification” of the existence of conscious self-awareness: the *Geist* in the machine that emerges when the day-to-day, mechanistic functioning of the brain machine is stymied by an encounter with the genius of Shakespeare. This rather sidesteps the deeper question of how we are to conceive of creativity and self-awareness if consciousness *is*, in fact, nothing other than the kind of electrical or blood-flow activity that can be measured by EEG and fMRI—a very profound and troubling question that is currently being explored in an interdisciplinary manner by philosopher-scientists trained on both sides of the wall.³³ Humanists need to have their basic categories fundamentally shaken up, not merely stirred.

33. See, for instance, Flanagan 2002, LeDoux 2002, Wegner 2002, Koch 2004, Searle 2004, Dennett 2005.

At the same time, we also need to resist the dystopic vision that such integration will mean the end of the humanities forever, and transform the university into a monolithic “dried cinder” of a world where poetry is reduced to math, fMRI scanners replace classrooms and books, and human spirit and creativity is suffocated by a dull grey blanket of mechanistic reasoning. As we have argued at some length earlier, the sort of nonreductive vertical integration proposed by “second-wave” consilience not only respects the relative autonomy and heuristic indispensability of human-level concepts and truths, but demands that the flow of explanation and interaction go both ways in the chain. The sciences do not merely provide some basic ontological constraints on humanistic inquiry—although they *should* do that—but also need to be guided by humanistic expertise, as well as being open, when necessary, to restructuring in light of humanistic work. Speaking of his particularly troubled discipline, Shore argues that we need “a genuinely multivocal anthropology that speaks authoritatively in several distinct and irreducible voices about the same material, and whose mode of engagement aims at expansive conversation rather than reductive simplification” (XX). It is our conviction that a proper respect for the importance of emergent level truths leads to precisely this sort of genuine multivocality, and a commitment to a unified ontology prevents such multivocality from degenerating into babble. Workshop participant Leslie Heywood and her colleagues, in a discussion of the proper role of evolutionary theory in the study of literature, argue that the framework of evolution provides precisely this sort of space for unified effort combined with multilevel, multidirectional interaction: “Evolution... becomes not the paradigm that can explain everything from a scientific point of view but rather the beginnings of a conversation about lower and upper level questions, and how these questions might inform and enrich each other’s research” (Heywood, Garcia, and Wilson 2009: 1).

“Second-wave” consilience contains space for all the disciplines that explore the complexities of human reality, acknowledging that each possesses its own conceptual tools and methods. When interlevel communication is deemed potentially appropriate and productive, it calls for non-eliminative and revealing forms of reduction—reduction that *explains* but does not *erase*. Such consilience is informed by a sophisticated model of scientific inquiry that recognizes the limitations of science without exaggerating them, and understands that the scientific study of human-level truths requires humanistic expertise on the ground floor, not merely as a source of data. It takes us beyond the nature-nurture debate by emphasizing the continuous co-evolution of mind and culture, and acknowledges the phenomenological ineradicability of mind-body dualism without reifying it into a barrier to explanations that cross the perceived mind-body divide. We hope that this volume gives some sense of the potential that such a vision of consilience promises for moving both the humanities and the sciences forward, with the desired effect of profoundly transforming both in the process.

References

- Begley, Sharon. 2009. Don’t blame the caveman. *Newsweek*, June 29: 42–47.
- Bentley, R. A., and H. D. G. Maschner. 2003. *Complex systems and archaeology*. Salt Lake City, UT: University of Utah Press.
- . 2007. “Complexity theory.” In *Handbook of archaeological theories*, ed. R. A. Bentley, H. D. G. Maschner, and C. Chippendale. Lanham, MD: AltaMira Press.

- Bloom, Paul. 2004. *Descartes' baby: How the science of child development explains what makes us human*. New York: Basic Books.
- Boyd, Brian, Joseph Carroll, and Jonathan Gottschall, eds. 2010. *Evolution, literature & film: A reader*. New York: Columbia University Press.
- Boyer, Pascal. 1994. "Cognitive constraints on cultural representations: Natural ontologies and religious ideas." In *Mapping the mind: Domain-specificity in culture and cognition*, ed. L. A. Hirschfeld and S. Gelman. New York: Cambridge University Press.
- Brooks, David. 2009. Human nature today. *New York Times*, June 25: A25.
- Carroll, Joseph. 2008. An evolutionary paradigm for literary study. *Style* 42 (2–3): 103–135.
- Carruthers, Peter, Stephen Laurence, and Stephen Stich, eds. 2005. *The innate mind: Structure and contents*. Vol. 1. New York: Oxford University Press.
- , eds. 2007. *The innate mind: Culture and cognition*. Vol. 2. New York: Oxford University Press.
- , eds. 2008. *The innate mind: Foundations and the future*. Vol. 3. New York: Oxford University Press.
- Chalmers, David John. 1996. *The conscious mind: In search of a fundamental theory, Philosophy of mind series*. Oxford: Oxford University Press.
- Cho, Francisca, and Richard Squier. 2008. He blinded me with science: Science chauvinism in the study of religion. *Journal of the American Academy of Religion* 76 (2): 420–448.
- Churchland, P.M. 1979. *Scientific realism and the plasticity of mind*. Cambridge: Cambridge University Press.
- Cooper, D.E. 2006. "Truthfulness and 'inclusion' in archaeology." In *The ethics of archaeology: Philosophical perspectives on archaeological practice*, ed. C. Scarre and G. Scarre. New York: Cambridge University Press.
- Corbey, Raymond. 2005. *The metaphysics of apes: Negotiating the animal-human boundary*. New York: Cambridge University Press.
- Crespi, Bernard, and Christopher Badcock. 2008. Psychosis and autism as diametrical disorders of the social brain. *Behavioral and Brain Sciences* 31: 284–320.
- Crick, Francis. 1994. *The astonishing hypothesis: The scientific search for the soul*. New York: Simon & Schuster.
- D'Andrade, R.G. 1995. Moral models in anthropology. *Current Anthropology* 36: 399–408.
- Dancygier, Barbara. 2006. What can blending do for you? *Language and Literature* 15: 5–15.
- Dawkins, Richard. 1976/2006. *The selfish gene*. 30th Anniversary Edition ed. Oxford: Oxford University Press.
- Dennett, Daniel. 1987. *The intentional stance*. Cambridge, Mass.: MIT Press.
- . 1995. Darwin's dangerous idea: Evolution and the meaning of life. New York: Simon & Schuster.
- . 2003. *Freedom evolves*. New York: Viking.
- . 2005. *Sweet dreams: Philosophical obstacles to a science of consciousness*. Cambridge, MA: MIT Press.
- . 2009. Darwin's "strange inversion of reasoning." *Proceedings of the National Academy of Science* 106(1): 10061–10065.
- Dupré, John. 1993. *The disorder of things: Metaphysical foundations of the disunity of science*. Cambridge, MA: Harvard University Press.
- Fauconnier, Gilles, and Mark Turner. 2002. *The way we think: Conceptual blending and the mind's hidden complexities*. New York: Basic Books.
- Feyerabend, Paul. 1993. *Against method*. 3rd ed. New York: Verso.

- Flanagan, Owen. 2002. *The problem of the soul: Two visions of mind and how to reconcile them*. New York: Basic Books.
- Foucault, Michel. 1978. *The history of sexuality, vol. 1: An introduction*. Translated by R. Hurley. New York: Random House.
- Geertz, Clifford. 1973. *The interpretation of cultures: Selected essays*. New York: Basic Books.
- Gottschall, Jonathan, and David Sloan Wilson, eds. 2005. *The literary animal: Evolution and the nature of narrative*. Chicago: Northwestern University Press.
- Haidt, Jonathan. 2001. The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review* 108 (4): 814–34.
- Henrich, Joseph, and Richard McElreath. 2007. Dual inheritance theory: The evolution of human cultural capacities and cultural evolution. In *Oxford handbook of evolutionary psychology*, eds. R. Dunbar and L. Barrett. Oxford: Oxford University Press.
- Henrich, Joseph, Samuel Bowles, Eric. A. Smith, Peyton Young, Robert Boyd, Karl Sigmund, Peter Richerson, and Astrid Hopfensitz. 2003. “The cultural and genetic evolution of human cooperation.” In *Genetic and cultural evolution of cooperation*, ed. P. Hammerstein. Cambridge: MIT Press.
- Henrich, Joseph, Steven Heine, and Ara Norenzayan. 2010. The weirdest people in the world? *Behavioral & Brain Sciences* 33 (2–3): 61–83.
- Heywood, Leslie, Justin Garcia, and David Wilson. 2009. Mind the gap: Appropriate evolutionary perspectives toward the integration of the sciences and humanities. *Science & Education* 19 (4): 505–522.
- Kenrick, Douglas. 2006. Evolutionary psychology: Resistance is futile. *Psychological Inquiry* 17: 102–109.
- Koch, Christof. 2004. *The quest for consciousness: A neurobiological approach*. New York: Roberts & Co.
- Kuhn, Thomas. 1962/1970. *The structure of scientific revolutions*. 2nd ed. Chicago: University of Chicago Press.
- . 1970. Reflections on my critics. In *Criticism and the growth of knowledge*, edited by I. Lakatos and A. Musgrave. Cambridge: Cambridge University Press.
- Lakoff, George, and Mark Johnson. 1999. *Philosophy in the flesh: The embodied mind and its challenge to western thought*. New York: Basic Books.
- Latour, Bruno, and Steve Woolgar. 1979/1986. *Laboratory life: The construction of scientific facts*. 2nd ed. Princeton: Princeton University Press.
- Laudan, Larry. 1996. *Beyond positivism and relativism: Theory, method, and evidence*. Boulder, CO: Westview Press.
- Lawson, E. Thomas, and Robert N. McCauley. 1990. *Rethinking religion: Connecting cognition and culture*. Cambridge: Cambridge University Press.
- LeDoux, Joseph. 2002. *Synaptic self: How our brains become who we are*. New York: Macmillan.
- Lewis, H.S. 1999. The misrepresentation of anthropology and its consequences. *American Anthropologist* 100: 716–731.
- Locke, John. 1690/1975. *An essay concerning human understanding*. Oxford: Clarendon.
- McCauley, Robert. 2007. “Reduction: Models of cross-scientific relations and their implications for the psychology-neuroscience interface.” In *Handbook of the philosophy of science: Philosophy of psychology and cognitive science*, edited by P. Thagard. Amsterdam: Elsevier.
- . 2008. Respondent, panel on “Cognitive science of religion: What is it and why is it important?” In *American Academy of Religion Annual Meeting, Cognitive Science of Religion Consultation*. Chicago, IL.

- McCauley, Robert, and E. Thomas Lawson. 2002. *Bringing ritual to mind*. Cambridge: Cambridge University Press.
- Menand, Louis. 2005. Dangers within and without. *Modern Language Association, Profession* (2005): 10–17.
- Mithen, Steven J. 1996. *The prehistory of the mind*. London: Thames & Hudson.
- Nichols, Shaun. 2004. *Sentimental rules: On the natural foundations of moral judgment*. New York: Oxford University Press.
- Nietzsche, Friedrich. 1886/1966. *Beyond good and evil*. Trans. W. Kaufmann. New York: Vintage.
- Nisbett, Richard E. 2003. *The geography of thought: How Asians and Westerners think differently... And why*. New York: The Free Press.
- Nisbett, Richard E., Kaiping Peng, Incheol Choi, and Ara Norenzayan. 2001. Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review* 108 (2): 291–310.
- Pinker, Steven. 2002. *The blank slate: The modern denial of human nature*. New York: Viking.
- Prinz, Jesse. 2007. *The emotional construction of morals*. New York: Oxford University Press.
- Putnam, Hilary. 1999. *The threefold cord: Mind, body, and world*. New York: Columbia University Press.
- Richerson, Peter, and Robert Boyd. 2005. *Not by genes alone: How culture transformed human evolution*. Chicago, IL: University of Chicago Press.
- Rorty, Richard. 1998. Against unity: A review of E.O. Wilson's *Consilience*. *The Wilson Quarterly* 22(1): 28–38.
- Ryle, Gilbert. 1971. "The thinking of thoughts: What is "le penseur" doing?" In *Collected papers*. London: Hutchinson and Co.
- Schaller, Mark, and Christian Crandall, eds. 2004. *The psychological foundations of culture*. Mahwah, NJ: Lawrence Erlbaum.
- Schaller, Mark, Ara Norenzayan, Steven Heine, Toshio Yamagishi, and Tatsuya Kameda, eds. 2010. *Evolution, culture, and the human mind*. New York: Psychology Press.
- Scheper-Hughes, N. 1995. The primacy of the ethical: Propositions for a militant anthropology. *Current Anthropology* 36: 409–420.
- Searle, John. 2004. *Mind: A brief introduction*. New York: Oxford University Press.
- Segerstråle, Ullica. 2000. *Defenders of the truth: The battle for sociobiology and beyond*. New York: Oxford University Press.
- Shanks, M., and C. Tilley. 1987. *Reconstructing archaeology*. New York: Cambridge University Press.
- Simonton, Dean Keith. 2009. Varieties of (scientific) creativity: A hierarchical model of domain-specific disposition, development, and achievement. *Perspectives on Psychological Science* 4: 441–452.
- Slingerland, Edward. 2008a. *What science offers the humanities: Integrating body & culture*. New York: Cambridge University Press.
- . 2008b. Who's afraid of reductionism? The study of religion in the age of cognitive science. *Journal of the American Academy of Religion* 76 (2): 375–411.
- . (in preparation). *Body, mind and religion in early China: Beyond the myth of holism*.
- Smith, Barbara Herrnstein. 2006. *Scandalous knowledge: Science, truth and the human*. Durham, NC: Duke University Press.
- Snow, C.P. 1959/1993. *The two cultures*. New York: Cambridge University Press.
- Sperber, Dan, and Lawrence A. Hirschfeld. 2004. The cognitive foundations of cultural stability and diversity. *Trends in Cognitive Sciences* 8(1): 40–46.
- Tanaka, Jiro. (under review). Autism, psychosis, and the two cultures. In *The evolutionary review*, ed. A. Andrews and J. Carroll. Albany, NY: State University of New York Press.

- Taylor, Charles. 1989. *Sources of the self: The makings of modern identity*. Cambridge, MA: Harvard University Press.
- . 2007. *A secular age*. Cambridge, MA: Harvard University Press.
- Tooby, John, and Leda Cosmides. 1992. “The psychological foundations of culture.” In *The adapted mind: Evolutionary psychology and the generation of culture*, eds. J. Barkow, L. Cosmides, and J. Tooby. New York: Oxford University Press.
- Wegner, Daniel. 2002. *The illusion of conscious will*. Cambridge, MA: MIT Press.
- Wilson, D. S. 1975. Theory of group selection. *Proceedings of the National Academy of Sciences of the United States of America* 72 (1): 143–146.
- Wilson, David Sloan. 2002. *Darwin’s cathedral: Evolution, religion, and the nature of society*. Chicago: University of Chicago.
- . 2006. “Human groups as adaptive units: Toward a permanent consensus.” In *The innate mind: Culture and cognition*, ed. P. Carruthers, S. Laurence, and S. Stich. New York: Oxford University Press.
- Wilson, E. O. 1998. *Consilience: The unity of knowledge*. New York: Knopf.
- . 1975/2000. *Sociobiology: The new synthesis 25th Anniversary Edition ed.* Cambridge, MA: Harvard University Press.
- Wolf, Eric. 1964. *Anthropology*. Englewood Cliffs, NJ: Prentice Hall.